

WARNING

THE FOLLOWING SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID PERSONAL INJURY, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO.

PLEASE CHECK FOR CHANGE INFORMATION AT THE REAR OF THIS MANUAL.



INSTRUCTION MANUAL

Tektronix, Inc. P.O. Box 500 Beaverton, Oregon 97077 070-2874-01 Product Group 42

Serial Number

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SAFETY SUMMARY

The general safety information contained in this summary is for servicing personnel. Specific warnings and cautions will be found throughout the manual where they apply and should be followed in each instance.

TERMS

IN THIS MANUAL

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

AS MARKED ON EQUIPMENT

CAUTION indicates a personal injury hazard not immediately accessible as one reads the marking, or a hazard to property including the equipment itself.

DANGER indicates a personal injury hazard immediately accessible as one reads the marking.

SYMBOLS

IN THIS MANUAL



Static-Sensitive Devices.

This symbol indicates where applicable cautionary or other information is to be found.

AS MARKED ON EQUIPMENT



DANGER-High voltage.

Protective ground (earth) terminal.

ATTENTION---refer to manual.

WARNINGS

POWER SOURCE

This product is intended to operate from a power source that will not apply more than 250 volts rms between the supply conductors or between either supply conductor and ground. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

USE THE PROPER POWER CORD

Use only the power cord and connector specified for your instrument. Use only a power cord that is in good condition.

For detailed information on power cords, see page 1-3.

GROUNDING THE INSTRUMENT

This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before connecting to the input or output terminals of the instrument. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

DANGER ARISING FROM LOSS OF GROUND

Upon loss of the protective-ground connection, all accessible conductive parts (including knobs and controls that may appear to be insulating), can render an electric shock.

USE THE PROPER FUSE

To avoid fire hazard, use only the fuse specified in the parts list for your product, and which is identical in type, voltage rating, and current rating.

DO NOT OPERATE IN EXPLOSIVE ATMOSPHERES

To avoid explosion, do not operate this product in an atmosphere of explosive gases unless it has been specifically certified for such operation.

DO NOT SERVICE ALONE

Do not perform internal service or adjustment of this product unless another person capable of rendering first aid and resuscitation is present.

USE CARE WHEN SERVICING

Dangerous voltages exist at several points in this instrument when power is applied. Furthermore, dangerous potentials may be present in the power supply and crt circuits for quite some time after the power has been turned off. To avoid personal injury, do not touch exposed connections and components while power is on and, when servicing power-supply and crt are properly discharged.

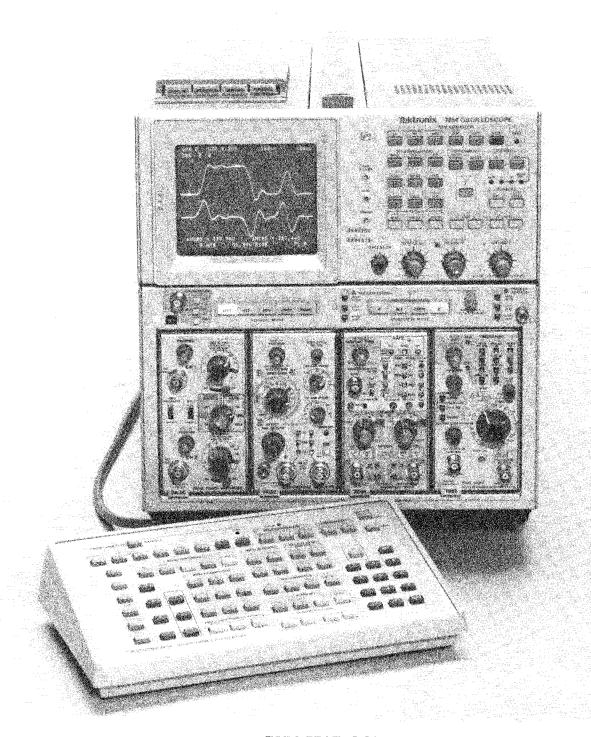
Disconnect power before removing protective panels, soldering or replacing components.

CRT HANDLING

Use care when handling a crt. Breakage of the crt causes a high-velocity scattering of glass fragments (implosion). Protective clothing and safety glasses should be worn. Avoid striking the crt on any object which might cause it to crack or implode. When storing a crt, place it in a protective carton or set it face down in a protected location on a smooth surface with a soft mat under the faceplate.

SILICONE GREASE HANDLING

Handle silicone grease with care. Avoid getting the silicone grease in your eyes. Wash hands thoroughly after use.



7854 FEATURES

The TEKTRONIX 7854 Oscilloscope with Waveform Calculator combines the features of a high-performance plug-in oscilloscope with a waveform-oriented dedicated-function digital processor.

The waveform processor provides equivalent-time sampled digitizing of waveforms to 400 megahertz equivalent-time bandwidth. The processor can be operated from either keyboard (front-panel measurement keyboard or detachable Waveform Calculator keyboard) or remotely over the GPIB (General Purpose Interface Bus).

Programming, consisting of a series of commands stored for later execution, is available to simplify measurements which must be repeated. Editing and execution is controlled either from the Waveform Calculator or the GPIB.

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GENERAL INFORMATION

This section contains a basic description of the Service Manual content, information on instrument installation, power and power cord requirements, operating temperature considerations, packaging for shipment, and instrument repair services.

SERVICE MANUAL

The following is a brief description of the information contained in this manual.



THE SERVICE MANUAL CONTAINS INSTRUCTIONS FOR USE BY QUALIFIED SERVICE PERSONNEL ONLY. TO AVOID PERSONAL INJURY, DO NOT PERFORM ANY SERVICING UNLESS YOU ARE QUALIFIED TO DO SO.

Section 1—General Information contains installation instructions, operating temperature considerations, Tektronix Field Service, and instrument packaging information.

Section 2—Theory of Operation contains a basic block diagram description and a detailed circuit analysis that may be useful for servicing or operating the instrument.

Section 3—Maintenance describes routine and corrective maintenance procedures with detailed instructions for troubleshooting the analog circuits. Diagnostic troubleshooting equipment and procedures can be purchased separately, or refer repair to your Tektronix Field Office.

Section 4---Calibration contains procedures to check the operational performance and electrical characteristics of the instrument. A performance check summary provides a cross reference between the specifications and related adjustment procedures.

Section 5—Instrument Options contains a description of available options and locations of incorporated information for these options.

Section 6—Replaceable Electrical Parts contains information necessary to order replaceable parts and assemblies related to the electrical functions of the instrument. Section 7-Diagrams and Circuit Board Illustrations includes detailed circuit schematics, locations of assembled boards within the instrument, voltage and waveform information, circuit board component locators, and locations of adjustments to aid in the performance of the Adjustment and Performance check portion of the Calibration procedure.

Section 8—Replaceable Mechanical Parts includes information necessary to order replaceable mechanical parts and shows exploded drawings which identify assemblies.

7854 RELATED DOCUMENTATION

In addition to the 7854 Service Manual, other publications are available; they include the Operators Manual, Diagnostic Manual Package and Data Sheets.

Operators Manual

The 7854 Operators manual contains installation instructions, specifications and operating information for the scope display, measurement and waveform calculator keyboard, GPIB, options and command language.

Diagnostic Manual Package

The information necessary for troubleshooting the digital portion of the 7854 Oscilloscope consists of several individually part numbered documents combined in an orderly fashion to produce a "Diagnostic Manual Package".

"7854 Diagnostic Troubleshooting Using 067-0911-XX Diagnostic Test Interface" is the principal manual and is bound in a 3-ring binder to enable insertion of the other support documents at their appropriate locations. Other support documents include supplement manuals and data sheets.

Supplement Manuals. The supplementary manuals "7854 Signature Analysis Tables Using 067-0911-XX Diagnostic Test Interface" (Part number 070-2922-XX) and "Test Procedures for 7854 Diagnostic Trouble-shooting Using 067-0911-XX Diagnostic Test Interface" (Part number 070-2875-XX) should be inserted behind the Primary Manual's "Signature Tables" and "Test Procedures" tabs respectively.

General Information-7854

The manual for the "Diagnostic Memory Board (067-0961-XX)" contains service information for the special circuit board containing the diagnostic firmware for troubleshooting the 7854.

Data Sheets (For Support-Related Test Fixtures). Data sheets for diagnostic related hardware include the following:

7854 Analog Test Board (067-0912-00)—See application under Analog Troubleshooting Equipment in Section 3, Maintenance.

7854 Extender Board, 44-Pin (067-0913-00)---See application under Digital Troubleshooting Equipment in Section 3, Maintenance.

7854 Extender Board, 80-Pin (067-0914-00)—See application under Digital Troubleshooting Equipment in Section 3, Maintenance.

7854 Extender Board, 124-Pin (067-0915-00)---See application under Digital Troubleshooting Equipment in Section 3, Maintenance.

INSTALLATION

INITIAL INSPECTION

This instrument was inspected both mechanically and electrically before shipment from the factory to be free of mars or scratches and to meet or exceed all electrical specifications. Upon receipt, inspect the instrument for any physical damage which may have been incurred in transit. Then, refer to the Performance Check Procedure in the Calibration section of this Manual to verify the electrical performance of the instrument. If mechanical damage or performance deficiencies are found, contact your local Tektronix Field Office or representative.

POWER SOURCE INFORMATION

This instrument will operate from either a 115-volt or 230-volt nominal line-voltage source, 48 to 440 hertz.

Operating Voltage

The LINE VOLTAGE SELECTOR switch (located on the rear panel of the 7854 Oscilloscope mainframe) allows selection of 115-volt or 230-volt nominal line voltage operation. To select the correct nominal line voltage, first change the power cord and plug to match the power-source receptacle (if necessary). Then, use a small screwdriver to move the LINE VOLTAGE SELECTOR switch to the desired range.

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To prevent damage to the instrument, always check the settings of the LINE VOLTAGE SELECTOR switch located on the rear panel of the 7854 Oscilloscope mainframe before connecting the instrument to the line-voltage source.

Power Cord Information

A power cord with the appropriate plug configuration is supplied with each instrument. For your convenience the color-coding of the power cord conductors is given in Table 1-1. Also, should you require a power-cord plug other than that supplied, refer to the Power-Cord and Plug Identification Table 1-2.

Power-Cord	Conductor	Identification	
	 	Alternate	JACON DESIGNATION

TADIC 1 1

Conductor	Color	Alternate Color
Ungrounded (Line)	Brown	Black
Grounded (Neutral)	Light Blue	White
Grounding (Protective Ground)	Green/Yellow	Green/Yellow

WARNING

This instrument operates from a single-phase power source, and has a detachable threewire power cord with a two-pole, threeterminal grounding-type plug. The voltage to ground (earth) from either pole of the power source must not exceed the maximum rated operating voltage, 250 volts.

Before making connection to the power source, determine that the instrument is adjusted to match the voltge of the power source, and has a suitable plug (two-pole, three-terminal, grounding type).

This instrument is safety class 1 equipment (IEC* designation). All accessible conductive parts are directly connected through the grounding conductor of the power cord to the grounding contact of the power cord. Therefore, the power plug must only be inserted in a mating receptacle with a grounding contact. Do not defeat the grounding connection. Any interruption of the grounding connection can create an electric shock hazard.

For electric shock protection, the grounding connection must be made before making connection to the instrument's input or output terminals.

*International Electrotechnical Commission

TABLE 1-2					
Power-Cord	And	Plug	Identification	Information	

Plug Configuration	Usage	Nominal Line-Voltage (AC)	Reference Standards	Option #
E C	North American 120V/15A	115 V	¹ ANSI C73.11 ² NEMA 5-15-P ³ IEC 83	STANDARD
	Universal Euro 250V/10-16A	230 V	⁴ CEE (7), Ⅱ, Ⅳ, ⅥI ³ IEC 83	A1
	UK 240V/13A	230 V	⁵ BS 1363 ³ IEC 83	A2 _
E F	Australian 240V/10A	230 V	⁶ AS C112	A3
STATE TO	North American 240V/15A	230 V	¹ ANSI C73.20 ² NEMA 6-15-P ³ IEC 83	Α4

ANSI-American National Standards Institute

²NEMA—National Electrical Manufacturer's Association

³IEC—International Electrotechnical Commission

⁴CEE-International Commission on Rules for the Approval of Electrical Equipment

Memory Back-up Power

Two female banana jacks (on the rear panel of the 7854 Oscilloscope mainframe) allow application of about 6.25 V dc (0.7 A maximum) to provide back-up power for the volatile storage devices used for processor memory. The instrument is fuse protected for application of any voltages applied to the MEMORY BACK-UP POWER INPUT up to +50 volts (dc plus peak ac). When power is first applied to the MEMORY BACK-UP POWER INPUT the associated red indicator lights to indicate that the fuse has not blown.

To prevent loss of data from memory due to a power failure, apply memory back-up power.

POWER-UP CONDITIONS

When the 7854 is turned on (without memory backup power applied), the digital processor runs four selfchecking tests. Although these tests are not all-inclusive, they indicate if major portions of the processor are working properly. The self-test sequence outlined below begins when power is applied to the 7854. ⁵BS—British Standards Institution

⁶AS--Standards Association of Australia

Step 1: When power is applied the following indicators will light: POWER, selected positions of the A and B TRIGGER SOURCE switches, and all selected indicators on the plug-in units. For approximately three seconds after power-up the following indicators will remain off: all positions of the VERTICAL and HORIZONTAL MODE switches, all intensity indicators, all red front-panel (measurement keyboard) and Waveform Calculator indicators.

- Step 2: All positions of the VERTICAL and HORIZONTAL MODE switches, all Intensity indicators, and all red-front-panel and Waveform Calculator indicators will now light.
- Step 3: A fault condition found through any of the four tests is indicated with the lights of the VERTICAL and HORIZONTAL MODE switches. Fault condition codes are listed in Table 1-3. Be sure to note the code received so that you may more fully inform the service person about the trouble.

If a fault code occurs, press any button of the VERTICAL or HORIZONTAL MODE switches and the self-testing will continue. Then, refer to the Performance Check Procedure in the Calibration section of this Manual to verify the electrical performance of the instrument.

Step 4: Successful completion of the self tests is indicated by the issuance of the audible warning tone (if the rear-panel AUDIBLE WARNING switch is ON), and the extinguishing of all red indicators, the S and A Intensity indicators, all VERTICAL MODE lights except LEFT, and all HORIZONTAL MODE switch lights except B. In addition, if the READOUT intensity control is set to about midrange, the message SELF TEST COMPLETE will be displayed on the crt.

TABLE 1-3 Self-Test Fault Codes

VERTICAL MODE Indicator Status	HORIZONTAL MODE Indicator Status	Circuitry With Fault
All lights on.	B light on.	RAM
All lights on.	CHOP light on.	ROM
All lights on.	CHOP and B lights on.	Real-time Clock
All lights on.	ALT light on.	Display

PRESET CONDITIONS

After successful completion of the processor self tests, several parameters of the 7854 are set to predetermined conditions. These power-up conditions are:

CRT DISPLAY mode Set to SCOPE
Program Mode Set to EXECUTE
Program MemoryCleared
VERTICAL MODE Set to LEFT
HORIZONTAL MODE Set to B
Stored Waveform Display Not displayed;
set to VECTors
P/W (Points/Waveform) Set to 512
Stack RegistersCleared to 0
OPW (Operational Waveform) Set to 0
All waveform memory points Set to the
zero value (center horizontal
graticule line)
VZR (Vertical Zero Reference)Set to 0
(all waveform memories)
Vertical Scale FactorSet to 1 (all
waveform memories)

Vertical Scale Factor UnitSet to V (all			
waveform memories)			
Horizontal Scale Factor Set to 1 (all			
waveform memories)			
Horizontal Scale Factor UnitSet to S (all			
waveform memories)			
Constant RegistersSet to 0			
TTL OutputSet HIGH			
RSV Control FlagsSet ON			

OPERATING POSITION

A bail-type stand, mounted on the bottom of the mainframe, permits the instrument to be tilted up about 10° for more convenient crt viewing.

OPERATING TEMPERATURE

The 7854 can be operated in ambient air temperatures between 0° and $+50^{\circ}$ C, and can be stored in ambient temperatures from -55° to $+75^{\circ}$ C. After being stored in temperatures outside the operating limits, allow the chassis temperature to return to within the operating limits before applying power.

The 7854 Oscilloscope mainframe is cooled by air drawn in through holes in the top, side, and bottom cabinet panels and blown out through the fan exhaust. To ensure proper instrument cooling, maintain the clearance provided by the feet on the bottom cabinet panel, and allow at least 2 inches of clearance at the top, sides, and rear of the instrument.

If the internal temperature of the mainframe exceeds a safe operating level, a thermal cutout will repeatedly interrupt the instrument power supply. This condition stops when the temperature returns to a safe level.

TEKTRONIX FIELD SERVICE

Tektronix Field Service Centers and the Factory Service Center provide instrument repair and adjustment services. Contact your Tektronix Field Office or representative for further information.

PACKAGING FOR SHIPMENT

If this instrument is to be shipped for long distances by commercial transportation, we recommend that the instrument be packaged in the original manner. The cartons and packaging material in which your instrument was shipped should be saved and used for this purpose. Also, if this instrument is to be shipped to a Tektronix Service Center for service or repair, attach a tag to the instrument showing the following: Owner of the Instrument (with address), the name of a person at your firm who can be contacted, and the complete instrument type and serial number. Also, list the Diagnostic Firmware number, and the Signature Table number (indicated on the rear-panel SERVICE IDENTIFICATION tag). Provide a description of the service required.

If the original packaging is unfit for use or not available, package the instrument as follows:

1. Obtain a corrugated cardboard carton with a 375 pound test strength (for the Mainframe) or a 200 pound test strength (for the Waveform Calculator), and having inside dimensions of no less than six inches more than the instrument dimensions; this allows for cushioning.

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2. Surround the instrument with polyethylene sheeting to protect the finish.

3. Cushion the instrument on all sides by tightly packing dunnage or urethane foam between the carton and the instrument, allowing three inches on all sides.

4. Seal the carton with shipping tape or with an industrial stapler.

5. Mark the address of the Tektronix Service Center and your return address on the carton in one or more prominent locations.

THEORY OF OPERATION

This section describes the circuitry used in the 7854 Oscilloscope mainframe. The description begins with a discussion of the instrument, using the block diagram shown in Figure 2-1. Next, each circuit is described in detail with supporting illustrations, when appropriate, to show the relationship between the stages in each major circuit. Detailed schematics of each circuit are located in the Diagrams section at the rear of this manual. Refer to these schematics throughout the following circuit description for specific values and relationships.

BLOCK DIAGRAM

The following discussion is provided to aid in understanding the overall concept of the 7854 before the individual circuits are discussed in detail. A basic block diagram of the 7854 is shown in Figure 2-1. Only the basic interconnections between the individual blocks are shown on this diagram. Each major circuit within the instrument is given a block. The number of each block refers to the complete circuit diagram located at the rear of this manual.

DESCRIPTION

The Main Interface circuit connects vertical and horizontal signals from the plug-in compartment to the vertical and horizontal deflection systems.

Vertical signals to be displayed on the crt (cathode-ray tube) are applied to the Vertical Channel Switch circuit from both vertical plug-in compartments. The front panel VERTICAL MODE switch determines whether the signals from the LEFT VERT or RIGHT VERT compartments are displayed on the crt. At this point the signal path is split into an analog and a digital path. For the analog path, the selected vertical signal(s) passes through a Delay Line and is then amplified by the Vertical Amplifier circuits to bring it to the level necessary to drive the vertical deflection plates of the crt. The digital path begins with the Vertical Pickoff Amplifier which converts the pushpull signals applied to it from the Vertical Channel Switch to the single-ended signal required by the Vertical Sampler circuit. After some digital processing, which will be more fully explained later, the signal may be applied to the Vertical Amplifier from the Display D/A and Amplifier circuit along with alphanumeric readout signals to produce the required vertical deflection for display of stored waveforms and readout characters.

Horizontal signals for the crt display are connected to the Horizontal Channel Switch circuit from both horizontal plug-in compartments. The HORIZONTAL MODE switch determines whether the signals from the A HORIZ or B HORIZ units are displayed by the crt. Here, as in the vertical system, the signal path is split into an analog and a digital path. For the analog path, the selected horizontal signal(s) are amplified by the Horizontal Amplifier circuit which provides horizontal deflection to the crt. The Horizontal Pickoff amplifier converts the push-pull signals from the Horizontal Channel Switch to the singleended signal required by the Horizontal Sampler circuit. After signal processing similar to that of the vertical system, stored waveform and alphanumeric readout deflection signals may be applied to the Horizontal amplifier by the Display D/A and Amplifier circuit when a display of that type is required.

The Readout Acquire circuit and the Display D/A and Amplifier circuit provide an alphanumeric display of information encoded by the plug-in units. The readout display is written on the crt on a time-shared basis with the analog or stored waveform display. The front-panel Mode switches and the Microprocessor circuits determine which plug-in units display readout information.

The internal trigger signals from the vertical plug-in units are connected to the A and B Trigger Selector circuits. The Mode Switch and Trigger Selector circuits direct trigger signals from the LEFT VERT or RIGHT VERT units to the A HORIZ or B HORIZ units.

The Mainframe Logic circuit develops control signals for use in other circuits within this instrument and the plugin units. These control signals automatically determine the correct instrument operation in relation to the plug-in units, the plug-in unit control settings, and the 7854 control settings.

The CRT Circuit contains the control circuits necessary for operation of the crt. The Z-Axis Amplifier provides the drive signal to control the intensity level of the crt display.

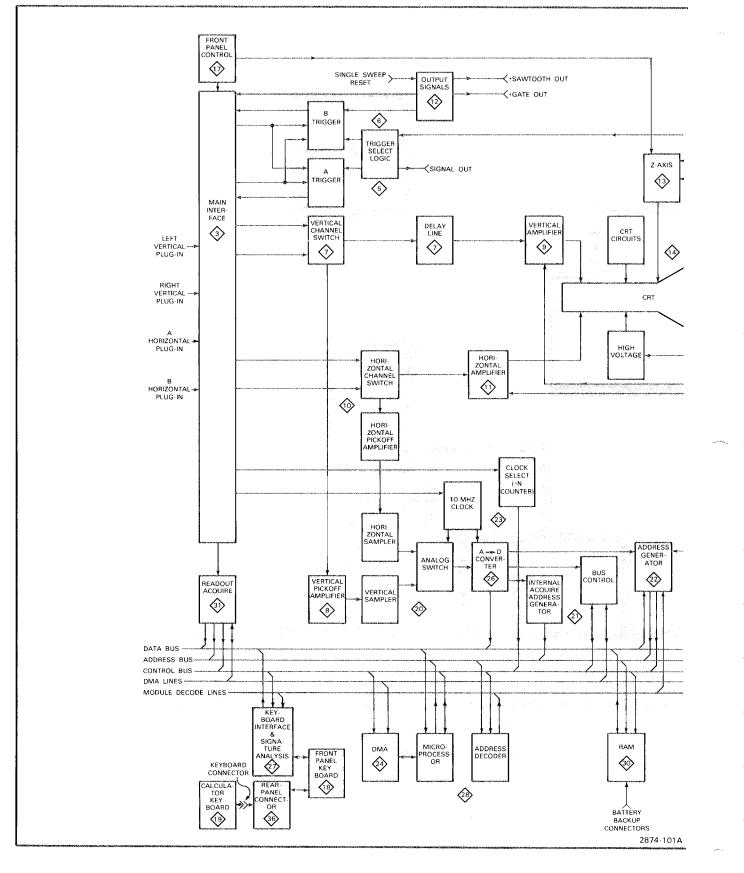
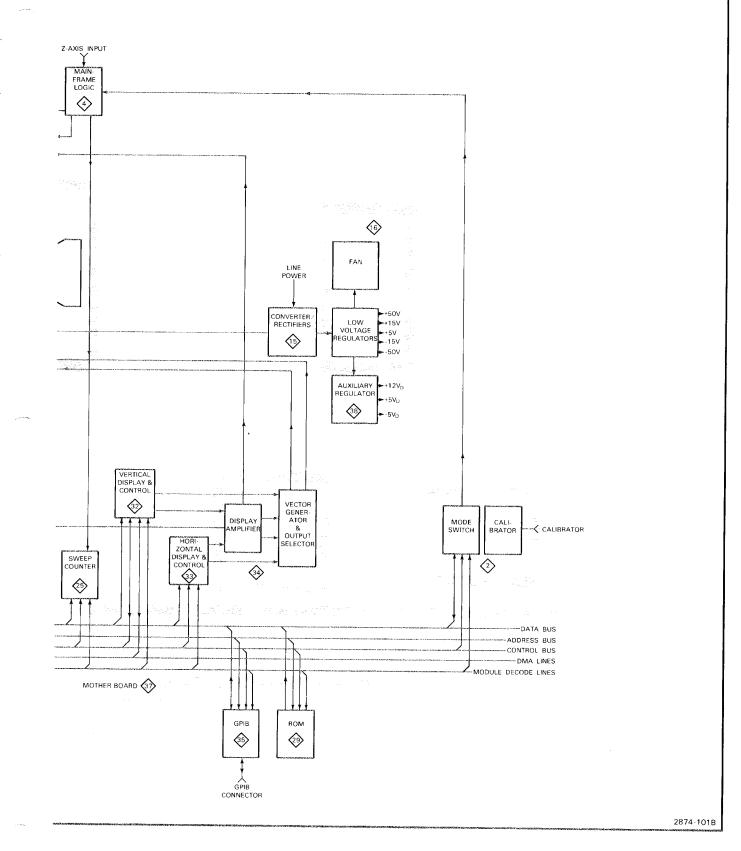


Figure 2-1. Block Diagram

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2-3

Theory of Operation-7854

The Calibrator circuit produces a 1-kilohertz square-wave signal which can be used to check the calibration of this instrument and the compensation of probes. The calibrator signal is available as a voltage at the CALIBRATOR connector or as a current through a 40 milliampere optional current loop accessory.

The Output Signals circuit processes signals from the plug-in units for rear-panel output.

The Converter/Rectifiers and Low-Voltage Regulator circuits provide the power necessary to operate this instrument. The voltages are connected to all circuits within the instrument. The crt circuit contains a high-voltage power supply that provides accelerating potential for the crt.

The Auxilliary Regulator circuit regulates existing supply voltages down to the potentials required by the digital portion of this instrument.

The Front Panel Controls circuit provides for user control and adjustment of crt beam and readout intensity as well as other functions such as trace FOCUS and trace BEAMFINDER.

The Front Panel Keyboard circuit provides user control of the functions performed by the microprocessor in this instrument. Pushbutton switches on the front panel provide this user-to-machine interface. The external Calculator Keyboard is similar to the Front Panel Keyboard in that it provides user interface to the instrument microprocessor through a pushbutton keyboard. This keyboard must be connected to the instrument through the Rear Panel Connector circuit which also provides GPIB interface connectors for this instrument.

The Keyboard Interface and Signature Analysis circuit provides the electrical scanning necessary for the reading of the above mentioned keyboards. It also generates the signature analyzer clock and the associated control levels required to use a signature analysis system for troubleshooting this instrument.

The Mother Board provides the majority of interconnection within the digital portion of this instrument. Up to seven individual boards controlling various operations of the 7854 may be plugged into the Mother Board.

The Microprocessor and Control circuit is the control center of the digital portion of this instrument. All numerical and waveform manipulation as well as data storage and display are either performed or controlled directly or indirectly by this circuit.

The Readout Acquire circuit "reads" the step-analog plug-in data, representing vertical deflection factors, horizontal sweep rate, etc., and encodes it into a digital format. This digitial information is later processed and results in a crt display of one or more alphanumeric characters representative of the plug-in(s) setup conditions.

The Vertical and Horizontal Sampler circuit samples, stores, and buffers, instantaneous analog voltage levels from the Vertical and Horizontal Pickoff Amplifier circuits to the Digitizer so they may later be displayed on the crt. These samples, when displayed with other similar samples, represent a waveform derived over one or more crt sweep intervals.

The Digitizer circuit accepts the buffered analog voltage levels from the Vertical and Horizontal Sampler circuit and converts them to ten-bit digital words. The Digitizer Control Logic circuit, in conjunction with the Address Generator circuit, generates the addresses necessary to store this data for later use. It also generates the control levels necessary for the digitizer system to request and assume control of instrument busses to facilitate this storage. A special burst clock is required by the digitizer system when digitizing and is produced by the Digitizer Clock circuit. As the digitizer system digitizes a waveform, the Digitizer Sweep Counter detects when a complete sweep has occured. After a complete sweep has been detected, the microprocessor determines when the digitizer system has acquired enough points to adequately represent the waveform being digitized, depending on the resolution (points per waveform) desired.

The DMA Control circuit generates the timing sequence and control levels necessary for DMA (direct memory access) devices internal to the 7854 to take control of the instrument busses.

The GPIB (general purpose interface bus) circuit allows the 7854 Oscilloscope to be used in multiple instrument GPIB configurations. This circuit provides the communications and control interface necessary to GPIB operation.

The ROM and RAM circuits provide the permanent and temporary memory required for proper operation of this instrument.

Together, the Vertical and Horizontal Display and Control circuits provide the proper control voltages for operation of oscilloscope deflection and Z-Axis Amplifier circuitry when displaying digitally processed waveforms or characters. The Display D/A and Amplifier circuit converts the stored digⁱ⁺al data representing waveform or character information to analog voltage levels to facilitate vertical and horizontal reflection of the crt beam.

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DETAILED CIRCUIT OPERATION

This portion of the Theory of Operation section provides a detailed description of the electrical operation and relationship of the circuits in the 7854. The theory of operation for circuits unique to this instrument is described in detail in this discussion. Circuits commonly used in the electronics industry are not described in detail.

The following circuit analysis is accompanied by supporting illustrations that give the names of the individual stages within the major circuits, and show how they are connected together to form the major circuit. These illustrations also show the inputs and outputs for each circuit and the relationship of the front-panel controls to the individual stages. The detailed circuit diagrams from which the illustrations are derived are shown in the Diagrams section.

TEKTRONIX DRAFTING CONVENTION

At Tektronix, logic symbols on schematics are drawn according to the function performed by the device in its particular application. By so doing, some deviations from the manufacturer's assigned symbology occur (although device electrical function is identical). An example of this would be an AND gate (all inputs HI---output HI; any input LO-output LO) drawn as an OR gate for LOs (any input LO-output LO; all inputs HI-output HI). The first gate shown in Table 2-1 illustrates this example and the remainder of the table further illustrates alternate ways of representing common logic gates. This table is meant only to familiarize the reader with Tektronix drafting convention and not as a complete source of alternate symbols used in schematic drafting. For operational characteristics of individual devices, refer to the manufacturer's data book.



display. The Mode Switch circuit operates in conjunction with the Mainframe Logic circuit (diagram 4) and the Microprocessor and Control circuit (diagram 28) to develop control signals for use in other circuits within this instrument, and within plug-in units installed in the plug-in compartments.

The Calibrator circuit provides voltage outputs of 40 millivolts, 0.4 volt and 4 volts at the CALIBRATOR output connector. A current output of 40 milliamperes is available from the CALIBRATOR with an optional current loop adapter. When the current loop adapter is used, the CALIBRATOR switch must be set to the 4 V position.

Figure 2-2 shows a detailed block diagram of the Mode Switch and Calibrator circuits. A schematic of these circuits is shown on diagram 2, in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. Sub-headings in the following discussion use these stage names to aid in locating and identifying the components and portions of the circuitry described.

Diagram 1, in the Diagrams and Circuit Board Illustrations section, shows the inter-connections between major circuits within the 7854.

MODE SWITCH AND CALIBRATOR

The Mode Switch circuit implements the front-panel switching and provides the necessary logic for selection of vertical and horizontal deflection signals for the crt

MODE SWITCH

The Mode Switch provides user control of the 7854 vertical and horizontal channel selection.

User commands from the front panel MODE switches, S1 and S2, are converted to BCD (binary coded decimal) by U1 and are then buffered by U61A. Plug-in commands from the plug-ins are sensed by comparator ICs U51 and U52. These logic levels are buffered by U62 and U61B. At intervals of approximately 20 ms, the microprocessor (diagram 28) pulls the FPR (front panel read) line at P63-1 LO, enabling U61 and U62, transferring the front-panel

TABLE 2-1 Common Logic Gates Illustrations

Basic Alternate	A 1	Description of Basic and Alternate Symbols	Truth Tables		
				В	OUTPUT X
		A device with two or more inputs & one output.	LO	LO	LO
A surrenze	A		LO	HI	LO
	В		ні	LO	LO
			H	HI	HI
DR	NTON IF FEDERILIZING AT CONSISTENT AND AT CONSISTENT AND AT CONSISTENT AND A DATA		A	B	X
an a	YYYAL PINALA CHOLOCUCHU CHUMA ARCT CCCANACHACH ANN ANN ANN ANN ANN ANN ANN ANN ANN AN		LO	LO	LO
A wearing		A device with two or more inputs &	LO	HI	HI
B massisse		one output.	н	LO	HI
			Н	HI	HI
	and and a subscription of the subscription of		A	B	X
and a construction of the	KOTYSOVORAULA	A device with two or more inputs & one output.	LO	LO HI	
			Н		HI
В чесочина В чесо	B recorded detractioned		н	ні	LO
NOR			A	В	X
	na ng kanang mulai malanang kang ping kalawing kalawing ng kang manang na kang kang kang kang kang kang k	A device with two or more inputs &	LO	LO	Н
A	A device with two or more inputs & one output.		LO	HI	LO
B caused and a second a		one output.	HI	LO	LO
			HI	HI	LO
INVERTER	1914-01.512-92-01.012-11-11-11-11-11-11-11-11-11-11-11-11-1		A		x
	_	A device with one input & one output	LO		н

A - C - X A - C - X A device with one input & one output. The output is always the opposite state of the input. HI LO

Negation Indicator Symbol	A small circle at the input or output of a symbol indicates that the LO state is significant. Absence of the circle indicates that the HI state is significant.

¹The first part of this table includes the alternate way to draw the same gate. The type of symbol used depends on how the gate is used in the circuit. The Basic symbols require an active HI input and the Alternate symbols require an active LO input.

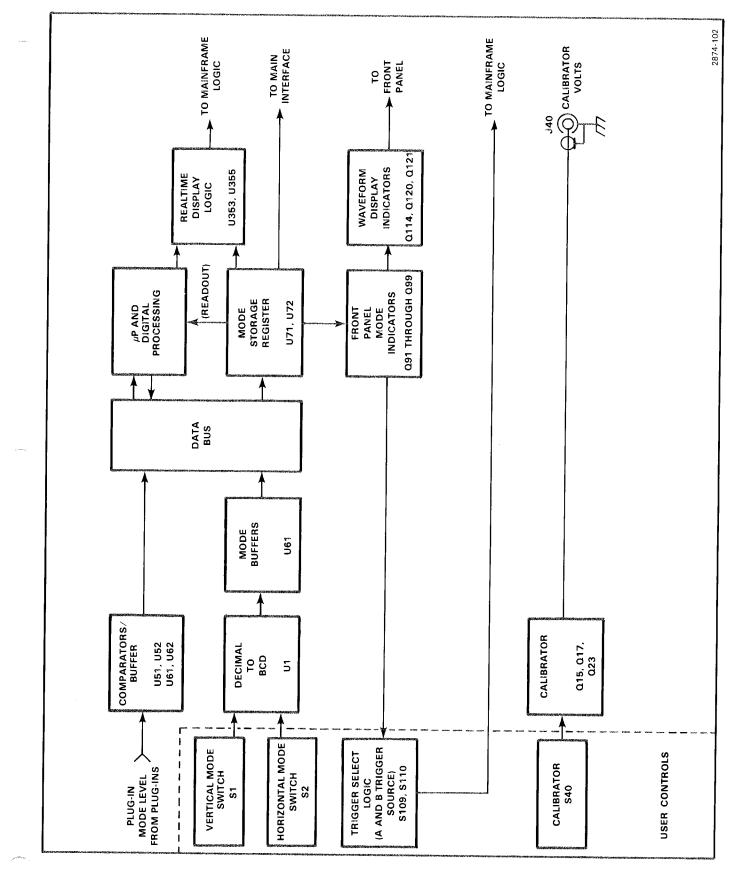


Figure 2-2. Mode Switch/Calibrator block diagram.

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Theory of Operation-7854

mode command information and plug-in mode command information to the Data Bus. Any new information on the Data Bus at this time effects a change in the microprocessor function, and new control information is put onto the Data Bus by the microprocessor. This information is latched by the storage registers, U71 and U72, with the presence of a WE (write enable) or FPW (front panel write) command, which provide control over the front-panel mode indicators, Mainframe Logic (diagram 4), and part of the Display D/A system (diagram 34). The DISPRT (display real time) command to the real time display logic, U73 and U70 provides additional control signals to the Mainframe Logic circuit (diagram 4). The Trigger Select logic commands are user selectable by S109 and S110 and are tied to the Mainframe Logic circuit (diagram 4). Transistors Q121, Q114 and Q120 are the waveform display indicator driver transistors and provide current to the STORED INTensity, A INTENSITY and B INTENSITY indicator lights on the front panel, respectively.

CALIBRATOR

Transistors Q15 and Q17 compose a 1 kilohertz, squarewave oscillator. Oscillation occurs as follows: initially assume that Q15 is conducting and Q17 is not conducting. The voltage at the emitter of Q17 becomes more negative as C16 discharges through R19. Capacitor C16 discharges until the emitter-base junction of Q17 becomes forward biased. As Q17 begins conducting the oscillator changes states. Regeneration starts when Q17 conducts and C16 stops discharging; this reduces the collector current of Q15. Thus, the collector voltage of Q15 rises positive which causes the base and emitter of Q17 to rise positive. The positive going voltage is coupled by C16 to the emitter of Q15, turning it off.

Now, Q17 is conducting and Q15 is not conducting. The voltage at the emitter of Q15 goes negative as C16 charges through R16. When the emitter-base junction of Q15 becomes forward biased the oscillator will again change states to complete the cycle.

The square-wave signal produced at the collector of Q17 switches Q23 on and off. When Q23 is on, the current from R22 and R23 flows to ground. When Q23 is off, this current flows through CR26 and R26 into the voltage divider network of R27, R31, R32, R33, R34, R35 and R36 to produce the 4 volt, 0.4 volt and 40 millivolt Calibrator output voltages. The accuracy of the Calibrator is set by the 0.4 V DC adjustment, R25. Both the 4 V and 0.4 V calibrator push-button switches must be engaged when adjusting R25. The Calibrator frequency is set by the 1 kHz adjustment, R15.

(3) MAIN INTERFACE

A schematic diagram of the Main Interface circuit is given on diagram 3, in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. These stages are related by name to other circuits within the instrument, depending upon the function they perform, and are used to aid in locating and identifying the portions of circuitry discussed here. Also, the signal and voltage connections of each interface connector are identified.

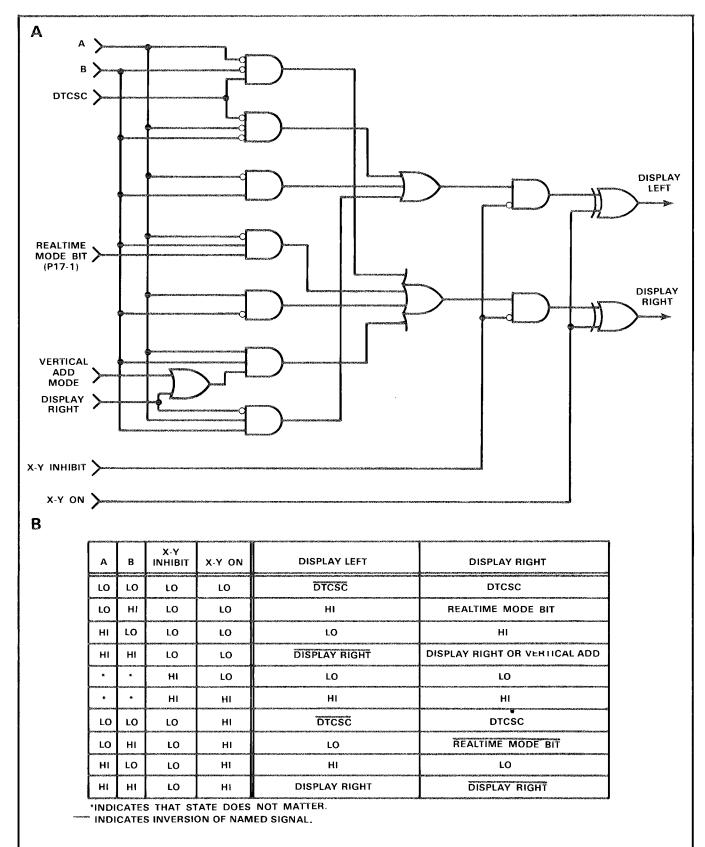
PLUG-IN INTERFACE

The Plug-in Interface stage consists of four multi-pin connectors and is used to connect signals between the plug-ins in the HORIZontal and VERTical plug-in compartments and the 7854 Oscilloscope mainframe. The gating scheme of U60 allows the selected horizontal plug-in to limit Z-Axis intensity when its sweep rate drops below 0.1 s/div, thus preventing burning of the crt. ICs U161, U65 and transistors Q61 and Q64 are current buffers for various signal levels.

VERTICAL CHANNEL SELECT LOGIC

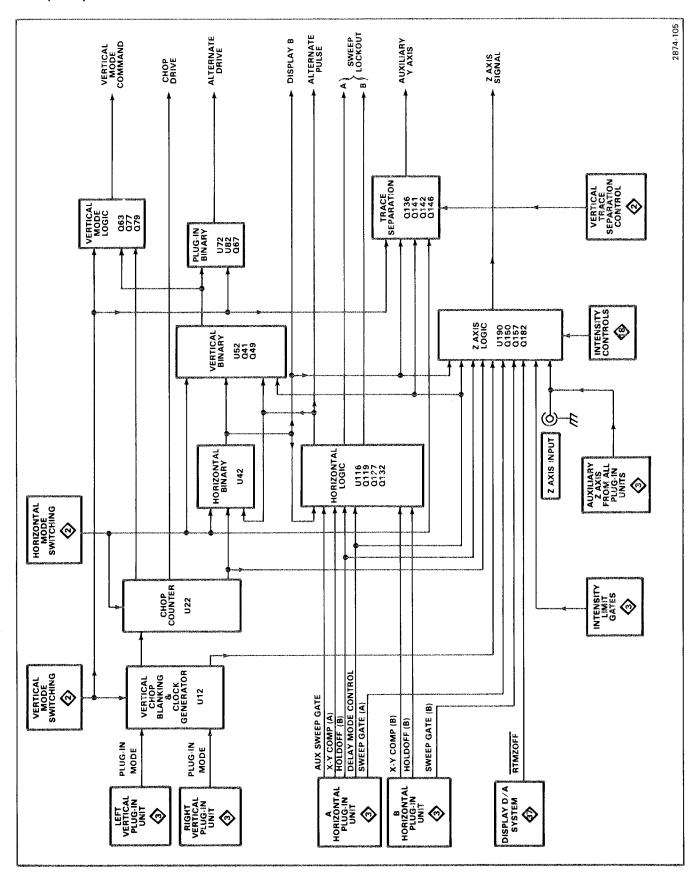
The Vertical Channel Select Logic consists of U33, U32, Q17, Q19, Q27, Q36, CR19 and their associated components. This stage generates the controlling logic commands, Display Left and Display Right going to the Vertical Channel Switch circuit, diagram 7. The logic diagram for the Vertical Channel Selector Logic stage is shown in Figure 2-3A.

Inputs A and B at pins 14 and 2 of U33 select the output states at pins 7 and 9 of U33 according to the table in Figure 2-3B. The Dual Trace Channel Switch Control (DTCSC) signal, the plug-in mode signal (J2A16), the Mainframe Channel Switch signal, and the signal at pin P17-1 from the Mode Switch act as input signals that may be switched to output pins 7 and 9 of U33, in the manner shown by Figure 2-3. When the X-Y Inhibit signal is HI, U33 is disabled and the levels at both pins 7 and 9 go LO and are not dependent on any input signals. When the X-Y On signal goes HI the exclusive OR gates, U32C and U32D, act as inverters and all signals at pins 7 and 9 of U33 are inverted. If the X-Y On input should exceed about +2 volts, Q36 disables U33 and the outputs at pins 7 and 9 go LO.



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Figure 2-3. (A) Logic Diagram of the Vertical Channel Switch Logic on the Main Interface. (B) Input/output table of the Vertical Channel Switch logic on the Main Interface.



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HORIZONTAL CHANNEL SELECT LOGIC

The Display B command, used as the switching control level applied to the Horizontal Channel Switch circuit (diagram 10), is developed by the Horizontal Channel Select Logic stage made up of U143, Q139 and Q147. The control levels at pins 2 and 14 of U143 determine the level of the Display B command at its output, pin 7. The control levels at pin 2 and 14 of U143 are as follows:



(1) Pin 2 HI and pin 14 HI—output at pin 7 follows the Mainframe Channel Switch Signal at input pin 3.

(2) Pin 2 LO and pin 14 HI-output at pin 7 is HI.

(3) Pin 2 LO and pin 14 LO—output at pin 7 follows the DTCSC signal at input pin 6.

(4) Pin 2 LO and pin 14 HI--output at pin 7 is LO.

Transistors Q139 and Q147 on the Main Interface board act as buffers and buffer the Mainframe Channel Switch Signal and Display B command, respectively to and from U143. A schematic diagram of the Mainframe Logic circuit is given on diagram 4, in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. These stages aid in locating components mentioned here. Sub-headings in the following discussion use these stage names to further identify portions of the circuitry on diagram 4.

The Mainframe Logic circuit develops control signals for use in other circuits within this instrument and any plugin units installed in the vertical and horizontal compartments. These control signals automatically determine correct instrument operation in relation to the plug-in units installed or selected, plug-in control settings, and 7854 control settings. A detailed block diagram of the logic circuit is shown in Figure 2-4.

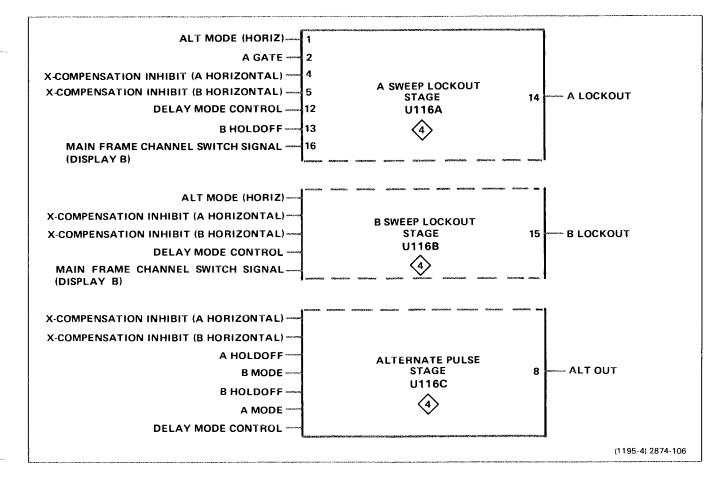


Figure 2-5. Breakdown of separate stages within Horizontal Logic IC (U116) showing inputs and output for each stage.

HORIZONTAL LOGIC

The Horizontal Logic stage performs three separate logic functions: A Sweep Lockout, B Sweep Lockout, and ALT OUT (alternate pulse) generation. Most of the logic for these functions is contained within the Horizontal Logic IC, U116. Figure 2-5 identifies the three individual stages of U116 and the input and output terminals associated with each. Note that some of the input levels are connected internally to more than one of the individual stages.

A Sweep Lockout

The A Sweep Lockout portion of the Horizontal Logic IC (U116) produces an output level at the collector of Q127 (A Sweep Lockout) that determines when the A HORIZ time-base unit can produce a sweep. If this output is HI, the A HORIZ unit is locked out (disabled) so it cannot produce a sweep. If the level is LO, the A HORIZ unit is enabled and can produce a sweep when triggered.

As shown by Figure 2-6, only two combinations of input conditions to U116 will produce a HI A Sweep Lockout level. The first combination disables the A sweep while the B sweep is being displayed in the ALT HORIZONTAL MODE (both units must be in time-base mode) if nondelayed operation is being used. The second combination disables the A sweep during delayed-sweep operation so that the B sweep can complete its holdoff before the next A sweep begins.

B Sweep Lockout

The B Sweep Lockout stage produces an output level at the collector of Q132 that determines if the B HORIZ time-base unit can produce a sweep. A HI output level locks out (inhibits) the B HORIZ unit and a LO level enables the B HORIZ unit to produce a sweep.

As shown by Figure 2-7, the output of this stage is HI only under one set of input conditions to U116. This set of conditions disables the B sweep while the A sweep is being displayed in the ALT HORIZONTAL MODE switch position, if both time-base units are in a sweep mode and nondelayed sweep is used. For any other combination of input conditions, the B Sweep Lockout level is determined by the Delay Gate from A time-base unit; see Main Interface, diagram 3.

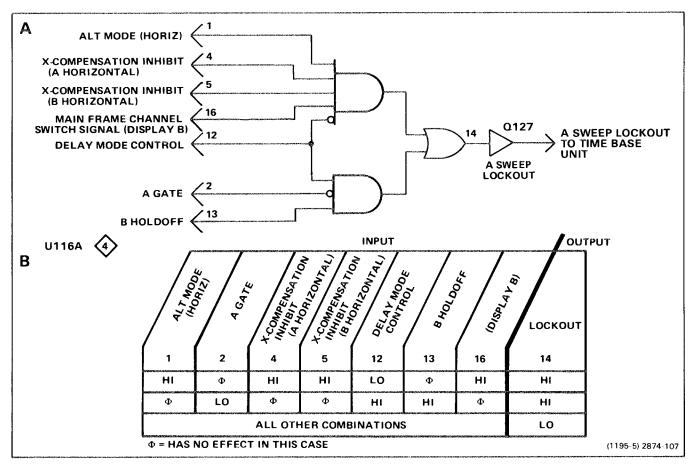


Figure 2-6. (A) Logic diagram for A Sweep Lockout Stage; (B) Table of input/output combinations.

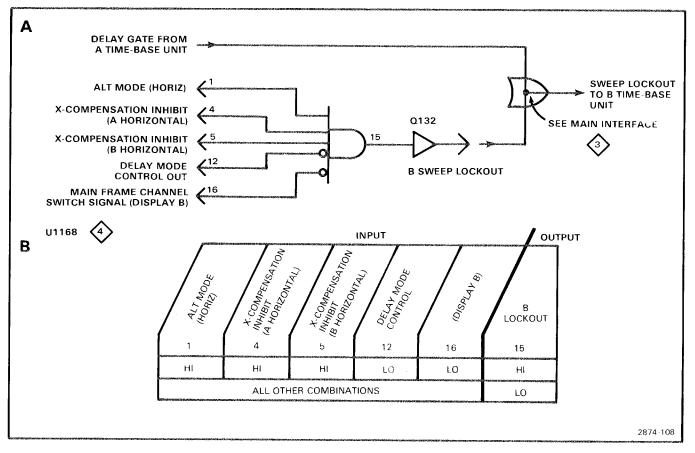


Figure 2-7. (A) Logic diagram for B Sweep Lockout stage; (B) Table of input/output combinations.

Alternate Pulse

The third function performed by the Horizontal Logic stage is to produce an ALT OUT (alternate pulse) for use by the Horizontal and Vertical Binary stages. The holdoff gate produced at the end of the sweep by the respective time-base unit is differentiated by either C109 or C112 to provide a positive-going pulse to pin 6 or 9 of U116. The differentiated A or B Holdoff gate may produce the alternate pulse depending upon the operating conditions as shown in Figure 2-8.

The following discussions describe the operation of U116 in relation to the various combinations of input conditions shown in Figure 2-8:

(1) A (Only) Mode—An ALT OUT (alternate) pulse is produced at the end of each A sweep when the HORIZONTAL MODE switch is set to the A position.

(2) B (Only) Mode—In the B position of the HORIZONTAL MODE switch, an ALT OUT pulse is produced at the end of each B sweep. (The A time-base must be in independent, nondelayed mode.)

(3) Ait or Chop Mode—When the HORIZONTAL MODE switch is set to ALT or CHOP (the A time-base unit must be in independent, nondelayed mode), an ALT OUT pulse is produced at the end of each sweep. For example, an alternate pulse is produced at the end of the A sweep, then at the end of the B sweep, again at the end of the A sweep, etc. Although ALT OUT pulses are produced in the CHOP horizontal mode, they are not used in this instrument.

(4) Delayed Sweep (A Delays B)—When the A timebase unit is set for delayed operation, the operation of the Horizontal Logic stage is changed so an ALT OUT pulse is produced only at the end of the A sweep, even when the HORIZONTAL MODE switch is set to B. This is necessary since the A time-base establishes the amount of delay time for the B time-base unit whenever it is displayed.

(5) Amplifier Unit In Horizontal Compartment— When an amplifier unit is installed in either of the horizontal plug-in compartments, the ALT OUT pulse can be produced only from the remaining time-base unit. If amplifier units are installed in both horizontal compartments, an ALT OUT pulse is not produced since there are no time-base units to produce a holdoff pulse.

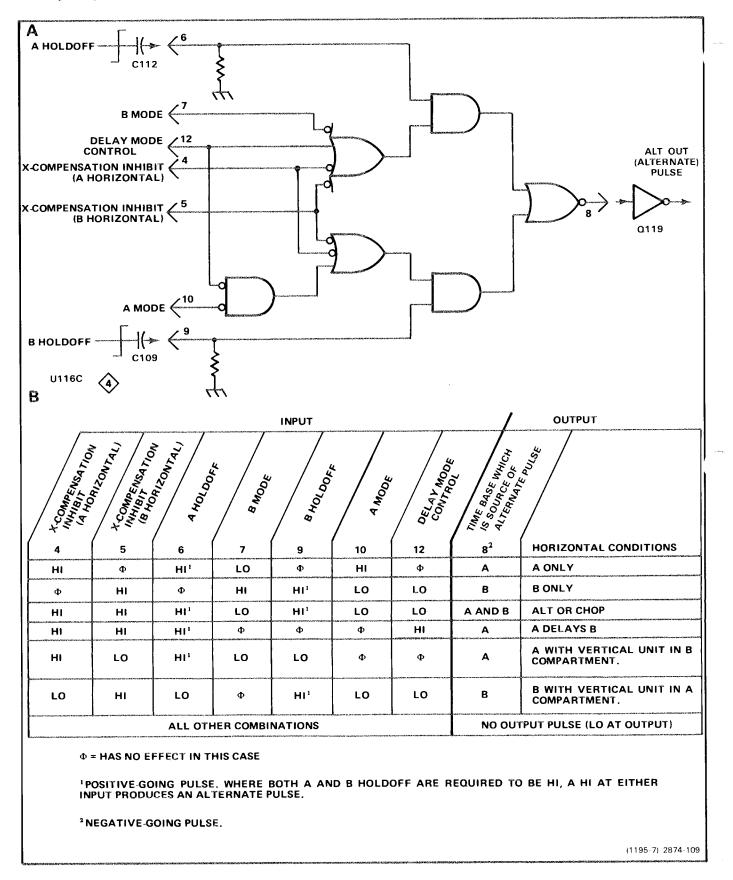


Figure 2-8. (A) Logic diagram for Alternate Pulse Generator stage; (B) Table of input/output combinations.

Z-AXIS LOGIC

The Z-Axis Logic stage produces an output current signal at pin 8 of U190 which sets the intensity of the crt display, except for the stored waveforms and alphanumeric readout display, which is controlled by the Display D/A circuit input to the Z-Axis and Focus Amplifier circuit (diagram 13). The output current at pin 8 is determined by the setting of the Z-Axis Level adjustment, A and B INTENSITY controls, the conditions of various logic gates, and by the Aux Z-Axis input. The Aux Z-Axis input is produced by either the external Z-AXIS INPUT (rear panel) or by an input from any of the plug-in units; see Main Interface, diagram 3. The input current from the A and B INTENSITY controls is switched so the output current matches the horizontal display selected. A HI Z-Axis Limit input applied to the base of Q150 or a LO Intensity Limit level from the horizontal plug-ins (via U60D) to the emitter of Q157 reduces current drive and limits display intensity. The Vertical Chopped Blanking, Horizontal Chopped Blanking, and RTMZOFF (realtime display Z-axis off) signal from the Display D/A circuit are applied to this stage to block the output current and blank the crt display for vertical chopping, horizontal chopping, or during a stored waveform or alphanumeric readout display.

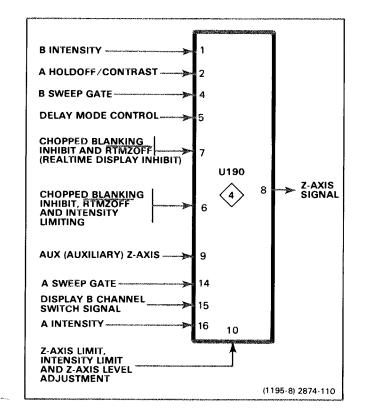


Figure 2-9. Input and output pins for Z-Axis Logic IC (U190).

Figure 2-9 identifies the inputs and the output of the Z-Axis Logic IC (U190). All inputs except pins 5 and 15 are current driven with pins 1, 2, 9, and 16 variable from zero to four milliamperes.

The Vert Chop Blank signal, connected to pin 7, and the Horiz Chop Blank and the RIMZOFF signal applied to U190 through Q103 enables or disables this stage to control all output current. Quiescently, the levels at pins 6 and 7 are HI so that the intensity current from pins 1, 2, 9, and 16 can pass to the output. However, pin 7 goes LO during vertical chopped blanking, and both pins 6 and 7 go LO during horizontal chopped blanking or during a digitized display. This blocks the output current and the crt is blanked. The Vert Chop Blank signal is connected to pins 6 and 7 of U190 directly from pin 4 of U12. The Horiz Chop Blank inhibit signal is connected to U190 from pin 4 of U22 through L35, R35, Q103, CR162 and CR161. Notice that this signal is connected to the collector of Q103. This transistor is normally operating in the saturated condition, and the HI Horiz Chop Blank inhibit level from U22 is the collector source voltage. When the Horiz Chop Blank inhibit level goes LO, the current through Q103 drops to produce a corresponding LO level at its emitter. This level is connected to pins 6 and 7 of U190 through CR162 and CR161.

Transistor Q103 also controls the levels at pins 6 and 7 for digitized displays. The RTMZOFF command from the Display D/A circuit is connected to the base of Q103 through R103. This level is normally HI, so Q103 operates as determined by the Horiz Chop Blank inhibit level at its collector. When a digitized display is to be presented, RTMZOFF goes LO and this level is coupled to the base of Q103 through R103. Transistor Q103 is then reverse biased to produce a LO level at its emitter. This level is coupled to pins 6 and 7 of U190 through CR162 and CR161 to block the Z-Axis Logic output current during the digitized display. (The intensity of the digitized display is determined by a separate Display D/A intensity level connected directly to the Z-Axis Amplifier; see Z-Axis and Focus Amplifier description.) Diode CR159 clamps the emitter of Q103 at about -0.6 volt when the transistor is off.

The A INTENSITY control sets the output current level when the A Gate at pin 14 is HI and the Display B command is LO. Whenever the A Gate level goes LO indicating that the A sweep is complete or the Display B Command goes HI indicating that the B sweep is being displayed, the A INTENSITY current is blocked. The current from the A INTENSITY control is connected to pin 16 through R192.

In the delayed mode, current is added to the A INTENSITY current during a portion of the A sweep time to intensify a portion of the trace. This intensified portion is

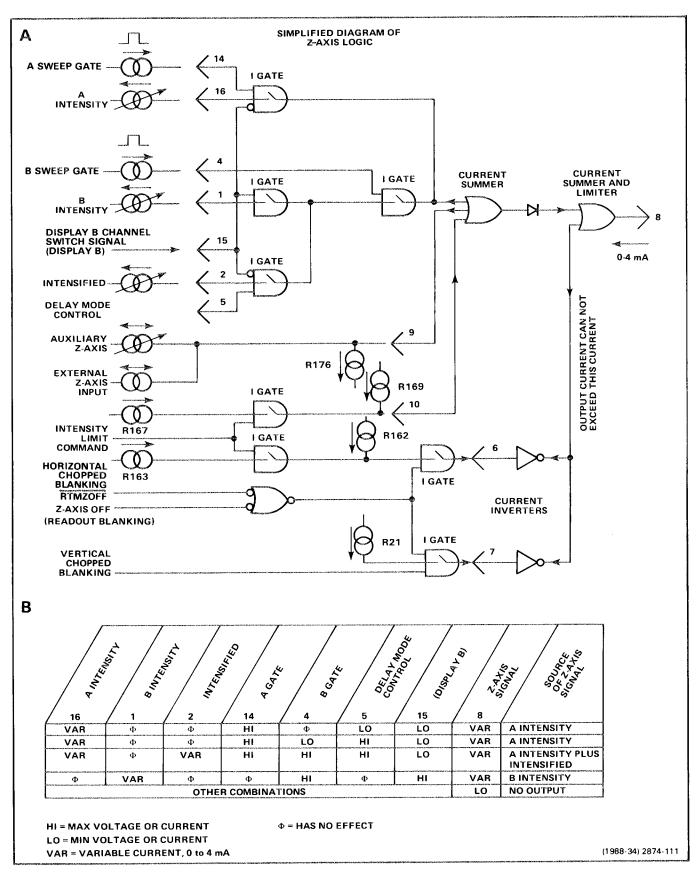


Figure 2-10. (a) Logic diagram for Z-Axis Logic stage; (B) Table of input/output combinations.

coincident with the B Sweep Gate pulse to provide an indication of which portion of the A sweep is displayed in the delayed mode. The A intensifing current is supplied to pin 2 of U190 through the front-panel CONTRAST adjustment, R80. Current to R80 is derived from the A Intensity control. With this configuration, the intensified current increases as the A INTENSITY control setting is advanced to provide a proportional intensity increase in the intensified zone as the overall A sweep intensity increases. Therefore, the intensified zone is more readily visible at high intensity levels. The CONTRAST adjustment is a front panel screwdriver adjustment and allows presetting for optimum intensity contrast between the intensified portion and the overall sweep. The intensified current is added to the A INTENSITY current to produce an intensified zone on the A sweep under the following conditions: HI A Gate level at pin 14, LO Display B command at pin 15, HI B Gate level at pin 4, and a HI Delay Mode Control input level at pin 5.

The B INTENSITY control determines the output current when the B Gate level at pin 4 and the Display B command at pin 15 are both HI. The current from the B INTENSITY control is connected to the Z-Axis Logic stage through R196.

The current level established by the intensity controls can be altered by the Aux Z-Axis current level at pin 9. The current at this pin can come from the Z-AXIS INPUT connector on the rear panel or from any of the plug-in compartments. This current either increases or decreases (depending on polarity) the output current to modulate the intensity of the display. Input from the Z-AXIS INPUT connector allows the trace to be modulated by external signals. The Aux Z-Axis inputs from the plugin compartments allow special-purpose plug-in units to modulate the display intensity. Diodes CR176 and CR177 limit the maximum voltage change at pin 9 to about ±0.6 volt to protect the Z-Axis Logic stage if an excessive voltage is applied to the Z-AXIS INPUT connector. Figure 2-10 shows a logic diagram and a table of the input/output conditions of the Z-Axis Logic stage.

HORIZONTAL BINARY

The Horizontal Binary stage develops the mainframe channel switch signal (Display B) to determine which horizontal plug-in unit provides the sweep displayed on the crt. When this level is HI, the B HORIZontal unit is used for the display; when it is LO, the A HORIZontal unit is used. Figure 2-11 shows the input and output pin assignments for the Horizontal Binary IC (U42).

The Display B command is used in the following stages within the Mainframe Logic circuit: Horizontal Logic (A and B Sweep Inhibit), Z-Axis Logic, Vertical Binary and

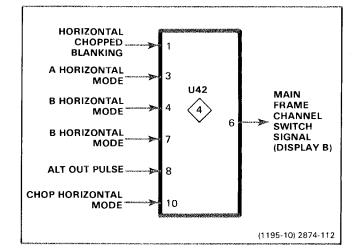


Figure 2-11. Input and output pins for Horizontal Binary IC (U4358).

Trace Separation. In addition, it is connected to the following circuits elsewhere in the instrument to indicate which horizontal unit is to be used during display: Main Interface (A and B HORIZ plug-in compartments), and Horizontal Interface (for horizontal channel selection).

The levels on pins 3, 4, 7 and 10 of U42 are determined by the HORIZONTAL MODE switch (see diagram 2). This switch indicates which horizontal mode has been selected by providing a HI output level on only one of four output lines; the remaining lines stay LO.

The Horizontal Binary stage operates as follows for each of the four positions of the HORIZONTAL MODE switch (refer to Figure 2-12 for the logic diagram and table of input/output conditions for the Horizontal Binary stage):

A Mode

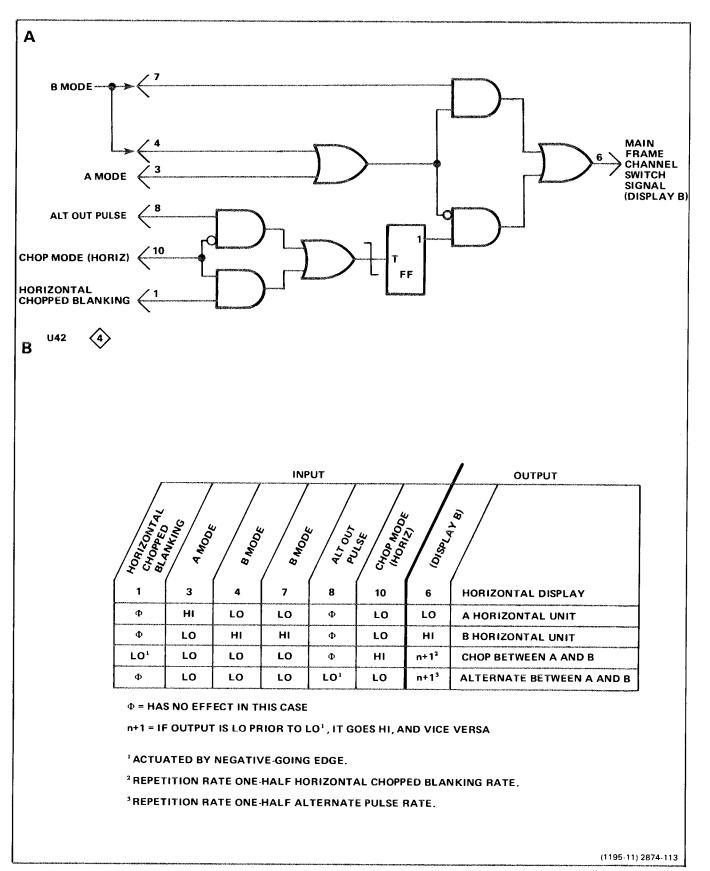
When the HORIZONTAL MODE switch is set to A, the Display B command is LO to indicate to all circuits A horizontal unit is providing the display sweep.

B Mode

Selecting the B horizontal mode provides a HI Display B Command to all circuits.

CHOP Mode

In the CHOP position of the HORIZONTAL MODE switch, the Display B command switches between the HI and LO levels to produce a display that alternates between the A and B horizontal units at a 0.2 MHz rate. The repetition rate of the Display B command in this mode is determined by the Horiz Chop Blank pulse (see Chop Counter description). Each time the Horiz Chop Blank pulse at pin 1 goes LO, the output at pin 6 switches to the opposite state.





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ALT Mode

For ALT horizontal operation, the Display B command switches to the opposite state each time the negative portion of the Alt Out pulse is received from the Horizontal Logic stage through Q119. Repetition rate of the Display B command in this mode is one-half the repetition rate of the Alt Out pulse applied to pin 8.

VERTICAL BINARY

The Vertical Binary stage produces the Display Right command, to determine which vertical unit is to be displayed when the VERTICAL MODE switch is set for ALT. When this output level is HI, the RIGHT VERT unit is displayed; when it is LO, the LEFT VERT unit is displayed. In the ALT or CHOP positions of the HORIZONTAL MODE switch (nondelayed operation only), the output of this stage is slaved to the output of the Horizontal Binary stage so that the Display Right command is always HI when the Display B command is LO, and vice versa. This action allows independent-pairs operation (sweepslaving) in the ALT position of the VERTICAL MODE switch and the ALT or CHOP positions of the HORIZONTAL MODE switch, whereby the LEFT VERT unit is always displayed at the sweep rate of the B timebase and the RIGHT VERT unit is displayed at the sweep rate of the A time-base. Thus, independent-pairs operation can simulate dual-beam operation for repetitive sweeps.

When the A time-base unit is set to the delaying mode, the repetition rate of the Display Right command is onehalf the repetition rate of the Display B command. This results in each vertical unit being displayed first against the A time-base unit (delaying), then the B time-base unit (delayed), before the display is switched to the other vertical unit.

Figure 2-13 illustrates pin assignments for the Vertical Binary IC (U52).

The Display Right command is used in the Plug-In Binary and Vertical Mode Logic stages. The Vertical Binary stage (U52) uses the same type of IC as the Horizontal Binary stage. Notice the Display A command level at pin 7. This input is the inverse of the Display B command level at pin 8 (Q49 generates the Display A Command level). Also, notice the line connected to pin 4 of the Vertical Binary IC U52. The level at pin 4 is generated by Q41 and is HI only when the HORIZONTAL MODE switch is set for ALT or CHOP and the time-base units are in nondelayed operation. The Vertical Binary IC uses the information at pin 4 for correct slaving of the Display Right command to the Display B command (necessary for independent-pairs operation).

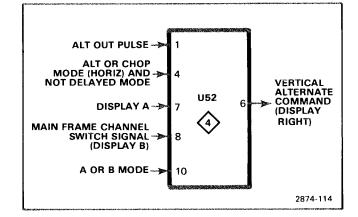


Figure 2-13. Input and output pins for Vertical Binary IC (U52).

The following discussions describe the operation of the Vertical Binary stage in relation to the modes of operation that can occur. Figure 2-14A shows a logic diagram of the Vertical Binary stage. An input/output table for this stage is given in Figure 2-14B.

A or B Mode

When the HORIZONTAL MODE switch is set to either A or B, the Display Right command switches to the opposite state each time an Alt Out pulse is received from the Horizontal Logic stage. Repetition rate of the Display Right command in this mode is one-half the repetition rate of the Alt Out pulse. The input conditions for these modes are:

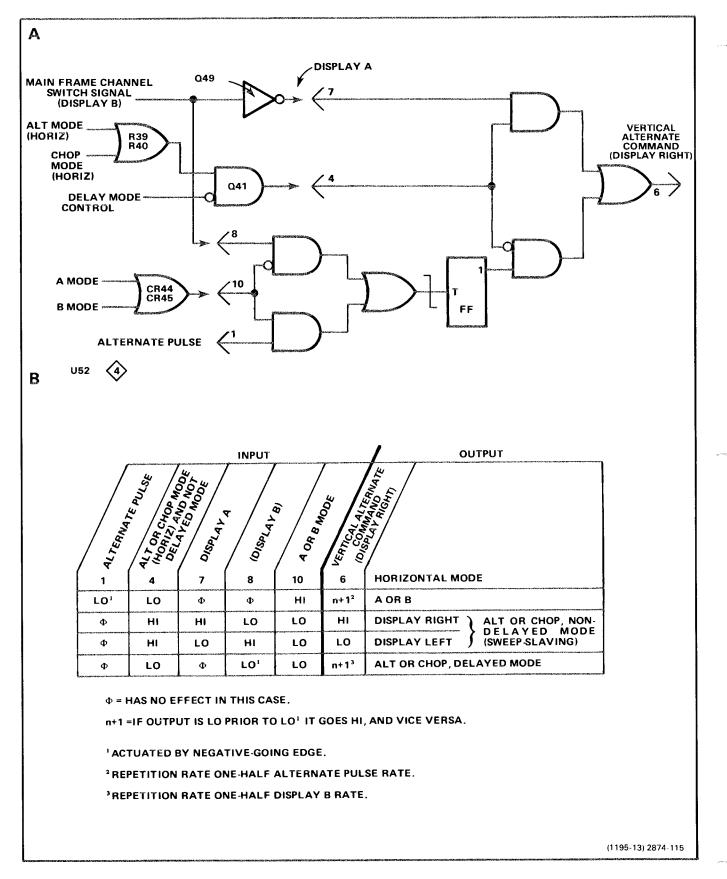
Pin 1 LO; Alt Out pulse generated by Horizontal Logic stage goes negative;

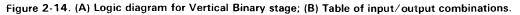
Pin 4 LO; (HORIZONTAL MODE switch in any position except ALT or CHOP, or the A time-base unit is set for delayed sweep); and

Pin 10 HI; HORIZONTAL MODE switch set to A or B.

ALT or CHOP Mode (HORIZONTAL)-Nondelayed

In the ALT or CHOP positions of the HORIZONTAL MODE switch, the output level at pin 6 is the same as the Display A command level at pin 7. The Display A command level is produced by inverting the Display B command from the Horizontal Binary stage. Therefore, the repetition rate of the output signal is the same as the Display B command. The result, with the VERTICAL MODE switch set to ALT and the A time-base unit set for nondelayed operation, is that the RIGHT VERT unit is always displayed at the sweep rate of the A time-base





unit, and the LEFT VERT unit is always displayed at the sweep rate of the B time-base unit (independent-pairs operation or sweep slaving). The input conditions to provide a HI output level so that the RIGHT VERT unit can be displayed at the A sweep rate are:

Pin 4 HI; (HORIZONTAL MODE switch set to ALT or CHOP with nondelayed sweep);

Pin 7 HI; The A sweep is to be displayed (Display B command LO); and

Pin 10 LO; HORIZONTAL MODE switch set to any position except A or B.

The input conditions to provide a LO output level so that the LEFT VERT unit can be displayed at the B-sweep rate are:

Pin 4 HI; (HORIZONTAL MODE switch set to ALT or CHOP with nondelayed sweep);

Pin 7 LO; The B sweep is to be displayed (Display B command HI); and

Pin 10 LO; HORIZONTAL MODE switch set to any position except A or B.

ALT or CHOP Mode (HORIZONTAL)-Delayed

If the A time-base unit is set to the delayed mode when the HORIZONTAL MODE switch is set to either ALT or CHOP, the operation of the stage is changed from that discussed above. Now, the Display Right command switches between the HI and LO states at a rate that is one-half the repetition rate of the Display B command. The resultant crt display in the ALT position of the VERTICAL MODE switch allows the RIGHT VERT unit to be displayed first against the A sweep (delaying) and then against the B sweep (delayed). Then the display switches to the LEFT VERT unit and is displayed consecutively against the A and B sweeps in the same manner. The input conditions for this mode of operation are:

Pin 4 LO; (The A time-base unit set for delayed operation);

Pin 8 HI or LO; Display Right command changes state at HI to LO transition of Display B command; and

Pin 10 LO; HORIZONTAL MODE switch set to any position except A or B.

PLUG-IN BINARY

The Plug-In Binary stage produces the plug-in Alternate Drive command to alternate dual-trace plug-in units. The Plug-In Binary IC, U82 is the same type of integrated circuit used in the Horizontal Binary and Vertical Binary stages. Figure 2-15 shows the pin assignments for the Plug-In Binary IC (U82).

Additional control from the mode switch (pins 2 and 14) and digitizer circuitry (pin 10) of the Plug-in Binary stage is provided by U72. Refer to Figure 2-16 for the logic diagram and input/output table for the Plug-in Binary stage.

Input pins 2 and 14 from the status bits latched into U71 of the Calibrator and Mode Switch circuit (diagram 2) indicating plug-in status (channel), are applied to U72 and control a pair of outputs (pins 7 and 9) which are tied to input pins 3 and 7, respectively of U82 (Plug-in Binary). Four possible output conditions of U82 exist, depending on the input levels at pins 14 and 2 of U72, and are as follows:

(1) Pin 14 HI and Pin 2 HI-Pin 7 LO—Pin 9 follows the vertical alternate command present at input pin 8 of U82. The vertical alternate command is coupled through Q67 and U72 to pin 7 of U82. This mode essentially shorts pin 7 and pin 8 of U82 together.

(2) Pin 14 HI and Pin 2 LO-Pin 7 HI; Pin 9 HI.

(3) Pin 14 LO and Pin 2 HI---Pin 7 HI; Pin 9 LO.

(4) Pin 14 LO and Pin 2 LO---Pin 7 HI; Pin 9 follows the DTCSC (dual trace channel switch control) signal at pin 10 from the Digitizer Board.

NOTE

These conditions are for the shaded portion marked U72 of Figure 2-16A. The entire Plugin Binary stage is discussed in reference to the outputs of this smaller block.

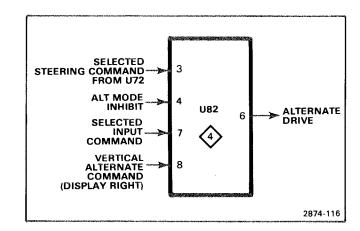
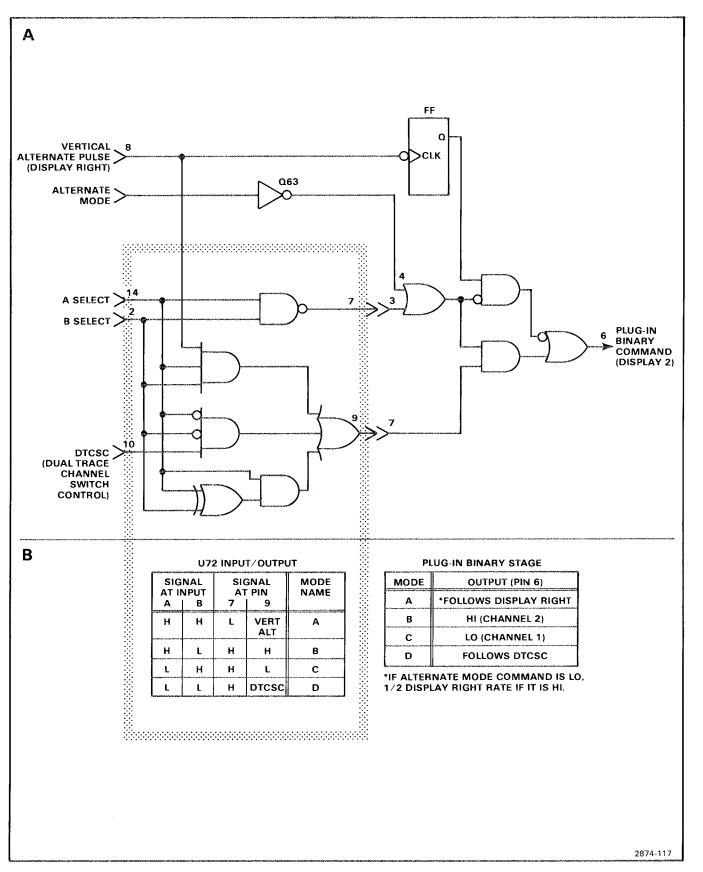


Figure 2-15. Input and output pins for the plug-in binary IC (U82).





The following discusses the operation of the Plug-in Binary stage in each of the four modes mentioned above.

When the plug-in Alternate Drive command level is HI and a dual trace amplifier plug-in unit is set for Alternate operation, Channel 2 of the dual trace unit is displayed. When the plug-in Alternate Drive command is LO, Channel 1 is displayed. The repetition rate of the plug-in Alternate Drive command is determined by the setting of the VERTICAL MODE switch and a control signal from the digitizer circuitry. This is true for each of the four modes.

Mode A

When Pins 14 and 2 of U72 are HI, the following is true.

For all positions of the VERTICAL MODE switch except ALT, the plug-in Alternate Drive command is the same as the Display Right command originating at pin 6 of U52 (Vertical Binary stage). Since the Display Right command is derived from the Display B command through the Vertical Binary stage, the two channels of a dual-trace vertical amplifier unit may be slaved to the time-base units (nondelayed, dual-sweep horizontal modes only) in the same manner as previously described for independent-pairs operation between the vertical and time-base units. The resultant crt presentation, when the dual-trace vertical amplifier unit is set for alternate operation, displays the Channel 1 trace at the sweep rate of the B time-base unit and the Channel 2 trace at the sweep rate of the A time-base unit.

The plug-in Alternate Drive command switches from HI to LO as the Display B command from the Horizontal Binary stage switches from LO to HI, and vice versa.

When the VERTICAL MODE switch is set to ALT, the output, pin 6, of the Vertical Binary stage switches the vertical display between the two vertical units. However, if either of the vertical plug-in units are dual-trace units, they can be operated in the alternate mode also. To provide a switching command to these units, the Plug-In Binary stage produces an output signal with a repetition rate that is one-half the repetition rate of the signal at pin 6 of U82. The sequence of operation, when two dualtrace vertical units are installed in the vertical plug-in compartments and they are both set for alternate operation, is as follows (VERTICAL MODE and HORIZONTAL MODE switches set to ALT): (1) Channel 1 of LEFT VERT unit displayed at sweep rate of B time-base unit; (2) Channel 1 of RIGHT VERT unit displayed at

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sweep rate of A time-base unit; (3) Channel 2 of LEFT VERT unit displayed at sweep rate of B time-base unit; (4) Channel 2 of RIGHT VERT unit displayed at sweep rate of A time-base unit. Notice that under these conditions, both channels of the LEFT VERT unit are displayed at the B-sweep rate and that both channels of the RIGHT VERT unit are displayed at the A-sweep rate. Input conditions when the VERTICAL MODE switch is set to ALT are:

Pin 4 LO; VERTICAL MODE switch set to ALT; and

Pin 8 HI or LO; plug-in Alternate Drive command signal changes state at HI to LO transition of the Display Right command signal.

Mode B

When U72's Pin 14 is HI and its pin 2 is LO, the output of U82 is HI. This causes Channel 2 of the dual-trace vertical units to be displayed.

Mode C

When U72's Pin 14 is LO and its pin 2 is HI, the output of U82 is LO. This causes Channel 1 of the dual-trace vertical unit to be displayed.

Mode D

When both pins 14 and 2 of U72 are LO, the output of U82 follows the Dual Trace Channel Switch Control signal from the digitizer circuitry.

CLOCK GENERATOR

Part of integrated circuit U12 along with the external components shown in Figure 2-17A make up the Clock Generator stage. R1, Q1, Q2 and Q3 represent an equivalent circuit within U12. This circuit along with discrete components C8, R8, R9 and R11 compose a two-megahertz free-running oscillator to provide a timing (clock) signal used to synchronize the vertical, horizontal and plug-in chopping modes.

This stage operates as follows: Assume that Q2 is conducting and Q1 is off. The collector current of Q2 produces a voltage drop across R1 to turn off Q1. This negative level at the collector of Q2 is also connected to pin 14 through Q3 (see waveforms in Figure 2-17B at

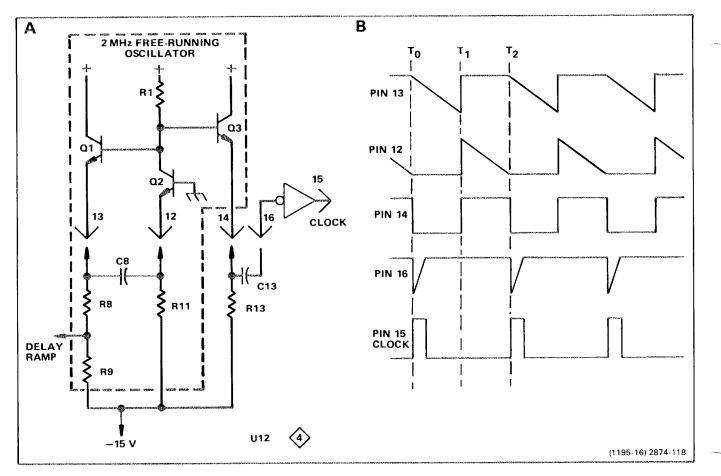


Figure 2-17. (A) Diagram of clock generator stage; (B) idealized waveforms for clock.

time T₀). Since there is no current through Q1, C8 begins to charge towards -15 volts through R8 and R9. The emitter of Q1 goes negative as C8 charges, until it reaches a level about 0.6 volts more negative than the level at its base. Then Q1 is forward biased and its emitter rapidly rises positive (see time T₁ on waveforms). Since C8 cannot change its charge instantaneously, the sudden change in voltage at the emitter of Q1 pulls the emitter of Q2 positive. With Q2 reverse biased, its collector rises positive to produce a positive output level at pin 14.

Now, conditions are reversed. Since Q2 is reverse biased, no current flows through it. Therefore, C8 begins to discharge through R11. The emitter level of Q2 follows the discharge of C8, until it reaches a level of about 0.6 volt more negative than its base. Then Q2 is forward biased and its collector drops negative to reverse bias Q1. The level at pin 14 drops negative also, to complete the cycle. Once again, C8 begins to charge through R8 and R9 to start the second cycle. Two outputs are provided from this oscillator. The Delay Ramp signal from the junction of R8 and R9 is connected to the Vertical Chopped Blanking stage. This signal has the same waveshape as shown by the waveform at pin 13; its slope is determined by the divider ratio between R8 and R9. A wide pulse train output is provided at pin 14. The frequency of this pulse train is determined by the overall rc relationship between C8, R8, R9 and R11. Its duty cycle is determined by the ratio of R8 and R9 to R11.

The pulse train at pin 14 is connected to pin 16 through C13. Capacitor C13, along with the internal resistance of U12, differentiates the pulse train at pin 14 to produce a narrow negative-going pulse coincident with the falling edge of the pulse train (positive-going pulse coincident with rising edge has no effect on circuit operation). This negative-going pulse is connected to pin 15 through an inverter-shaper circuit that is also part of U12. The output at pin 15 is a positive-going clock pulse with a repetition rate of about two megahertz.

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VERTICAL CHOPPED BLANKING

The Vertical Chopped Blanking stage is made up of the remainder of U12. This stage determines if Vertical Chopped Blanking pulses are required, based upon the operating mode of the vertical system or the plug-in units (dual-trace units only). Vertical Chopped Blanking pulses are produced if: (1) The VERTICAL MODE switch is set to CHOP; (2) A dual-trace vertical unit is operating in the

chopped mode and that unit is being displayed. The repetition rate of the negative-going Vert Chop Blank pulse at output pin 4 is two megahertz for all of the above conditions as determined by the Clock Generator stage. Figure 2-18 shows the logic diagram and the input/output combinations for the Vertical Chopped Blanking stage.

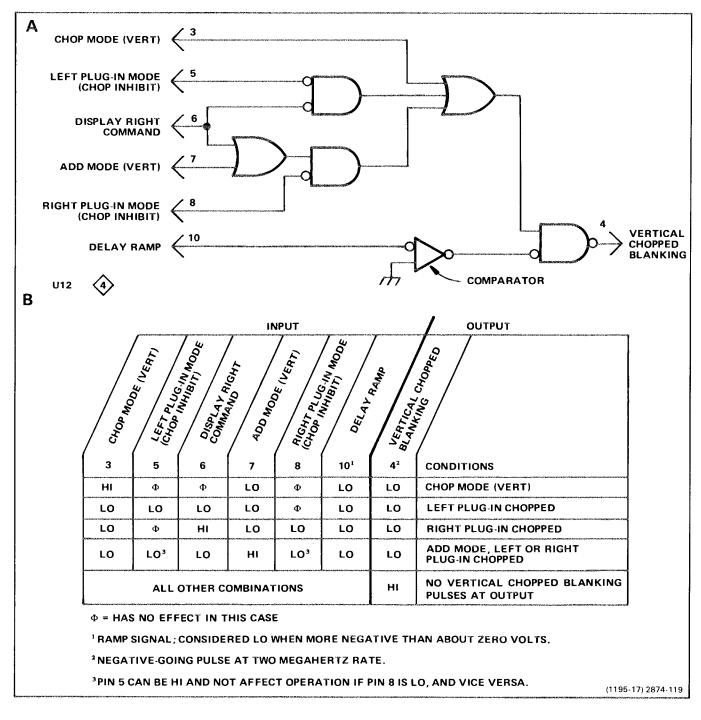


Figure 2-18. (A) Logic diagram for Vertical Chopped Blanking stage; (B) Table of input/output combinations.

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The Delay Ramp signal from the Clock Generator stage determines the repetition rate and pulse width of the Vert Chop Blank pulses. The Delay Ramp applied to pin 10 starts to go negative from a level of about +1.1 volts coincident with the leading edge of the Clock pulse (see waveforms in Figure 2-19). This results in a HI quiescent condition for the Vert Chop Blank pulse. The slope of the negative-going Delay Ramp is determined by the Clock Generator stage. As it reaches a level slightly negative with respect to ground, the Vert Chop Blank output level changes to the LO state and remains LO until the Delay Ramp goes HI again.

Notice the delay between the leading edge of the Clock pulse generated by U12, and the leading edge of the Vert Chop Blank pulses. The amount of delay between the leading edges of these pulses is determined by the Delay Ramp applied to pin 10. This delay is necessary due to the delay line in the vertical deflection system. Otherwise, the trace blanking resulting from the Vert Chop Blank pulse would not coincide with the switching between the displayed traces. The duty cycle of the wide pulse train produced in the Clock Generator stage determines the pulse width of the vertical chopped blanking pulses (see Clock Generator description for more information).

CHOP COUNTER

The Chop Counter stage U22 produces the Vert Chop signal, the Plug-In Chop Drive command, and the Horiz Chop Blank signal. The Clock pulse produced by the Clock Generator stage provides the timing signal for this stage.

The functions of the input and output pins for the Chop Counter IC, U22, are identified in Figure 2-20A. Idealized waveforms showing the timing relationship between the input and output signals for this stage are shown in Figure 2-20B.

The repetition rate of the output signals from this stage is determined by the setting of the HORIZONTAL MODE switch. When the HORIZONTAL MODE switch is set to any position except CHOP, the repetition rate of the Vert Chop signal at output pin 1 is one megahertz (one-half Clock rate). This determines the switching between the LEFT and RIGHT VERT units when the VERTICAL MODE switch is set to CHOP. At the same time, the repetition rate of the Plug-In Chop Drive at pin 8 is 0.5 megahertz (one-fourth Clock rate). This provides a chopping signal to dual-trace vertical units to provide switching between the two channels. The relationship between these output signals and the Clock input is shown by the waveforms in Figure 2-20B in the area between To and T1. During this time, the Horiz Chop Blank at pin 4 remains HI.

When the HORIZONTAL MODE switch is set to CHOP, the basic repetition rate of the Vert Chop signal and the Plug-In Chop Drive is altered. For example, if the HORIZONTAL MODE switch is changed to the CHOP position at time T₁ (see Figure 2-20B), a HI level is applied to pin 6. This stage continues to produce outputs at pins 1 and 8 in the normal manner until both outputs are at their HI level. (See time T₂; this condition only occurs once every fifth Clock pulse and only when the HORIZONTAL MODE switch is set to CHOP.) When both of these outputs are at their HI level sare at their HI level. Same their HI level sare at their HI level sare at their HI level sare at their HI level. When the HORIZONTAL MODE switch is set to CHOP.) When both of these outputs are at their HI level, the next Clock pulse switches both outputs LO, and at the same time switches Horiz Chop Blank to the LO level.

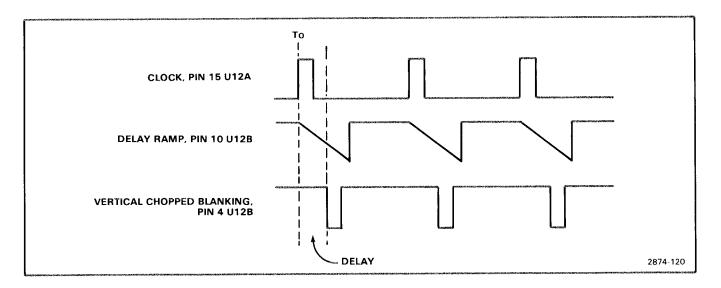


Figure 2-19. Idealized waveforms for Vertical Chopped Blanking stage.

This change at time T_2 does not appear at pin 4 immediately, due to a delay network in the circuit. The delay is necessary to make the Horiz Chop Blank signal coincide with the Vert Chop Blank produced by U12 and the switching between the displayed signals. (Compare bottom two waveforms of Figure 2-20B; also see Vertical Chopped Blanking for further information.) After the delay time, the output level at pin 4 goes LO where it remains for about 0.5 microsecond; this is equal to the period of the Clock pulse (two-megahertz repetition rate).

The horizontal chopped blanking time must be longer than the vertical chopped blanking time, since it takes more time for the display to switch between horizontal units than between vertical units. During the time that the level at pin 4 is LO, the crt is blanked and the Vert Chop signal and the Plug-In Chop Drive cannot change levels. The Clock pulse at T₃ changes only the Horiz Chop Blank output at pin 4. The level on this pin goes HI after the delay time to unblank the crt.

For the next three Clock pulses, the Vert Chop signal output and Plug-In Chop Drive operate in the normal manner. However, just prior to the fourth Clock pulse (time T4), both outputs are again at their HI level. The fourth clock pulse at T₄ switches the output at pin 1, pin 8 and pin 4 (after delay) to the LO level to start the next cycle. Notice that a Horiz Chop Blank pulse is produced at pin 4 with every fifth Clock pulse. Also notice that with the HORIZONTAL MODE switch set to CHOP, two complete cycles of the Vert Chop signal are produced with each five Clock pulses (repetition rate two-fifths Clock rate) and one complete cycle of the Plug-In Chop Drive for every five clock pulses (one-fifth clock rate). Notice that the large shaded area produced by the Horizontal Chopped Blanking pulse (see Figure 2-20B) is not part of the display time (crt display blanked), However, about the same time segment is displayed from the vertical signal source with or without horizontal chopped blanking, due to the change in repetition rate when in the CHOP horizontal mode.

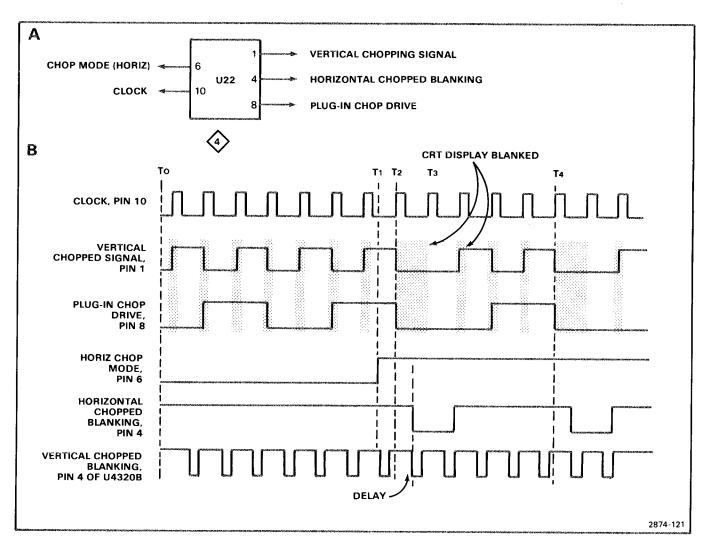


Figure 2-20. (A) Input and output pins for Chop counter IC (U22); (B) Idealized waveforms for Chop Counter stage.

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The Vert Chop signal at pin 1 of U22 is connected to the Vertical Mode Logic stage (see following description) through L26 and R26. This signal is HI when the RIGHT VERT unit is to be displayed and it is LO when the LEFT VERT unit is to be displayed. The Plug-In Chop command at pin 8 is connected to the plug-in units in the vertical compartments through L29 and R29, via the Main Interface board. When this signal is HI, Channel 2 of the plug-in units can be displayed; when this level is LO, Channel 1 can be displayed. The Horiz Chop Blank signal at pin 4 is connected through L35 and R35 to the Horizontal Binary stage U42, and to the Z-Axis Logic stage U190 by way of Q103. When this signal is HI, the crt is unblanked to display the selected signal. When it is LO, the crt is blanked to allow switching between the horizontal units.

Figure 2-21 shows a logic diagram of the Chop Counter stage.

VERTICAL MODE LOGIC

The Vertical Mode Logic stage is made up of discrete components CR17-CR16, CR62-CR61 and buffer Q77-Q79. These components develop the Display Right signal, which is connected to the Main Interface, Vertical Interface, and Trigger Selector circuits to indicate which vertical unit is to be displayed. When this output level is HI, the RIGHT VERT unit is displayed; when it is LO, the LEFT VERT unit is displayed. The VERTICAL MODE switch shown on diagram 2 provides control levels to this stage. This switch provides a HI level on only one of five output lines to indicate the selected vertical mode; the remaining lines are LO. Notice that only four of the lines from the VERTICAL MODE switch are connected to the Mainframe Logic circuit. Operation of this stage is as follows: When the VERTICAL MODE switch is set to RIGHT, a HI level is connected to the base of Q77 through R16. This forward biases Q77, and the positive-going level at its emitter is connected to the emitter of Q79. The collector of Q79 goes HI to indicate that the RIGHT VERT unit is to be displayed. For the CHOP position of the VERTICAL MODE switch, a HI level is applied to the anodes of CR17 and CR16 through R17. Both diodes are forward biased so that the Vert Chop signal from pin 1 of U22 can pass to the base of Q77. This signal switches between the HI and LO levels at a one-megahertz rate and produces a corresponding Display Right command output at the collector of Q79. When the Display Right signal is HI, the RIGHT VERT unit is displayed and when it switches to LO, the LEFT VERT unit is displayed.

In the ALT position of the VERTICAL MODE switch, a HI level is applied to the anodes of CR62 and CR61 through R62. These diodes are forward biased so the Display Right command, originating at pin 6 of the Vertical Binary stage, can pass to the base of Q77 to determine the vertical operating mode. The Display Right command switches between its HI and LO levels at a rate determined by the Vertical Binary stage.

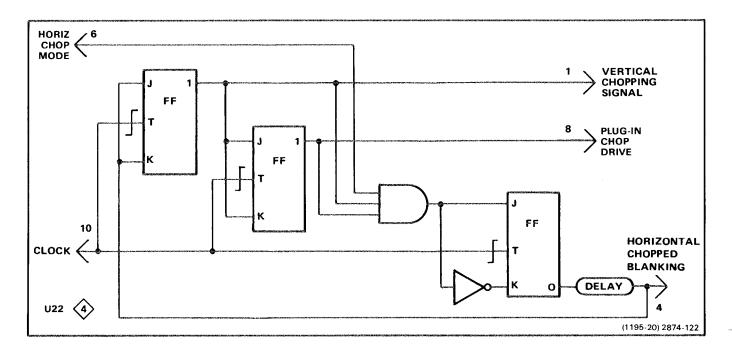


Figure 2-21. Logic diagram of Chop Counter stage.

The control levels in the LEFT and ADD positions of the VERTICAL MODE switch are not connected to this stage. However, since only the line corresponding to the selected vertical mode can be HI, the RIGHT, CHOP and ALT lines must remain at their LO level when either LEFT or ADD are selected. Therefore, the base of Q77 remains LO to produce a LO Display Right output level at the collector of Q79.

A logic diagram of the Vertical Mode Logic stage is shown in Figure 2-22. The discrete components that make up each logic function are identified.

TRACE SEPARATION

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The Trace Separation stage is made up of discrete components Q136, Q141, Q142, and Q146. This stage produces the trace separation output level to the Aux Y input of the Vertical Amplifier circuit (diagram 9) to offset the B sweep display when operated in a dual-sweep mode (horizontal). The level of this output current is determined by the setting of the VERT TRACE SEPARATION (B) control. The current from the VERT TRACE SEPARATION (B) control is switched so that the Aux Y Axis output is provided only when the B sweep is being displayed in the ALT or CHOP horizontal modes and not when the B sweep only is being displayed, nor for independent-pairs operation (sweep-slaving).

The VERT TRACE SEPARATION (B) control provides current to the Aux Y-Axis output through R147 and Q146 when Q146 is forward biased. When the B sweep is being displayed (for ALT or CHOP horizontal operation), the Display B command at the base of Q141 is HI. This forward biases Q141 causing its collector to go negative, forward biasing Q142. This causes Q142 to saturate and its collector goes positive to forward bias Q146. During the time the A sweep is being displayed, the Display B command is LO. This reverse biases Q141 and Q142. At this time, Q146 is reverse biased and the VERT TRACE SEPARATION (B) control is disconnected while the A sweep is being displayed.

When the HORIZONTAL MODE switch is set to B (only), a HI level is connected to the emitter of Q141 through R138. This reverse biases Q141 (even though the Display B command at its base is HI for this mode). Therefore, the VERT TRACE SEPARATION (B) control has no effect. When the VERTICAL MODE switch is set to ALT and the Delay Mode Control level from the A time-base unit is LO (indicating nondelayed sweep operation), a HI level is applied to the emitter of Q141 through R137 and CR137. This HI level reverse biases Q141 (even though the Display B command is HI). This action disconnects the VERT TRACE SEPARATION (B) control for independentpairs operation so that the vertical position of the B sweep display is determined by the slaved LEFT VERT plug-in unit only. If delayed-sweep operation is selected, the Delay Mode Control level is HI to forward bias Q136 and Q141. This allows the VERT TRACE SEPARATION (B) control to position the B sweep display, since independent-pairs operation is not possible when operating in a delayed-sweep mode.

A logic diagram of the Trace Separation stage is shown in Figure 2-23A. The discrete components which make up each logic function are identified. An input/output table for this stage is given in Figure 2-23B.

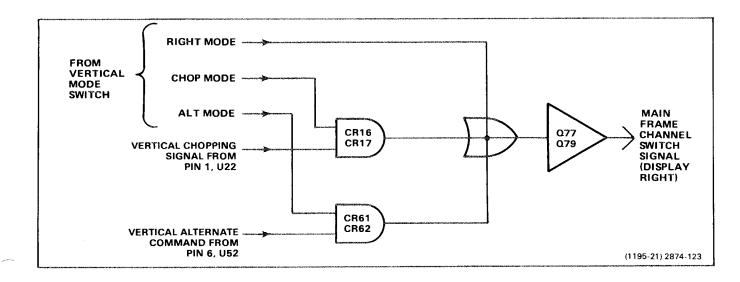


Figure 2-22. Logic diagram of Vertical Mode Logic stage.

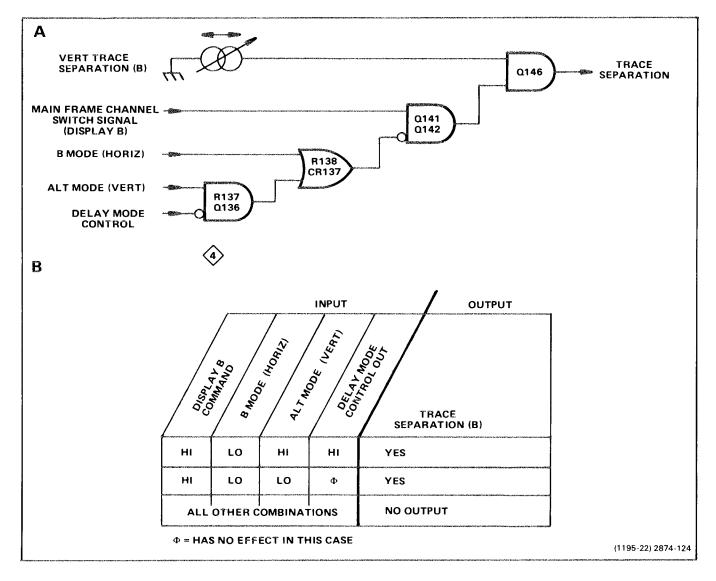


Figure 2-23. (A) Logic diagram of Trace Separation stage; (B) Table of input/output combinations.



The A Trigger Selector circuit determines the source of the internal triggering signals connected to the A HORIZ plug-in compartment. Figure 2-24 shows a detailed block diagram of the A Trigger Selector circuit. A schematic of the A Trigger Selector circuit is shown on diagram 5, in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. Sub-headings in the following discussion use these stage names to aid in locating and identifying the components and portions of the circuitry described.

A TRIGGER CHANNEL SWITCH

The A Trigger Channel Switch stage provides control signals for the Left and Right Trigger Preamplifier stages. The front-panel A TRIGGER SOURCE switch (S352) provides the control signals to operate the A Trigger Channel Switch. When the A TRIGGER SOURCE is set to LEFT, the A Trigger Channel Switch allows the Left Trigger Preamplifier to pass trigger signals from the LEFT VERT plug-in compartment to the A Trigger Output Amplifier. When the A TRIGGER SOURCE switch is set to RIGHT, the A Trigger Channel Switch allows the Right Trigger Preamplifier to pass trigger signals from the RIGHT VERT plug-in compartment to the A Trigger Output Amplifier. When the A TRIGGER SOURCE switch is set to RIGHT VERT plug-in compartment to the A Trigger Output Amplifier. When the A TRIGGER SOURCE switch is set to the RIGHT VERT plug-in compartment to the A Trigger Output Amplifier. When the A TRIGGER SOURCE switch is set to VERT MODE, the A Trigger Channel Switch allows the Right is set to VERT MODE, the A Trigger Channel Switch

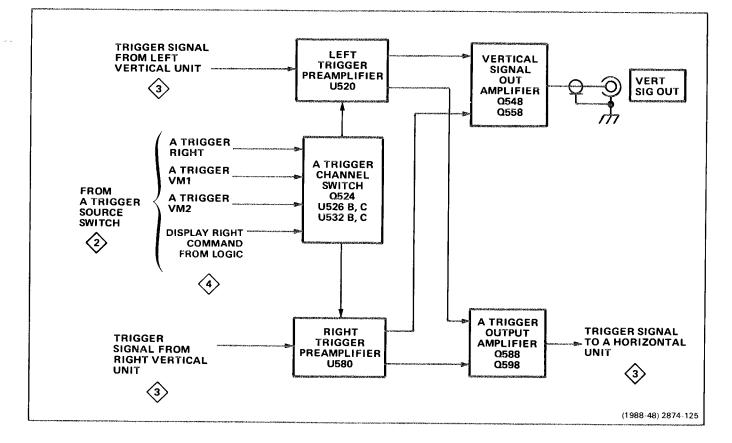


Figure 2-24. Detailed block diagram of the A Trigger Selector circuit.

allows the Left and Right Trigger Preamplifier stages to pass trigger signals from the LEFT and RIGHT VERT plugin compartments to the A Trigger Output Amplifier.

Table 2-2 shows the input and output conditions of the A Trigger Channel Switch, for each combination of the A TRIGGER SOURCE switch and VERTICAL MODE switch. Notice that only the A TRIGGER SOURCE switch controls the output to U520 and U580 when in the LEFT or RIGHT VERT positions. Also, notice that the VERTICAL MODE switch determines the output when the A TRIGGER SOURCE switch is in the VERT MODE position. U520. The logic levels applied to pins 11 and 12 determine if the trigger signal is coupled from the input to the output (pins 9 and 5) or is terminated within the stage. Table 2-2 shows the logic level combinations applied to pins 11 and 12 of both U520 and U580, with all combinations of the A TRIGGER SOURCE switch and the VERTICAL MODE switch. When pin 12 is HI and pin 11 is LO, trigger signals are coupled through the stage. When pin 12 is LO and pin 11 is HI, signals are terminated within the stage.

LEFT AND RIGHT TRIGGER PREAMPLIFIERS

The operation of the Left and Right Trigger Preamplifier stages is similar, therefore only a discussion of the Left Trigger Preamplifier is given.

The Left Trigger Preamplifier, U520, operates as a switching amplifier. Trigger signals from the LEFT VERT compartment are connected to the input pins 1 and 13 of

A TRIGGER OUTPUT AMPLIFIER

The A Trigger Output Amplifier provides the internal trigger signal to the A HORIZ compartment. Transistors Q588 and Q598 are connected as a push-pull amplifier. The DC Center adjustment R586 balances the emitter current of Q588 and Q598 for equal dc output levels. Gain adjustment R589 sets the emitter degeneration of Q588 and Q598 to adjust the gain of the A Trigger Output Amplifier. Components R596 and C596 are

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selected for optimum amplifier bandwidth. The output impedance of this stage is 100 ohms differentially, determined primarily by R584 and R594.

VERTICAL SIGNAL OUT AMPLIFIER

The Vertical Signal Out Amplifier provides the signal to the VERT SIG OUT connector, located on the rear panel. Transistors Q548 and Q558 are connected as a push-pull to single-phase converter. The DC Center adjustment, R547, sets the emitter currents of Q548 and Q558 which determines the quiescent dc output voltage at J548. The source of the output signal is determined by the A TRIGGER SOURCE switch and the VERTICAL MODE switch as shown in Table 2-2.



The B Trigger Selector circuit determines the source of the internal triggering signals connected to the B HORIZ plug-in compartment. Figure 2-25 shows a detailed block diagram of the B Trigger Selector circuit. A schematic of the B Trigger Selector circuit is shown on diagram 6, in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. Sub-headings in the following discussion use these stage names to aid in locating and identifying the components and portions of the circuitry described.

TABLE 2-2								
Input/Output	Combinations for A Trigger Channel Switch							

A TRIGGER SOURCE Switch Positions	VERTICAL MODE Switch Positions	Display Right Command (HI=1 V, LO=-0.5V)		A Trigger Channel Switch Output to U520 and U580					
			Right (HI=5 V, LO=GND	VM1 (HI=4.4 V, LO=-0.6 V)	VM2 (Hi=4.4 V, LO=-0.6 V)	U520		U580	
						Pin 11	Pin 12	Pin 11	Pin 12
						9999 994 - 199 9 996 99 99 99 99 99	, 1992 - Mariel I. B. M. 1998 - 1929 - 1994		
LEFT VERT	Φ ¹	Φ ¹	LO	Open	Open	LO	ні	н	LO
RIGHT VERT	Φ^1	Φ^1	HI	Open	Open	HI	LO	LO	ні
VERT MODE	LEFT	LO	LO	LO	LO	LO	ні	н	LO
	ALT	ALT ²	LO	HI	LO	ALT ²	ALT ²	ALT ²	ALT ²
	ADD	Φ ¹	LO	LO	HI	LO	ні	LO	н
	СНОР	Φ ¹	LO	LO	н	LO	н	LO	н
	RIGHT	HI	LO	HI	LO	ні	LO	LO	Н

¹ Φ—Has no effect in this case.

² Switches between HI and LO at a rate determined by the sweep speed of time-base unit(s) installed in the horizontal compartment(s).

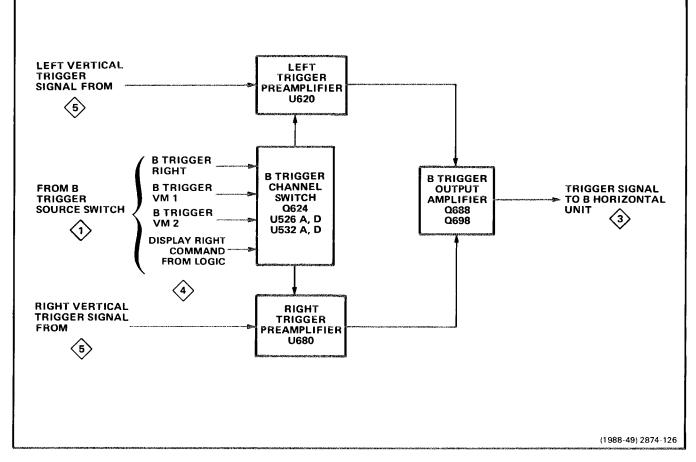


Figure 2-25. Detailed block diagram of the B Trigger Selector circuit.

B TRIGGER CHANNEL SWITCH

The B Trigger Channel Switch provides control signals for the Left and Right Trigger Preamplifier stages. The frontpanel B TRIGGER SOURCE switch (S110) provides the control signals to operate the B Trigger Channel Switch. When the B TRIGGER SOURCE is set to LEFT, the B Trigger Channel switch allows the Left Trigger Preamplifier to pass trigger signals from the LEFT VERT plug-in compartment to the B Trigger Output Amplifier. When the B TRIGGER SOURCE switch is set to RIGHT, the B Trigger Channel Switch allows the Right Trigger Preamplifier to pass trigger signals from the RIGHT VERT plug-in compartment to the B Trigger Output Amplifier. When the B TRIGGER SOURCE switch is set to VERT MODE, the B Trigger Channel Switch allows the Left and Right Trigger Preamplifier stages to pass trigger signals from the LEFT and RIGHT VERT plug-in compartments to the B Trigger Output Amplifier.

Table 2-3 shows the input and output conditions of the B Trigger Channel Switch, for each combination of the B TRIGGER SOURCE switch and the VERTICAL MODE switch. Notice that only the B TRIGGER SOURCE switch controls the output to U620 and U680 when in the LEFT or RIGHT VERT positions. Also, notice that the VERTICAL MODE switch determines the output when the B TRIGGER SOURCE switch is in the VERT MODE position.

LEFT AND RIGHT TRIGGER PREAMPLIFIERS

The operation of the Left and Right Trigger Preamplifier stages is similar, therefore, only a discussion of the Left Trigger Preamplifier is given.

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The Left Trigger Preamplifier, U620, operates as a switching amplifier. Trigger signals from the LEFT VERT compartment are connected to the input pins 1 and 13 of U620. The logic levels applied to pins 11 and 12 determine if the trigger signal is coupled from the input to the output (pins 9 and 5) or is terminated within the stage. Table 2-3 shows the logic level combinations applied to pins 11 and 12 of both U620 and U680, with all combinations of the B TRIGGER SOURCE switch and the VERTICAL MODE SWITCH. When pin 12 is HI and pin 11 is LO, trigger signals are coupled through the stage. When pin 12 is LO and pin 11 is HI, trigger signals are terminated within the stage.

B TRIGGER OUTPUT AMPLIFIER

The B Trigger Output Amplifier provides the internal trigger signal to the B HORIZ compartment. Transistors Q688 and Q698 are connected as a push-pull amplifier. The DC Center adjustment R686 balances the emitter currents of Q688 and Q698 for equal dc output levels. Gain adjustment, R689, sets the emitter degeneration of Q688 and Q698 to adjust the gain of the B Trigger Output Amplifier. Components R696 and C696 are

selected for optimum amplifier bandwidth. The output impedance of this stage is 100 ohms differentially, determined primarily by R684 and R694.



The Vertical Channel Switch circuit selects the vertical deflection signal from the output of the LEFT and/or RIGHT VERTical plug-in compartment(s) for display on the crt. The block diagram in Figure 2-26 shows how the various portions of the Vertical Amplifier circuitry relate to each other, of which the Vertical Channel Switch is a part.

A schematic diagram of the Vertical Channel Switch is given on Diagram 7, in section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. These stages aid in locating components mentioned here. Sub-headings in the following discussion use the stage names to further identify portions of the circuitry on diagram 7.

B TRIGGER SOURCE Switch Positions	VERTICAL MODE Switch Positions	Display Right Command (HI=1 V, LO=-0.5 V)		B Trigger Channel Switch Output to U620 and U680					
			Right (HI=5 V, LO=GND)	VM1 (HI=4.4 V, LO=-0.6 V)	VM2 (HI=4.4 V, LO=-0.6 V)	U620		U680	
						Pin 11	Pin 12	Pin 11	Pin 12
	an mangan ga nganga ang ng managa na ang pang na ng pang ng pang ng			n a na manana ana ana ana ana ana ana an					
LEFT VERT	Φ1	Φ ¹	LO	Open	Open	LO	Ні	ні	LO
RIGHT VERT	Φ^1	Φ^1	н	Open	Open	н	LO	LO	н
VERT MODE	LEFT	LO	LO	LO	LO	LO	HI	н	LO
	ALT	ALT ²	LO	ні	LO	ALT ²	ALT ²	ALT ²	ALT ²
	ADD	Φ^1	LO	LO	н	LO	ні	LO	н
	СНОР	φ ¹	LO	LO	HI	LO	н	LO	н
geografie george and and an one and the line line of an and the second se	RIGHT	HI	LO	ні	LO	HI	LO	LO	н

TABLE 2-3 Input/Output Combinations for B Trigger Channel Switch

¹ Φ---Has no effect in this case.

² Switches between HI and LO at a rate determined by the sweep speed of time-base unit(s) installed in the horizontal compartment(s).

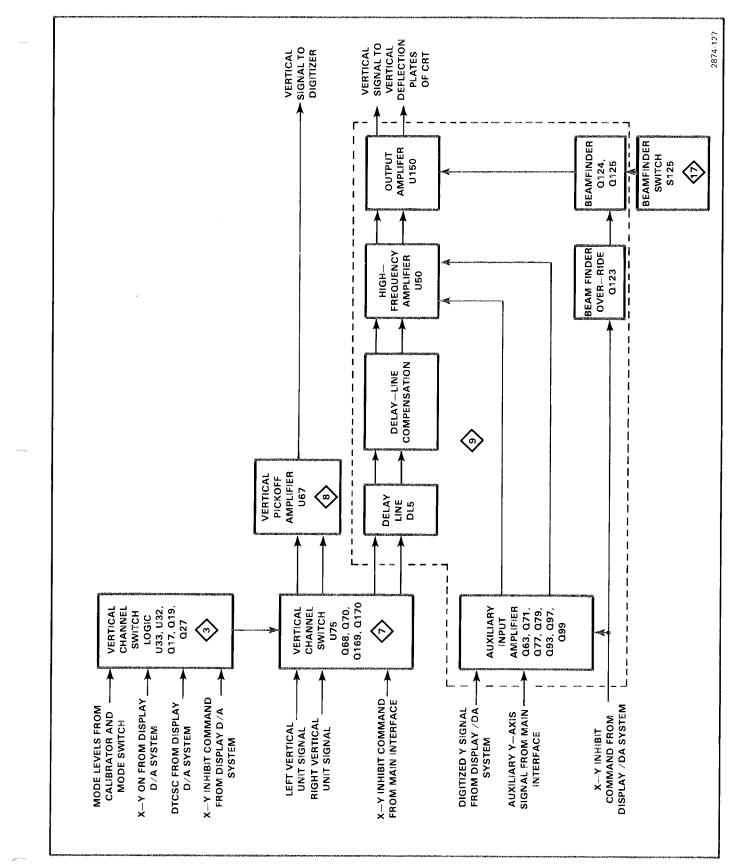


Figure 2-26. Vertical Amplifier detailed block diagram.

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2-35

CHANNEL SWITCH

The vertical deflection signals from the Left and Right vertical plug-in units are coupled through the stage as determined by the Vertical Channel Selector stage. The Channel Switch stage is made up primarily of hybrid circuit U75. Inputs 7 and 9 provide a differential input for the signal from the RIGHT VERT plug-in unit. Input pins 17 and 19 provide a differential input for the signal from the LEFT VERT plug-in unit. The output signal from the delay line to the Vertical Amplifier (diagram 9) at pins 12 and 13, and the vertical signal going to the Vertical Pickoff Amplifier (diagram 8) at pins 2 and 3 are differential signals, which are connected to J90, J89, J194 and J193 respectively. Differential input signals from the RIGHT and LEFT VERT plug-ins may be routed to either of the two differential outputs of U75. One output goes to the Vertical Amplifier circuitry (pins 12 and 13) while the other is provided to drive the Vertical Pickoff Amplifier circuitry (pins 2 and 3). Figure 2-27 demonstrates signal distribution by the Vertical Channel Switch, Output signal selecting is dependent upon signals received and developed by the Vertical Channel Selector stage which will be discussed later in this section.

OUTPUT VOLTAGE REGULATORS

Transistors Q179, Q186, Q187, Q188 and their associated components compose a voltage regulator circuit that supplies standing current to a portion of U75 and maintains the output common-mode dc level to the Vertical Pickoff Amplifier at +5.2 volts for all Vertical Channel Switch modes. The common-mode level at pins 2 and 3 of U75 is sensed by Q188 through R191 and R192 and compared with a reference level of +5.2 volts determined by R182 and R183. Assume, for example, that the base voltage of Q188 is lower than that at the base of Q186, indicating an average output level below +5.2 volts. The collector of Q186 will be driven LO, turning on Q187, which turns on Q179. This makes pin 3 more positive which raises the output common-mode level at pins 2 and 3. These outputs continue in the positive direction until the average voltage level sensed by Q188 through R191 and R192 is equal to the reference voltage on the base of Q186. This is the balanced condition.

Transistors Q79, Q86, Q87, Q88 and their associated components compose a voltage regulator circuit referenced at +5.8 volts, supplying standing current to a

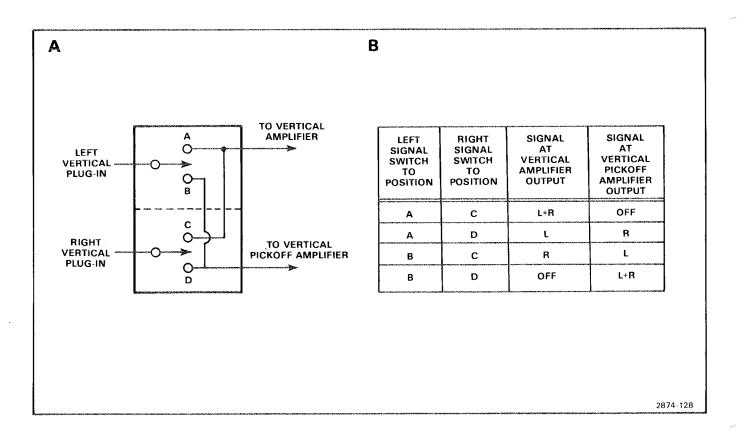


Figure 2-27. (A) Functional diagram of Vertical Channel Switch; (B) Table showing signal distribution by the Vertical Channel Switch.

portion of U75 and maintaining the common-mode dc level to the Vertical Amplifier at +5.8 volts. Operation of this regulator is identical to the regulator described above.

CR94 and CR95 between output jacks J90 and J89 act an an attenuation network for high-frequency signals that pass through the Vertical Channel Switch to the Vertical Amplifier output due to small stray capacitances coupling through the device. During normal display of a waveform, CR94 and CR95 are reverse biased by the voltage divider established by R94 and R95, and do not affect the signal. When no signal is desired at J90 and J89, the X-Y Inhibit signal at the base of Q99 goes HI, pulling its collector LO to about +2 volts. This turns on both CR94 and CR95, essentially shorting J90 and J89 together. All signals are attenuated.

High-frequency compensation of signals going to the Vertical Pickoff Amplifier is provided by the adjustable rc network, R195 and C195.

VERTICAL CHANNEL SELECTOR

The Vertical Channel Selector interfaces the logic signals arriving from the Main Interface (diagram 3) to the Channel Switch, U75. The Vertical Channel Switch requires two pairs of complementing control voltages; one pair for each channel. The HI control voltage is +2.7 volts, and the complementing LO voltage is +2.0 volts. To select a channel, the HI level must be applied to the ON in at (pin 20 for left, pin 10 for right) and the LO level must appear at the OFF input (pin 1 for left, pin 11 for right). To inhibit a channel, the control voltages should be reversed. Operation of both halves of the Vertical Channel Selector are identical. Therefore, only the operation of the right Vertical Channel Selector will be discussed.

The pair of complimentary control voltages applied to pins 10 and 11 of U75 are developed by the emitter coupled pair transistors Q69 and Q70, from a single ended logic signal (Display Right) from the Main Interface.

The base of Q70 is referenced at about +0.5 volt by resistors R72 and R73. If, for example, the Display Right command connected to the base of Q69, through R66, should go LO (about +0.2 volt), the voltage divider R66 and R67 causes the base of Q69 to go to about +0.07 volt. Since the base of Q70 is referenced at +0.5 volt and the emitters of both Q70 and Q69 are at approximately -0.2 volt (0.7 volt lower) Q69 is cut off and Q70 is conducting. The collector of Q69 goes HI, approaching the +2.8 volts supply voltage. The voltage level at pin 10

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of U75 (the collector of Q70) goes to about +2 volts, a level primarily determined by emitter resistor R71 and the collector load R70. When the Display Right command connected to the base of Q69 through R66 goes HI (to about +3.4 volts), the voltage divider R66 and R67 causes the base of Q69 to go to +1.1 volts which pulls its emitter and the emitter of Q70 to +0.4 volt. This turns Q69 on and cuts off Q70. The voltage at pin 10 of U75 (the collector of Q70) goes HI, approaching the +2.8 volts supply voltage, while the voltage level at pin 11 of U75 (the collector of Q69) goes to about +2 volts. This level is primarily determined by R71 and R69 and the impedance of U75A at pin 11.

The controlling logic for the Vertical Channel Selector (Display Left and Display Right commands) is on the Main Interface board (diagram 3).

RIGHT AND LEFT CHANNEL FEEDBESIDE

The operation of the Right and Left Channel Feedbeside stages are identical. Therefore, only a discussion of the Right Channel Feedbeside is given.

The function of the Feedbeside stage is to compensate for low-frequency imperfections in the frequency response of the Channel Switch stage, U75. Self heating of the transistor base-emitter junctions in some transistors within U75 causes the low-frequency gain to appear larger than the midband gain. To correct this, a portion of the input signal is picked off through R6 and R9 and applied to U11. This differential signal is converted to a single-ended signal and distributed into five rc (resistive-capacitive) networks, each having a different time constant. Variable components R25, R33, R37, R42, R45 and C50 are adjusted to provide an accumulated waveform. This waveform is converted to a differential signal by U50, Q59, and Q60, and is then injected into U75 through pins 6 and 4, where it is subtracted from the signal entering U75 at pins 7 and 9. Proper adjustment results in flat-frequency response and optimum-transient response at the output pins 12 and 13.

SECONDARY SUPPLY REGULATORS

Transistors Q233, Q243 and their associated components make up simple voltage regulators to drop existing regulated supplies to voltages required by circuitry on the Vertical Channel Switch Board. Each transistor acts as an emitter follower with output voltages determined by the voltage divider resistors at each base.



The Vertical Pickoff Amplifier and its related circuitry provide amplification of the push-pull signals from the Vertical Channel Switch (diagram 7) and convert them to the single-ended signal required to drive the vertical portion of the digitizer circuitry. The schematic diagram of the Vertical Pickoff Amplifier is given on diagram 8, in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. Sub-headings in the following discussion use these stage names to aid in locating and identifying the components and portions of the circuitry described.

PICKOFF AMPLIFIER

The Pickoff Amplifier, made up primarily of U65, accepts the push-pull signals from the Vertical Channel Switch (diagram 7) at its input pins 4 and 10. The push-pull outputs of U65 at pins 2 and 8 are converted to a singleended signal and pass through Q105 to the digitizer circuitry. Transistor Q125 sets the quiescent collector voltage of the output transistor at pin 8 of U65 while Q115 provides biasing and drift compensation for the transistors within U65. Transistor Q105 provides a path for low-frequency signals between pin 2 of U65 and the Sampling Bridge stage of the Vertical and Horizontal Sampler (diagram 20) via the delay line. Transistor Q104 effectively causes all signal current at the emitter node of Q105 to pass through that transistor (approximately 100% signal transfer) by injecting a current into the signal path (at the emitter of Q105) equal to the signal current lost through Q105's base-emitter junction. Capacitor C105 provides a signal path for moderate and high-frequency signals. The rc networks between pins 5 and 6, 11 and 12 and pins 5 and 11 provide compensation for the amplifier at various frequencies as determined by their time constants. Resistors R43 and R63 are selected to set amplifier gain.

Operational amplifier U21 provides proper emitter current for transistors within U65 by sensing the average emitter voltages at pins 6 and 12 of U65 (through R19 and R20) and comparing it to its reference voltage set by R21 and R22.

VOLTAGE/CURRENT REGULATOR

Active devices U73A, U73B, Q93, Q94 and their associated components compose a Voltage/Current Regulator to maintain signal integrity independent of small changes in supply voltages. Any change in current through Q94 develops a change in voltage across R91. This voltage change, tied to pin 6 of U73B, is referenced

to the voltage at pin 5 of U73B set by the Center adjustment, R80. Since any voltage difference between pin 6 and the reference voltage at pin 5 of U73B is amplified and inverted by U73B, the voltage at the base of Q93, and thus at its emitter, is forced to follow in the same direction. The current at its emitter is greatly multiplied and applied to the base of Q94. This current change at the base of Q94 causes a corresponding (but multiplied) change in current at its emitter until the preset current is flowing through R91. This is the balanced condition and any subsequent change in current causes this regulation process to occur again.

U73A is connected as a feedback amplifier referenced to ground through R72. Resistor R71, tied to pin 2 of U73A, allows the amplifier to sense any change in the -5 volts supply voltage, and transmit a correction signal to the current regulator (U73B, Q93 and Q94) through R77.



The Vertical Amplifier circuit provides final amplification for the vertical signals from the vertical plug-ins before it is applied to the vertical deflection plates of the crt. The Vertical Amplifier also accepts inputs from the Display D/A and Amplifier circuit (diagram 34) to produce the vertical portion of the stored waveforms and the alphanumeric display. An input is provided for the BEAMFINDER switch to compress an over-scanned display within the viewing area of the crt. In addition, the Vertical Amplifier accepts the A Y Axis (Aux Y) input signal from the Main interface circuit. Figure 2-26 shows a block diagram of the Vertical Amplifier circuit and a schematic is provided on diagram 9 in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray lines separating the circuitry into major stages. Sub-headings in the following discussion use these stage names to aid in locating and identifying the components and portions of the circuitry discussed.

DELAY LINE

Delay Line DL5 provides approximately 65 nanoseconds of delay (for the vertical signal) to allow the horizontal circuits time to initiate a sweep before the vertical signal reaches the vertical deflection plates of the crt. This allows the instrument to display the leading edge of the signal originating the trigger pulse when using internal triggering. The delay line used in this instrument has a characteristic impedance of 100 ohms differentially. It is of the coaxial type that does not produce preshoot or phase distortion in the crt display.

AUXILIARY INPUT AMPLIFIER

The Auxiliary Input Amplifier controls the bias current to the High-Frequency Amplifier stage and thus the centering for the Output Amplifier stage. This stage also provides for Display D/A and auxiliary (Aux Y) inputs to the Main Vertical Amplifier circuit.

Auxiliary Y-axis (Aux Y) signals are connected to the base of Q93. Transistors Q93 and Q71 are connected as a paraphase amplifier to convert the single-ended input to a push-pull output to drive Q77 and Q97. The X-Y Inhibit command from the Display D/A circuit goes HI when stored waveform or alphanumeric character information is to be displayed. This HI level turns on Q63. The emitter of Q63 goes HI to turn off Q93 and Q71, thus blocking any auxiliary Y-axis signals. During the display of stored waveforms or alphanumeric characters, bias current to Q77 and Q97 is supplied through R65, R68 and R88. The display RO-WFM Ctr (readout-waveform centering) adjustment, R65, balances this bias current to adjust the vertical position of the stored waveform and alphanumeric portion of the crt display. The Vert Ctr (vertical centering) adjustment, R105, balances the quiescent dc levels in this stage so the trace is displayed at the center of the crt when the inputs to the High-Frequency Amplifier stage are at the same potential.

The signal at the collectors of Q77 and Q97 is applied to the bases of Q79 and Q99 through R77 and R97. For the display of stored waveforms or alphanumeric characters, the RO-WFM Y signal from the Display D/A and Amplifier system is connected to the base of Q77 through R81 and R75. Since the signal from the vertical plug-in unit is blocked in the Vertical Channel Switch circuit (diagram 7), the RO-WFM Y signal provides the

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only vertical deflection. This signal is connected to the base of Q77 and results in a differential signal at the collectors of Q79 and Q99. This differential signal is applied to the bias inputs of U50 in the High-Frequency Amplifier stage and provides readout deflection.

HIGH-FREQUENCY AMPLIFIER

The High-Frequency Amplifier stage, consisting primarily of integrated circuit U50, provides a 50-ohm input impedance (100 ohms differentially) to permit accurate delay-line termination. The components connecting the input signal to U50 provide forward termination and compensation for the delay line. Components R18 and C18 provide adjustable high-frequency compensation. The internal circuitry of U50 is represented on diagram 9. Terminals to the emitters of the input transistors of U50 at pins 5-6 and 11-12 permit the quiescent operating conditions of the stage to be set by discrete components. Resistors R41 and R48 set the quiescent operating level; resistors R43 and R47 are selected to accurately set the gain of the differential channels. These emitter inputs also provide a means of injecting the output of the Auxiliary Input Amplifier stage. The Vertical Gain adjustment R160, sensitor RT133, R133 and R163 set the resistance between the output terminals of U50 to control the current gain of this stage. This adjustment sets the overall gain of the main Vertical Amplifier circuit; the sensitor provides thermal compensation.

OUTPUT AMPLIFIER

The Output Amplifier stage, consisting primarily of integrated circuit U150, provides final amplification for the vertical signal to drive the crt vertical deflection plates. A representation of the internal circuitry of U150

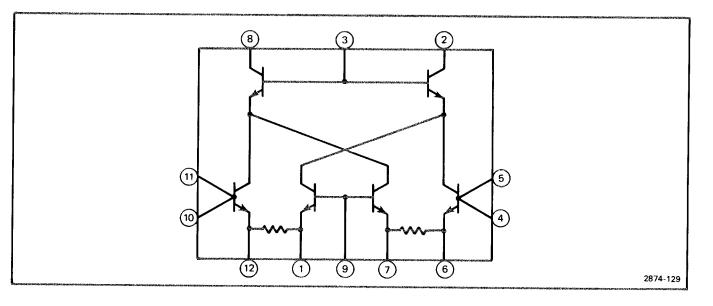


Figure 2-28. U150 internal circuitry representation.

is shown in Figure 2-28. Terminals to the emitters of the input transistors at pins 1-12 and 6-7 allow the use of discrete components to establish the quiescent operating characteristics of this stage. Resistors R143 and R173 are selected to accurately set the gain of the differential channels. R136, R137, R167, R166 and R126 set the operating level of this stage. The series rc networks in parallel with R143 and R173 provide frequency compensation for uniform gain at all frequencies within the bandpass of this instrument.

The signal at the output collectors of U150 is connected directly to the vertical deflection plates of the crt. A distributed deflection plate system is used in this instrument for maximum frequency response and sensitivity. The signal at the output of U150 is connected to the deflection-plate structure in the crt and then to termination network L81, R81, R83A, L82, R82, and R83B. As the signal passes through the deflection-plate structure in the crt, its velocity is essentially the same as the velocity of the electron beam passing between the vertical deflection plates. This synchronism of the deflection signal and the electron beam reduces the loss in high-frequency sensitivity due to electron-transmit time through the deflection-plate structure.

OUTPUT PROTECTION

Transistors Q192 and Q196 compose a protection circuit for U150, in case the +15 volt supply is shorted to ground. If this occurs Q192 turns on causing the base of Q196 to drop below +35 volts. Thus, the emitter voltage of Q196 is kept at a safe level for U150.

BEAM FINDER/BEAM FINDER OVERRIDE

The BEAM FINDER switch, S69 (diagram 17), switches Q124 and Q125 to provide the beam-finder function. Normally, the emitter current for U150 is supplied from +5 volts through Q125 and R126. However, when S69 is actuated, Q124 is turned on. This turns off Q125 and the emitter current source for U150 is now through R127 and R126. This limits the dynamic range of this stage by limiting its current, so the display is compressed vertically within the graticule area.

The Beam Finder Override stage overrides the beamfinder function as determined by the X-Y Inhibit command from the display system. Quiescently, the X-Y Inhibit command is LO with Q123 and Q124 cut off. Transistor Q125 is saturated, providing normal emitter current to U150. When the BEAM FINDER switch is actuated, Q124 turns on which turns Q125 off. Resistor R127 then limits the current for the Output Amplifier. When stored waveform or alphanumeric character information is to be displayed, the X-Y Inhibit command goes HI to turn on Q123. The resultant LO on the collector of Q123 causes Q124 to turn off, which saturates Q125. The current necessary for full-range operation of U150 is supplied from +5 volts through Q125 during this time.



HORIZONTAL CHANNEL SWITCH AND PICKOFF AMPLIFIER

A schematic diagram of the Horizontal Channel Switch and Pickoff Amplifier is given on diagram 10, in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. Sub-headings in the following discussion use these stage names to aid in identifying the components mentioned here and individual portions of the circuitry on diagram 10.

HORIZONTAL CHANNEL SWITCH

The Horizontal Channel Switch stage is made up of U20 and its associated components. The horizontal signal going to the Horizontal Amplifier (diagram 11) at pins 12 and 13 of U20 is selected from the A plug-in signal at pins 2 and 15 of U20, or the B plug-in signal at pins 7 and 10 of U20, depending on the level of the Display B command as determined by U143 on the Main Interface board (diagram 3).

When the Display B Command at pin 4 of U20 is HI, the signal from the B plug-in is coupled to the output of U20. When the Display B Command is LO, the signal from the A plug-in is coupled to the output of U20. When the X-Y Inhibit command at pin 6 of U20 is LO, signals from the Horizontal plug-ins may be transferred to the Horizontal Channel Switch, U20, output as just described. If, however, the X-Y Inhibit command is HI, the Horizontal Channel Switch is disabled and no signals may be transferred through the device.

PICKOFF AMPLIFIER

The Pickoff Amplifier stage is made up of Q32, Q62, Q35, Q65, Q37, Q66, Q67 and their associated components. The Pickoff Amplifier converts the push-pull output signal of U20 to the single-ended signal required by the digitizer circuitry, providing gain at the same time.

Transistors Q32 and Q62, with the push-pull output signals from U20 applied to their bases through R32 and R62, provide input to the stage. Transistors Q35 and Q65 are connected to the collectors of Q32 and Q62 respectively in the cascode configuration to enhance the frequency response of the amplifier. Collector current of Q35 flows through R36, CR36, Q37, and R37 to -5 volts, developing a voltage drop across R37. The voltages at the base of Q37 and Q67, and thus the emitter of Q67, is

dependent on the emitter current of Q37. Since R37 and R67 are the same value and the voltage across them is the same, the current flowing through Q67 and Q66 is equal to the current flowing in Q37. This current is added to the current flowing through Q65. Any change in current through Q37 shows up as an equal change in current through Q67 and Q66. Thus, the single-ended signal at the junction of the collectors of Q65 and Q66 contain components of both portions of the push-pull signal currents present at the collectors of Q35 and Q65. This signal is applied through delay line DL64 to the horizontal sampler circuit.

Variable resistor R45 is the dc Center adjustment and R42 sets the gain of the amplifier. The variable components R41, C41, R65 and C65 are high-frequency compensation adjustments.

X-Y DELAY COMPENSATION (OPTION 2)

The X-Y Delay Compensation network (Option 2 only) provides a delay for the horizontal (X) signal from the B HORIZ plug-in compartment to match the delay of the vertical (Y) signal due to the Delay Line stage (diagram 9). This circuit may or may not be activated depending on the type of plug-in in the B HORI compartment and the plug-in's mode.

The horizontal (X) signal from the A HORIZ plug-in compartment is coupled directly to the Horizontal Channel Switch, without a delay compensation network.

Time-Base Operation

When the plug-in unit installed in the B HORIZ compartment is operated as a standard time-base unit to produce a horizontal sweep for deflection of the crt beam, the B delay portion of the X-Y Compensation network is effectively disabled. The X-Y Compensation command, applied to pin BY is a HI and relays K822 and K838 are not actuated. Therefore, the relay contacts remain in the normally-closed position so the B horizontal signal passes directly through this network to the Horizontal Channel Switch stage.

X-Y Operation

If the time-base unit installed in the B HORIZ compartment is operated as an amplifier, or if an amplifier unit is installed in the B HORIZ compartment, the X-Y Compensation command to the B delay compensation network is held at ground. This actuates relays K822 and K838 to connect the X-Y Compensation network into the circuit. The B horizontal signal then passes through the X-Y Compensation Board, where the horizontal signal is delayed to match the vertical signal.

The (X-Y) Compensation network is an optional feature. For instruments which are not equipped with this feature, the B horizontal signal from the B HORIZ plug-in compartment is connected directly to the Horizontal Channel Switch through the Horizontal Interconnect Board.



The schematic diagram of the Horizontal Amplifier is given on diagram 11, in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. Sub-headings in the following discussion use these stage names to aid in locating and identifying the components and circuitry described.

INPUT AMPLIFIER/BEAMFINDER

The horizontal signal from the Horizontal Channel Switch and Pickoff Amplifier circuit (diagram 10) is connected to the bases of O21 and O121 via R21 and R121. The gain of this stage is controlled by the resistive network between the emitters of Q21 and Q121. The horizontal Gain adjustment, R30, is variable to set overall gain. The horizontal Ctr (centering) adjustment R15 balances the base currents of Q21 and Q121 to horizontally center the display. The emitter current for this stage is normally supplied from the +15 volt supply through Q197. However, when the front-panel BEAMFINDER switch is actuated, the base of Q197 goes HI and the transistor is cut off. Emitter current to Q21 and Q121 is reduced, as it is now supplied through R133. This reduction of emitter current limits the dynamic range of Q21 and Q121. At the same time, current now flowing in R133 pulls the base of Q134 negative, turning the transistor on. The bias currents for Q41 and Q141 are maintained at nearly the same level, for, as the BEAMFINDER switch is actuated, the current through R134 and Q134 flows through R37 and R137 to compensate for the smaller currents through Q21 and Q121. The reduction of emitter current in Q21 and Q121 effectively reduces the gain of the horiontal system and reduces its dynamic range to keep the crt display within the horizontal limits of the graticule, regardless of the setting of positioning controls or signal amplitude.

The RO-WFM X (readout or waveform horizontal) signal input at JT2 is a single-ended input from the display D/A and Amplifier circuit and is the source of all digitized and alphanumeric display information coming onto the board. It is applied to the paraphase amplifier made up of Q3 and Q103 through R2 and is converted to a push-pull signal to drive Q41 and Q141 of the Driver Amplifiers and Active Peaking stage.

DRIVER AMPLIFIERS AND ACTIVE PEAKING

The left and right Driver Amplifiers each consist of a single inverting transistor stage followed immediately by an Active Peaking network. Transistors Q41 and Q141 make up the left and right Driver Amplifier stages respectively. Both act as shunt feedback amplifiers, converting current signals at their bases to voltage signals of low impedance at their collectors.

The Active Peaking networks are composed of Q51, Q151 and their related components. The signal at the collector of Q141 is coupled through R143 to the bases of Q161 and Q162 of the Output Amplifier stage and to the base of Q151 of the right Active Peaking circuit. Transistor Q151 is connected as an emitter follower stage providing current gain, which is coupled through R154, C154, and C155 to the input of the right Output Amplifier stage. This differentiated signal current (differentiated by C154 and C155) is added to the dc coupled signal current passing through R143, providing the current necessary to charge the feedback capacitor, C166, when a fast transition occurs. The amount of differentiated signal current added to the dc signal may be adjusted by C155 to obtain best signal response.

Operation of the left Active Peaking circuit is identical to that described above for the right Active Peaking circuit. Transistor Q63, along with resistors R53, R55, R56 and R57; provide proper biasing of Q61 and Q62 with changes in temperature.

Capacitor C52 between the left and right Active Peaking circuits serves to somewhat balance the signal transfer characteristics of the separate circuits by providing a means for signal variations to be equally shared in both circuits. Lets assume, for example, that the signal at the bases of Q51 and Q151 were equal and opposite but the signal at the emitter of Q51 tended to rise in the positive direction faster than the signal at the emitter of Q151 were transition is reflected as a negative transition at the collector of Q51. This change is coupled through C52 to the collector and thus to the emitter of Q151. This coupling tends to speed up the slower signal and to slow down the faster signal, resulting in approximately equal and opposite signals at the emitters of the transistors.

OUTPUT AMPLIFIERS

The right Output Amplifier consists of a current driven feedback amplifier. The common junction point at the bases of Q162 and Q161 is the input to the stage while the common junction point at the collectors of Q173 and Q169 is the output. Components R166 and C166 make up the feedback loop. Signals at the bases of Q162 and Q161 are amplified and inverted, and then pass through Q169 connected in the common base configuration to drive the Horiz (+) deflection plate of the crt. Signals coupled to Q173 through R171 and C171 are coupled to the output of the amplifier stage to provide additional output signal current at the Horiz (+) crt plate, enabling fast positive voltage transitions to take place.

Operation of the left Output Amplifier is the same as just described for the right Output Amplifier. Zener diode VR63 is added between the input transistors (Q61-Q62) and the output transistors (Q69-Q73) to maintain proper operating voltages within the input and output circuits.

The Limit Center adjustment, R160, provides a variable current to both left and right Output Amplifiers to more closely balance their operation.

Diodes CR160 and CR159 act to balance out quiescent voltage level differences between the left and right Output Amplifiers, due to using different polarity transistors at the inputs, and to ensure that the proper current will flow in R159 with changes in ambient temperature.

Zener diode VR79 and resistor R79 provide bias for Q73 and Q69 operating in the common base configuration. Potentiometer R33 is used to adjust the stability of the character readout display.



The Output Signals circuit provides signals to the connectors located on the rear panel. These output signals are samples of signals from the associated plugin units. In addition, this circuit contains the Single Sweep Reset input. A schematic of the Output Signals is given on diagram 12, of Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. Sub-headings in the following discussion use these stage names to aid in locating and identifying the components and portions of the circuitry described.

SAWTOOTH AMPLIFIER

The sawtooth signals from the A and B time-base units are connected to the Sawtooth Amplifier stage through series resistors R163 and R164 respectively (see diagram 3). Sweep Selector switch S3 determines whether the A Sweep or the B Sweep sawtooth signal provides the \pm SAWTOOTH OUT signal. The unused sawtooth signal is terminated by R3 to provide a constant load to the signal source.

Transistors Q10, Q11 and Q17 compose an inverting feedback amplifier. Gain of the stage is about two, as determined by the ratio of feedback resistor R16 to the input resistance (made up of R9 and either R163 or R164, depending on which sawtooth source is selected). The rc network, composed of R17-C17, provides frequency-response stabilization for this stage.

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Diode CR12 provides protection from high-amplitude positive voltages inadvertently connected to the output connector. This diode provides a current path to the +15 V supply through the collector-base junction of Q17. When the diode is forward biased, it clamps the base of Q17 at +15 volts. Diode CR19 provides protection from highamplitude negative voltages at the \pm SAWTOOTH OUT connector by clamping the output if it attempts to go more negative than about --15.6 volts.

GATE AMPLIFIER

The + GATE OUT signal is selected from three input gate signals by Gate Selector switch S46. In the A position, the Sweep Gate A signal from the A HORIZ compartment is connected to the base of emitter-follower Q62. The base of Q49 is connected to ground by S46 so the circuit operates as a common-base stage. Transistor Q62 provides a high-input impedance for the stage while the emitter coupling between the transistors provides temperature compensation. Operation is the same in the B position of the Gate Selector switch, except that the gate signal from the B HORIZ compartment provides the input signal.

In the Dly'd position, the Gate Selector switch connects the base of Q62 through R59 to ground and disconnects the A Gate and B Gate signals. The other section of the Gate Selector switch opens to allow the Delay Gate signal from the delaying time-base unit to reach the base of Q49. Transistor Q49 inverts this negative-going Delay Gate signal so that all three gate signals at the + GATE OUT connector are positive going.

Diode CR76 provides temperature compensation for Q77. Diode CR77 protects Q77 if a high-level positive voltage is applied to the + GATE OUT connector, and CR78 clamps the collector of Q77 at about -0.6 volt if a negative voltage is applied to the output connector.

SINGLE SWEEP RESET

The Single Sweep Reset input is provided to work in conjunction with horizontal plug-in units capable of performing the single-sweep function.



The schematic diagram of the Z-Axis and Focus Amplifier is given on diagram 13, in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. Sub-headings in the following discussion use these stage names to aid in locating and identifying the components and portions of the circuitry discussed.

Z-AXIS AMPLIFIER

The Z-Axis Amplifier provides the drive signal to the crt control grid to control the crt intensity. The Z-Axis signal from the Mainframe Logic circuit (diagram 4) and the Ro Z-Axis (display intensity) signal from the Display D/A and Amplifier circuit are connected to the emitter of Q113 through R110 and R109, and from the input signals to the Z-Axis Amplifier. The output of the Z-Axis Amplifier at the collectors of Q173 and Q183 provides the drive signal to control the crt intensity level through the Control-Grid DC Restorer stage of the High Voltage Power Supply and CRT circuit (diagram 14).

Transistor Q113 is a common-base amplifier, and is used to establish a low input impedance for the Z-Axis Amplifier. Transistors Q122, Q127, Q132 and Q143 form a noninverting, current-driven, operational amplifier; the Z-Axis Ampl Gain, R125, and Output Level, R135, are set in this stage. The output stage of the Z-Axis Amplifier circuit consists of Q167, Q166, Q173, Q184 and Q183 in a high-speed operational amplifier configuration.

Transistor Q162 is a constant-current source for Q167 and Q166. The signal at the emitter of Q143 is dc coupled to the bases of Q167-Q166 through R166 to provide a fast rising pulse at the output of Q173. Transistors Q184 and Q183 maintain the output level of the Z-Axis Amplifier. The Z-Axis Amplifier is compensated to provide a fast rising pulse with optimum square corner by C180, C155, R155, C150 and R150.

Comparator U105 provides the GSF (good signal flip-flop) logic level going to the Digitizer Control Logic circuit (diagram 21). The reference voltage at pin 2 is set by the GSF Level adjustment, R102, and the signal level at pin 1 is compared to it. If pin 2 is lower than pin 1 the GSF output is HI. If the level at pin 2 is higher than at pin 1, the GSF output is LO.

Transistor Q142 acts as a switch turning the Z-Axis signal off and on. When the X-Y On signal is LO, Q142 is cut off and it does not affect the circuit operation. When the X-Y On signal goes HI, Q142 turns on pulling the base of Q132 to ground. This causes the majority of available current to Q122 and Q132 to flow in Q132, nearly shutting Q122 off. Under this condition, Z-Axis drive signals are virtually non existant and no trace is displayed.

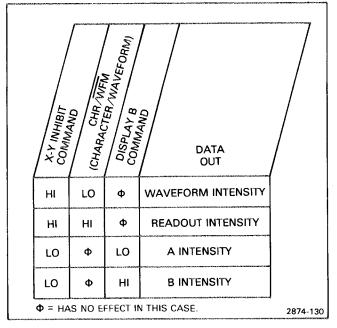


Figure 2-29. Input/output relationships for the Auto-Focus Channel Switch.

AUTO-FOCUS CHANNEL SWITCH AND AMPLIFIER

The Auto-Focus Channel Switch and Amplifier stages provide control voltages to maintain optimum focus of the crt display. When the front-panel FOCUS control is set for best definition of the crt display at low to medium settings of the INTENSITY controls, these stages maintain optimum focus for all portions of the display as it is switched between the digitized, A Horizontal, and B Horizontal displays.

Transistors Q36, Q32, Q39, Q46, Q49 and Q50 act as a current driven data switch that provides the correct input to the base of Q67 of the amplifier stage. This switch selects either the A Intensity, B Intensity, Readout or the Store Waveform Intensity input as determined by the X-Y Inhibit command, Display B command, and the CHR/WFM (Display Character/Stored Waveform) command. The input/output table in Figure 2-29 shows the output of the channel switch stage applied to the base of Q67 for each combination of the input conditions.

Transistors Q67, Q68, Q77 and Q83 are connected as a noninverting operational amplifier to amplify the output of the channel switch and drive the focus-grid electrode of the crt. Resistors R63, R62, R64 and R65, in conjunction with diodes CR64 and CR65, shape the output of the channel switch. Focus Gain adjustment, R63, determines the amount of signal to the base of Q67 to set the overall gain of the amplifier stage. Output Level adjustment, R70, determines the output level of this stage.

HIGH VOLTAGE POWER SUPPLY AND CRT

The High Voltage Power Supply and CRT circuits provide the potentials necessary for proper operation of the crt (cathode-ray tube). These circuits, in conjunction with the Vertical, Horizontal, Z-Axis and Auto-Focus Amplifiers, provide all quiescent potentials and signal information necessary for a properly displayed crt trace. The schematic diagram of the High Voltage Power Supply and crt circuits is given on diagram 14, in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. Sub-headings in the following discussion use these stage names to aid in locating and identifying the components and portions of the circuitry described.

POWER TRANSFORMER

The Power Transformer is driven by a 25 KHz squarewave voltage from the Converter/Rectifiers circuit (secondary of Low-Voltage Transformer, T110, on diagram 15). Three secondary windings on T14 provide power for the +130 V Supply, CRT Heater voltage, Anode Voltage Multiplier, and the CRT Cathode supply. The square-wave output of T14 also drives the Control-Grid DC Restorer and the Focus-Grid DC Restorer stages through the resistor pairs R61-R62 and R31-R32 respectively.

+130 V SUPPLY

The +130 V Supply provides a semi-regulated voltage for use in several circuits in the 7854; semi-regulation is achieved by the Inverter Control stage of the Converter/Rectifiers circuit, diagram 15. Diodes CR101 and CR102 rectify the voltage from the secondary of T14. Capacitors C103, C104 and R104 filter the rectified voltage.

CRT HEATER

The CRT Heater voltage is provided by a separate 6.3-volt secondary winding of T14. The CRT Heater circuit is elevated to the cathode potential through R93.

ANODE VOLTAGE MULTIPLIER

Positive accelerating potential for the crt anode is supplied by the seven times voltage multiplier contained within U21. The applied voltage to the input of U21 from the secondary of T14 is about three kilovolts peak-topeak. This results in an output voltage of about +21 kilovolts at the crt anode. The high voltage sense output of U21 is tied to Q23 which interfaces this dc level to the Z-Axis Limit sense input of the Mainframe Logic circuit and to the ground reference points of T14 through CR17, CR18 and CR19.

CRT CATHODE SUPPLY

The negative three-kilovolt (-2965 V) accelerating potential for the crt cathode is generated by a voltage doubler consisting of CR83, CR82, C82 and C84. High frequency filtering is accomplished by R84, C86, R86 and C89. Components R86 and C89 also provide an accoupling path for error correction from the Cathode Supply Regulator stage.

CATHODE SUPPLY REGULATOR

The Cathode Supply Regulator maintains the potential on the crt cathode and reduces ac ripple from the CRT Cathode Supply. A sample of the output from the CRT Cathode Supply stage is connected to the Cathode Supply Regulator stage through divider resistors R52A, R116 and R115. High-frequency changes from the CRT Cathode Supply are coupled to the Cathode Supply Regulator through C119 and R119.

The Cathode Supply Regulator consists of a noninverting preamplifier U123 and an inverting output amplifier, Q129. The +50 volt supply connected to pin 3 of U123 (through HV ADJ, R115) in conjunction with the ground connected to pin 2 of U123 through R122, provide the reference for error amplifier U123. Transistor Q129 is connected as an inverting amplifier driven by U123 to provide error correction to the crt cathode supply.

Regulation occurs as follows: If the crt cathode voltage becomes less negative, a positive-going change is coupled to the input of U123 at pin 3 and results in a positive-going output at pin 6. This positive-going change is inverted by Q129 to a negative going change at its collector. This causes the voltage across C82 to increase during the positive half cycle of the input waveform. During the negative half cycle, the increased voltage across C82 increases the voltage at the output of the CRT Cathode Supply to correct the original error. Highfrequency correction signals are ac coupled to the crt cathode through C89.

CONTROL-GRID DC RESTORER

The Control-Grid DC Restorer stage elevates the dc level of the Z-Axis Amplifier output to a potential more negative than the crt cathode. This action allows the control grid to control the crt beam current. The Control-Grid DC Restorer stage is driven by the square-wave output of T14. Diodes CR64 and CR63 are forward biased during the positive and negative half cycles of the input

square wave respectively to limit the square-wave amplitude at their junction. Grid Bias adjustment, R65, sets the voltage on the cathode of CR64 to establish the forward-bias level and peak positive level at the anode of CR64. The dc level of the Z-Axis Amplifier output determines the voltage on the anode of CR63 to establish the forward-bias level and peak negative level at the cathode of CR63. The limited-amplitude square wave at the junction of CR64 and CR63 is coupled to the junction of CR67 and CR68 through C66. During the positive half cycle, CR67 is forward biased to clamp its anode at the crt cathode voltage level. During the negative half cycle, C69 is charged through CR68 to a voltage level more negative than the crt cathode by an amount equal to the difference between the Grid Bias adjustment setting and the Z-Axis Amplifier output level. High-frequency Z-Axis Amplifier signals are coupled to the control grid through C72, R72, R63 and C69.

FOCUS-GRID DC RESTORER

The operation of the Focus-Grid DC Restorer is similar to the operation of the Control-Grid DC Restorer. The limited-amplitude square wave at the junction of CR34 and CR33 is coupled to the junction of CR38 and CR37 through C36. The amplitude of the positive half cycle of the input square wave is clamped at approximately +130 volts by CR34. The peak negative amplitude is established by the dc level of the Auto-Focus Channel Switch and Amplifier output (diagram 13) through CR33. During the positive half cycle, the focus grid voltage is clamped to the voltage set by the FOCUS control R50 through R37, CR37 and CR38. During the negative half cycle, C39 charges through CR38 to establish the proper level at the focus grid electrode.

CRT CONTROL

The ASTIG adjustment, R160, used in conjunction with the FOCUS control R50 to obtain a well defined display, varies the voltage level on the astigmatism grid. The SHIELD VOLTS adjustment, R155, varies the positive potential on the grid shielding the vertical deflection plates from stray voltages existing within and near the crt. GEOM adjustment, R143, varies the positive level on the horizontal deflection plate shield to control the overall geometry of the display.

Two adjustments control the trace alignment by varying the magnetic field around the crt. The Y-AXIS ALIGN adjustment, R148, controls the current through L22, which affects the crt beam after vertical deflection but before horizontal deflection. Therefore, it affects only the vertical (Y) components of the display. The TRACE ROTATION adjustment, R142, controls the current through L21 and affects both the vertical and horizontal rotation of the beam.



The Converter/Rectifiers circuit provides the operating power for this instrument from an ac line-voltage source. This circuit includes a LINE VOLTAGE SELECTOR switch located on the rear panel. Figure 2-30 shows a detailed block of the Converter/Rectifiers circuit. A schematic diagram of the Converter/rectifiers is given on diagram 15, in section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. These stage names aid in locating and identifying the components and portions of circuitry mentioned here.

LINE INPUT

Power is applied through line filter FL10, line fuse F10, and POWER switch S10. The line filter is designed to keep powerline interference from entering the instrument and to keep the approximate 25-kilohertz Inverter signal from entering the power line. Components R5, C5 and C6 suppress reverse-recovery transients of CR15.

The LINE VOLTAGE SELECTOR switch, S12, allows the instrument to operate from either a 115 volt nominal or a 230 volt nominal line voltage source. In the 115 volt position, rectifier CR15 operates as a full-wave doubler with energy-storage capacitors C16 and C17, so the voltage across the two capacitors in series will be the approximate peak-to-peak value of the line voltage. For 230 volt operation, CR15 is connected to a bridge rectifier and the voltage across C16 and C17 will be the

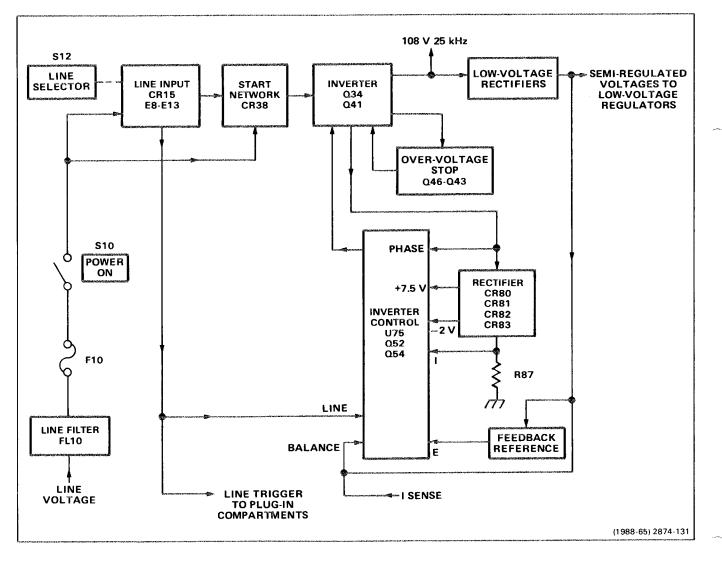


Figure 2-30. Detailed block diagram of the Converter/Rectifiers circuit.

approximate peak value of the line voltage. Thus, the dc voltage applied to the Inverter stage is about the same for either 115 or 230 volt operation.

Thermistors RT9 and RT13 limit the surge current when the power supply is first turned on. After the instrument is in operation, the resistance of the thermistors decreases so that they have little effect on the circuit. When the instrument is turned off, the Inverter Control stage turns off the Inverter which prevents it from discharging C16 and C17; C16 and C17 discharge slowly through R21 to allow for thermistor thermal-recovery time. This ensures sufficient thermistor resistance to limit the turn-on surge current to a safe level. Since C16 and C17 discharge slowly, dangerous potentials exist within the power supply for several minutes after the POWER switch is turned OFF. The presence of voltage in the circuit is indicated by the relaxation oscillator R19, C19 and DS19. Neon bulb DS19 will blink until the potential across C16 and C17 drops to about 80 volts.

Spark gap electrodes E8 and E13 are surge-voltage protectors. When the LINE VOLTAGE SELECTOR switch is in the 115 volt position, only E8 is connected across the line input. If a peak voltage greater than 230 volts is present on the line, E8 will conduct and quickly open line fuse F10 to interrupt the input power before the instrument can be damaged. In the 230 volt position, E8 and E13 are connected in series across the line input to provide protection for peak voltages greater than 460 volts.

Transformer T8 provides a sample of the line voltage to the plug-in connectors for triggering at line frequencies. This line frequency signal is also connected to the Inverter Control stage to sense when line voltage is present.

INVERTER START

Components R10, R38 and C35 are connected between the input line (ac) and the negative side of C17 (through T25). Capacitor C42 charges on each cycle of the input line voltage. When the charge on C42 reaches about 33 volts, the programmable UJT (unijunction transistor) Q30 fires to provide base drive to turn on Q40 through C39. When Q40 turns on, it shock-excites series-resonant network L37 and C37 to generate a damped oscillation. This damped oscillation provides the drive necessary to start the Inverter switching action. After the Inverter is operating, the recurrent waveform at the collector of Q40 keeps C42 discharged through CR49, thus disabling the Inverter Start network while the instrument is on.

INVERTER

The Inverter stage converts the dc voltage across C16 and C17 to a sine-wave current to drive power transformer T110. Once the Inverter has been started by the Inverter Start network, transformer T30 provides feedback to the bases of Q34 and Q40 to sustain oscillation. These transistors operate at a forced beta of 4 due to the turns ratio of T30. Also, T30 provides a 60:1 turn ratio center-tapped winding for pre-regulation and fault protection shut-down. The Inverter Control stage short circuits one-half of this winding to either delay the turn-on of Q34 and Q40 or to completely stop their switching action.

The switching action of Q34 and Q40 generates a square-wave voltage with an amplitude approximately equal to the dc voltage at the input to this stage. The square-wave voltage at the emitter of Q34 supplies the drive necessary to maintain a sine-wave current in the series-resonant network of L37 and C37. Diodes CR34 and CR41 provide paths for series-resonant current when Q34 and Q40 are held off for pre-regulation.

To aid in understanding circuit operation, Figure 2-31A shows a representation of the Inverter stage as a switch. The three possible states of the Inverter are depicted by the three possible switch positions: Q34 is on in position (a); Q40 is on in position (c); or both transistors are held off for pre-regulation in position (b). In the composite current waveform of Figure 2-31B, the relative phase and amplitude of each component of I_t is shown for periods T_{a} , T_{b} and T_{c} corresponding to the three switch positions. Figure 2-31C and Figure 2-31D show the relationship of the Inverter voltage and primary winding voltages with respect to the current waveform.

The normal sequence of operation is as follows: assume that the voltage at point X is some voltage more positive than the negative supply voltage and that Q40 has just turned on. The current labeled I4 in Figures 2-31A and 2-31B flows as the voltage at point W goes negative. Point X goes toward the negative supply voltage as C37 charges through L37. The voltage across the primaries of T110 and T35 at point Y produces a voltage at the secondary of T35 that is sensed by the Inverter Control IC, U75 (see Fig. 2-31D). When this voltage changes phase from negative to positive, Q40 is held off (turned off) by U75. Due to the inductive action of L37, current continues to flow through the Inverter circuit, pulling the voltage at point W below the negative supply voltage. This forward biases CR40, which now conducts I1 (Figs. 2-31A and 2-31B). After a predetermined time, the Inverter Control IC, U75, allows Q34 to turn on and conduct the current labeled I2 in Figures 2-31A and 2-31B. Since Q34 is now conducting, the voltage at point X charges toward the positive supply voltage through

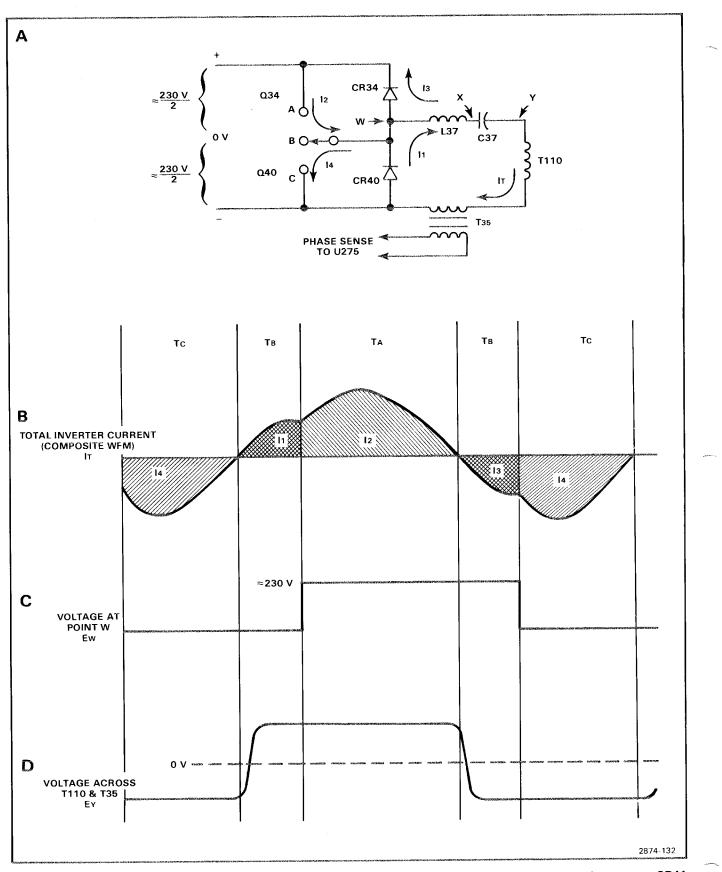


Figure 2-31. (A) Representation of Inverter stage. Idealized waveforms of (B) total Inverter current, IC, (C) Voltage across CR41 and (D) Voltage across primaries of T10 and T35.

L37. Once again, voltage phase change is sensed at the secondary of T35 by U75 as previously described. Transistor Q34 is held off at this time and I_3 flows due to the inductive action of L37 pulling the anode of CR34 to a voltage greater than the positive supply voltage. After a time determined by the Inverter Control stage, Q40 conducts the current labeled I_4 and the cycle repeats itself.

Pre-regulation is achieved by varying the hold-off of the Inverter transistors, T_b in Figure 2-31B, thereby determining the net power delivered to T110.

OVER-VOLTAGE STOP

Whenever the voltage across the primary of T110 exceeds a safe level, the Over-Voltage Stop stage shuts down the Inverter to protect Inverter components from damage. For example, this stage activates whenever the normal voltage regulating path through Q52 and T30 is inoperative.

Capacitor C43 charges through CR44 and R44 to the peak voltage across the primary of T110. If this voltage exceeds a safe level, Q45 conducts to cause Q43 and Q46 to turn on. When Q46 turns on, the base-drive winding of T30 is short-circuited, which stops the Inverter switching action. Since Q43 is turned on, C42 in the Inverter Start network is prevented from charging to the firing voltage of Q30, thus preventing the Inverter from starting. Transistors Q45 and Q43 continue to conduct until C43 has discharged sufficiently through R45 to turn Q45 off. At this point, Q43 and Q46 will turn off and the Inverter will start on the next positive half cycle of the line.

INVERTER CONTROL

The Inverter Control stage, made up of primarily U75, provides pre-regulation and fault protection functions. For pre-regulation purposes, U75 varies the hold-off time (T_b, in Fig. 2-31B) of the Inverter switching transistors.

Under normal operating conditions, only the voltage sense (E Sense) input at pin 15 controls the hold-off time. However, various fault conditions can affect hold-off time or stop the Inverter operation altogether. The operation of each individual function of the Inverter Control stage is described in the following discussion.

Pre-Regulator

The pre-regulator operation of U75, maintains constant voltage at the outputs of the Low-Voltage Rectifiers stage. It also provides constant peak-to-peak voltage to the High-Voltage Power Supply and CRT circuit (diagram 14).

Transformer T35 provides Inverter phase information and power to U75. The phase information is connected to pins 10 and 11 through C77 and C78. Bridge rectifier CR73, CR74, CR76 and CR75 provides positive and negative operating voltages to U75. A shunt regulator in U75 maintains the +7.5 volts at pin 6. The -2 volt (nominal) supply connected to pin 7 is unregulated. Zener diode VR72 provides protection against open circuit conduction (U75 removed) and is normally not conducting.

Pin 15 is the voltage sensing (E Sense) point of the preregulator circuit. Zero volts at pin 15 indicates proper regulation. Zener diode VR88 provides a stable reference voltage for sensing-divider resistors R93, R95, R86 and R87. Variable resistor R93 in this divider adjusts the ratio of the divider to adjust the output of the +108 volt supply. Outputs of the other supplies are then set by the turns ratio of T110.

Integrated circuit U75 regulates the Inverter by varying the hold-off time of the switching transistors, Q34 and Q40. A variable pulse-width monostable multivibrator in U75 is triggered at pins 10 and 11 whenever the Inverter current changes direction. The pulse width holds off the Inverter by turning on transistor Q52 through pin 9 of U75, thus shorting out the base drive to Q34 and Q40. The pulse width and therefore holdoff is controlled by a ramp at pin 12. If the voltage at the E Sense input, pin 15, is too low, the ramp is not allowed to rise very high and the pulse width and holdoff are short. As the E Sense voltage rises, the ramp is allowed to rise to a higher voltage level, increasing the holdoff time.

Fault Protection

The fault protection portions of U75 provide protection for the power supply components due to short circuits, turnon surge currents, and other malfunctions. When a fault is detected at the Fault Sense input (pin 2) or I Sense input (pin 13), a current from the Fault Holdoff Time output (pin 1) charges C64. If the detected fault lasts longer than about 10 milliseconds, C64 will charge positive enough to initiate a positive output at pin 8. This output turns on Q54 and Q52 which turns off the Inverter. The Inverter will remain off while C54 discharges through R54, keeping Q54 and Q52 turned on. The Inverter restarts in roughly 500 milliseconds when the current through R54 is insufficient to keep Q54 and Q52 turned on. When the inverter restarts, C54 is recharged through CR59 and R59. This cycle repeats until the fault is corrected, with the Inverter on for about 10 milliseconds, and off for about 500 milliseconds.

Inverter Current Limiter

The inverter current limiter provides protection for the Inverter components from damage due to excessive current turn-on or short circuits. Operation of this stage is similar to the pre-regulator (voltage regulation). The inverter current limiter takes control of the Inverter hold-off time whenever pin 13 starts to go negative. Transformer T35 provides a current step-down. The current is rectified and flows through R84, the current-sensing resistor. The voltage across R84 is negative and proportional to the Inverter current. The I Sense input at pin 13 is normally held positive through divider R81, R82 and R83. The Inverter Current Limiter takes control of regulation when pin 13 reaches near zero volts. Peak Inverter current is limited to about 5 amperes. If the voltage at pin 13 remains near zero for more than about 10 milliseconds, pin 8 will go positive to turn off the Inverter.

Fault Sense

The fault sense portion of U75 provides overload protection for those supplies on the Low Voltage Regulators and Fan Board schematic. Diagram 16 and other supplies generated throughout the instrument. Resistive networks from supplies are connected to the Fault Sense input at pin 2 of U75. During normal operation, the voltage at the Fault Sense input remains near zero. If one of the inputs changes sufficiently to cause this voltage level to vary 200 millivolts (positive or negative) for more than 10 milliseconds, a positive output is produced at pin 8 of U75 to stop the inverter. Thermal switch S72 opens up the -50VS line to stop the inverter should ambient temperature of the instrument exceed approximately 140° F (60° C)

Line Stop

The line stop portion of U75 stops the Inverter when the POWER switch, on the front panel, is turned OFF. The Line Stop stage will also stop the Inverter if the ac line voltage falls below a minimum value.

The line-frequency signal from transformer T8 is connected to pin 4, the Line Stop Sense input of U75. During normal operation, the line-frequency signal causes the Line Stop Timer terminal (pin 3) to periodically discharge to ground. When the line-frequency signal is interrupted or falls below a minimum value, C67 will charge to approximately +0.7 volt causing the Line Stop stage to produce a positive output at pin 8 of U75 to stop the Inverter.

POWER UP LOGIC

When the instrument is first turned on, the Power Up Logic stage produces a LO at its output, pin 6 of U179B, for about 2 seconds, after which time a HI output is produced, indicating that power is on.

When the power is initially turned on, the unregulated -17 volt supply pulls the emitter of Q171 LO through R171, turning it on. At the same time, the collector of Q171 has been pulled to +5 Volts through C172 which begins to charge through R171 and Q171 towards the -17 volt supply potential. Transistor Q173 is turned off and Q177 is turned on until C172 has charged to a level of about +1.5 volts. This level is determined by voltage divider R173 and R174 between +5 volts and the LO output level at pin 12 of U179A. When C172 reaches this level, Q173 turns on, turning Q177 off. This forces input pin 13 of U179A HI which causes its output, pin 12, to also go HI. This HI level acts as positive feedback through R174 to the emitter of Q173, latching the circuit in this state. Components CR171 and Q171 limit the voltage to which C172 may charge to about -0.7 volt.

The HI level at pin 12 of U179A is applied to pin 11 of U179C. Since the levels at pins 9 (set by R181 and R182) and 10 of U179C (set by Q162) are HI, its output at pin 8 goes HI.

When the instrument is turned off, this circuit produces a LO output level before the regulated power supply voltages begin to drop. The Inverter Stop signal, at pin 8 of U75, goes HI allowing Q162 to turn on, producing a LO at pin 10 of U179C. The resultant LO at pin 8 is coupled through C183 to pin 9 of U179C, ensuring that the output at pin 8 is held at a stable LO condition. The PUP signal follows this level.

The time delay incorporated in this circuit is to ensure that all the regulated power supplies are running and settled to their proper levels before the digital portion of the ocilliscope begins operation.

LOW-VOLTAGE RECTIFIERS

The Low-Voltage Rectifiers stage rectifies the square-wave ac voltages at the output windings of T110 to the dc levels used for all regulated supplies in this instrument.



A schematic diagram of the Low-Voltage Regulators and Fan Board circuit is given on diagram 16, in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. These aid in locating and identifying the components and portions of circuitry described here. Sub-headings in the following discussion use these stage names to further identify the components and portions of the circuitry shown on diagram 16. Figure 2-32 shows a detailed block diagram of the Low-Voltage Regulators and Fan Board circuit.

The Low-Voltage Regulators convert semi-regulated voltages from the Converter/Rectifiers circuit (diagram 15) to stabilized low-ripple output voltages. The regulators are series type, using the +50 volt supply as a reference.

OPERATIONAL AMPLIFIER POWER SUPPLIES

The operational amplifiers used to regulate the +50, +15, +5, -50, and -15 volt supplies require that four special voltages be generated for their operation:

(1) The +22 volt supply is generated from the semi-regulated +54 volt supply by reference zener diode VR32 and emitter follower Q34.

(2) The -22 volt supply is generated from the semiregulated -54 volt supply by reference zener diode VR36 and emitter follower Q38.

(3) The +5.6 volt supply is generated from the semiregulated +17 volt supply by zener diode VR152.

(4) The -5.6 volt supply is generated from the semiregulated -17 volt supply by zener diode VR156.

+50 V REGULATOR

Semi-regulated +54 volts from the Converter/Rectifiers circuit (diagram 15) provides the unregulated voltage source for this supply. Differential amplifier U15 compares the feedback voltage at pin 2 against the reference voltage at pin 3. The error output at pin 6 of U15 reflects a difference between these two inputs. Zene: diode VR12 sets a reference level of about +9 volts at pin 3 of U15. A sample of the output voltage from the +50 volt supply is connected to pin 2 of U15 through divider network R16, R15 and R14. Variable resistor R15 in this divider sets the output level of this supply. Notice that the feedback voltage of this divider is obtained from a line labeled +50 VS (sense). If the feedback voltages were obtained at the supply, the voltage at the load would not stay constant, due to the inherent resistance of the interconnecting cable between the supply and its load. The sense configuration overcomes this problem by sensing the voltage at the load. Since the current in the sense line is small and constant, the load voltage is held constant regardless of the load current.

Regulation of voltage occurs as follows: If the output level of this supply decreases (becomes less positive) due to an increase in load or a decrease in input voltage (as a result of line-voltage change or ripple), the voltage across divider R16, R15 and R14 decreases also. This results in a less positive level at pin 2 of U15 than that established by zener diode VR12 at pin 3 of U15. This decreases the current through CR15 and VR17 causing a similar increase in current through the base-emitter junction of Q28. This results in increased conduction of Q28, the +50 volt series regulator. The load current increases and therefore the voltage across the load also increases (becomes more positive) sufficiently to balance the input into differential amplifier U15. The +50 V ADJ, R15, sets the output level of this supply.

Current foldback protection is provided for the +50 volt supply if excessive current is demanded from the supply. Since the load is connected to this supply through R28, all current from the +50 volt supply must flow through this resistor. Under normal operation there is insufficient voltage drop across R28 to turn Q22 off. However, when excessive current is demanded from the +50 volt series regulator (Q28) due to a short circuit or similar malfunction at the output of this supply, the voltage drop across R28 increases and begins to turn off Q22. The reduced collector current of Q22 results in a reduction of current through Q28. This current limiting protects Q28 from damage due to excessive power dissipation.

Several protection diodes are also included in this circuit. Diode CR28 prevents the output of this supply from going more negative than about -0.6 volt if it is shorted to a negative supply. Zener diode VR10 and diode CR10 supply a turn-on voltage for U15 to start the +50 volt supply when the instrument is first turned on. As soon as the +50 volt supply turns on, CR10 stops conducting.

-15 V REGULATOR

Basic operation of all stages in the -15 V Regulator is the same as for the +50 V Regulator. The reference level for this supply is established to ground through R82 at pin 5 of U84B. The divider ratio of R80 and R81 sets a level of zero volts at pin 6 of U84B. The level on the +50 VS (sense) line is held stable by the +50 volt supply. Any change at the output of the -15 volt supply appears at pin 6 of U84B as an error signal. The output voltage is regulated in the same manner as described for the +50 volt supply. Diode CR96 limits the output of this supply from going more positive than about +0.6 volt if it is shorted to one of the more positive supplies. Operational amplifier U84A provides current foldback protection for Q94 by monitoring the voltage drop across R95. When too much current is demanded from the supply, the increased voltage drop across R95 allows U84A to turn Q88 off, in turn reducing the current through Q94.

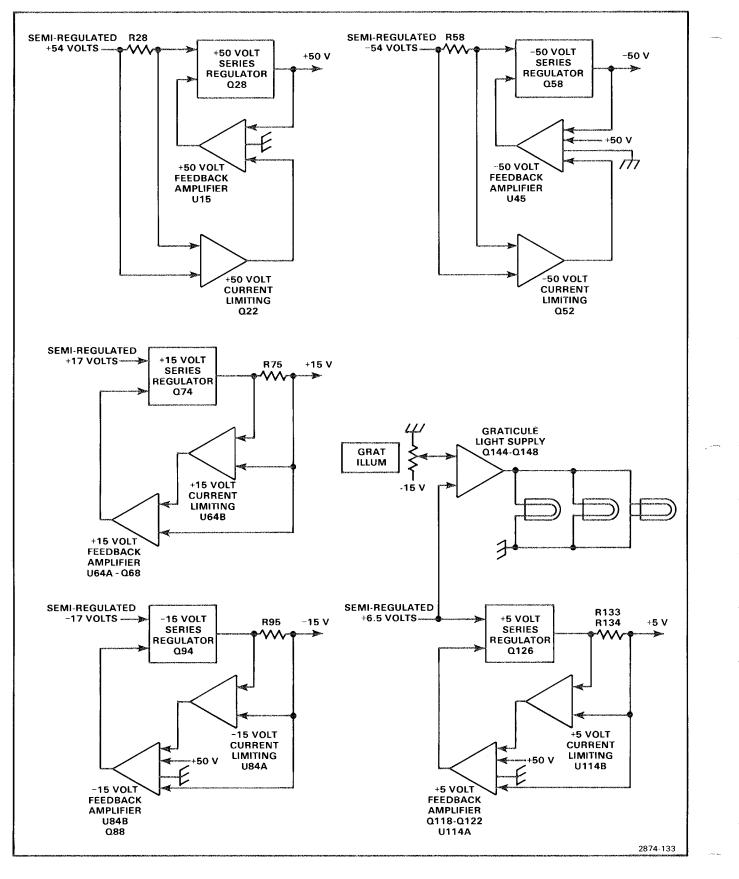


Figure 2-32. Detailed Block Diagram of the Converter/Rectifiers circuit.

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+5 V REGULATOR

The operation of the +5 V Regulator is basically the same as described for the previous supply regulators. Error voltage to pin 2 of U114A is provided through R131 and pin 3 is referenced to the +50 VS (sense) line. The divider ratio of R113 and R114 is 10:1, so pin 3 of U114A is at +5 volts when the supply is operating normally. The level on the +50 V Sense line is held stable by the +50 volt supply. Therefore, any change at the output of the +5 volt supply appears at pin 2 of U114A as an error signal. The output voltage is regulated in the manner described previously for the +50 volt supply. Diode CR132 limits the output of this supply to about -0.6 volt, if it is shorted to one of the negative supplies.

The +5 volt current foldback protection is accomplished by U514B and protects this supply from excessive output current damage. With normal supply current through R133 and R134, the voltage drop across this parallel resistance is such that the base of Q118 is biased on. If the current through R133 and R134 increases above a safe level, pin 7 of U114B reduces the forward bias current to Q118. Now, the base current of Q122 is reduced which decreases the voltage on the base of Q126. This limits the conduction of Q126 to a safe current level.

+15 V REGULATOR

The +15 V Regulator regulates in the same manner as that of the +50 volt supply; current foldback protection operates in the manner described for the +5 volt supply. Error feedback voltage to pin 2 of U64A is provided through R69. Pin 3 of U64A is referenced to the +50 VS (sense) line. The divider ratio of R61 and R62 sets pin 3 of U64A at +15 volts. Any change in the output level of the +15 volt supply appears at pin 2 of U64A as an error signal. This results in an opposite change at the output, pin 1 of U64A, which is conveyed to the +15 volt series regulator transistor Q74 through CR64 and Q68 to correct the error in the output voltage of the supply. Diode CR76 limits the output of this supply to about -0.6 volt if it is shorted to one of the negative supplies.

-50 V REGULATOR

Operation of the -50 V Regulator is basically the same as described for the +50 volt supply; current foldback protection operates in a similar manner, as described for the +50 volt supply. Error voltage to pin 2 of U45 is provided by divider R45-R46 and is referenced to the -50 VS (sense) line, from the +50 VS line. The divider ratio of R45 and R46 sets the level at pin 2 of U45 at zero volts when the output of this supply is correct. The protection diode CR58 limits the output voltage of this supply to +0.6 volt should the supply be shorted to a positive supply.

FAN CIRCUIT

The fan motor used in this instrument is a brushless dc motor, using Hall Effect devices. The two Hall Effect devices sequentially drive the four transistors (Q20 A, B, C and D) which, in turn, control the current flow through the four field windings. The fan motor speed is regulated by limiting the current flow through Q10. Diodes CR21, CR22, CR23 and CR24 rectify the back emf produced by the four field windings. This voltage is applied to the base of Q10 through resistive divider network R24, R25 and R11. The voltage developed by this circuit is proportional to the motor speed. If the motor speed starts to increase, the current drive to the base of Q10 will decrease, reducing the current to the motor, thus maintaining a constant motor speed.

GRATICULE LIGHT SUPPLY

The Graticule Light Supply provides power to illuminate the graticule lights. The front-panel GRAT ILLUM potentiometer controls the output of this supply to set the brightness of the graticule lights. Transistors Q144, Q148 and diode CR148 form a voltage following current buffer. The output voltage at the collecor of Q148 follows the voltage set at the base of Q144 by the divider made up of R142, R141, R143 and the GRAT ILLUM control, R55, on the front panel. Resistor R148 limits the output current from this supply to protect Q148 from damage due to a short circuit.



A schematic diagram of the Front-Panel Controls is given on diagram 17 in Section 7, Diagrams and Circuit Board Illustrations.

The Front-Panel Controls provide for user control of the A (sweep) INTENSITY, B (sweep) INTENSITY, STORED WFM (waveform) intensity, READOUT OFF/MAX intensity, trace FOCUS, GRATicule ILLUMination level, and the BEAMFINDER function for locating waveforms outside of the normal crt display area.

In addition, the CONTRAST preset (R80), a screwdriver adjustable potentiometer, is tied between the A INTENSITY control and the Z-Axis Logic stage of the Mainframe Logic circuit (diagram 4). This adjustment allows for optimum contrast between the intensified portion of a delayed sweep and the overall sweep. With this configuration, the intensified current increases as the A INTENSITY control setting is advanced. Therefore,

Theory of Operation-7854

the intensified zone is more readily visible at high intensity levels. The ASTIGmatism preset adjustment, R160 is used to adjust the overall viewability of the crt trace while R142, the TRACE ROTATION preset, is adjusted to properly align the trace display with respect to the crt graticule.



KEYBOARD SYSTEM

The Keyboards system consists of the Front Panel Keyboard, Calculator Keyboard and Keyboard Interface circuits shown on diagrams 18, 19 and 27, respectively. These schematics are divided by gray shaded lines separating the circuitry into major stages. These stage names are used as an aid in locating and identifying the components and portions of circuitry mentioned here. A block diagram of the Keyboards system showing the relationship of these stages to each other and to the 7854 system busses is shown in Figure 2-33.

The Keyboard Flags stage, shown in Figure 2-33, allows the microprocessor to control the keyboard hardware by using the 7854 Address and Control busses (see diagram 27). This stage, in conjunction with the current-buffering LED Drivers stage, provides circuitry to present some system status information to the user in the form of visible front-panel LEDs and an audible warning.

The Clock Divider stage (diagram 27) divides the 3 MHz Φ 3 system clock down to an 11.7 kilohertz rate and applies this slower clock to the Keyboard Scanner stage. It also provides an 11.7 kilohertz clock with special timing relationships for stopping Keyboard scanning. The Keyboard Scanner stage, when properly enabled, produces an incrementing eight-bit code (KO-K7) that is applied to the keyboards via the keyboard cable.

The Column Scanner stage (diagram 18) decodes an incrementing counter output, bits K4-K7, to sequentially drive only one of 8 columns of the Keyboard matrix LO. Each time a new column is driven LO, the Row Scanner stage sequentially scans each of the 16 possible rows of the Keyboard matrix as selected by KO-K3, to determine if a key has been pressed. A LO applied from the Column Scanner stage through a closed key to the Row Scanner stage indicates that a particular key has been pressed. When detected, a LO KDOWN level is generated and applied to the Keyboard Stop-Scan stage (diagram 27).

The Keyboard Stop-Scan stage monitors the KDOWN (key down) level and when a key in the Keyboard matrix has been checked and found to be pressed, two events are initiated. First, one-shot U200B fires, stopping the Keyboard Scanner from incrementing, thereby "freezing" the count at the keycode of the key that was found pressed. Secondly, a LO IKB (keyboard interrupt) level from U320B is applied to the microprocessor interrupt system, indicating that a key has been pressed and needs to be "read".

As the microprocessor services this interrupt request, it enables the Keyboard Data Bus Buffer stage and the eight-bit keycode (KO-K7) uniquely representing the key pressed is put onto the data bus and read by the microprocessor. When the user releases the key, keyboard scanning is re-enabled and a new key may be read.

CLOCK DIVIDER

Clock Divider stage, U120 and U1000D on diagram 27 is an 8-bit counter that develops a keyboard scan clock with a frequency of 11.7 kHz by dividing (counting down) the 3 MHz Φ 3 clock frequency by 256 using an 8-bit counter. This free running 11.7 kHz square wave clock with a 50% duty cycle is applied to pin 13 of U220A of the Keyboard Scanner stage. (See the timing diagram, Fig. 2-34.) The output of U1000D is also 11.7 kHz but with a duty cycle of about 25% and is used for stopping the scanning of the keyboards.

KEYBOARD SCANNER

The Keyboard Scanner stage, consisting of U220A, U310 and U420, develops the necessary incrementing keycodes for the scanning of the Front Panel and Calculator Keyboards and stores those keycodes for use by the microprocessor when a user command key is pressed.

When the levels at pins 1 and 2 of U220A from the Keyboard Stop-Scan stage are HI, indicating that no key has been pressed, the keyboard scan clock, developed by the Clock Divider stage, is applied to pin 13 of U220A. This clock is inverted by U220A, and clocks an 8-bit binary counter, U420.

As consecutive clock pulses are applied to the clock input of U420, 256 unique 8-bit keycodes are generated at the eight Q outputs of the counter. IC U310 buffers these binary keycodes and drives the column and row scanner stages of the Calculator and Front Panel Keyboards. The four least significant bits of a keycode, KO-K3, are used to sequence the row scanner while keycode bits K4-K7 sequence the column scanner.

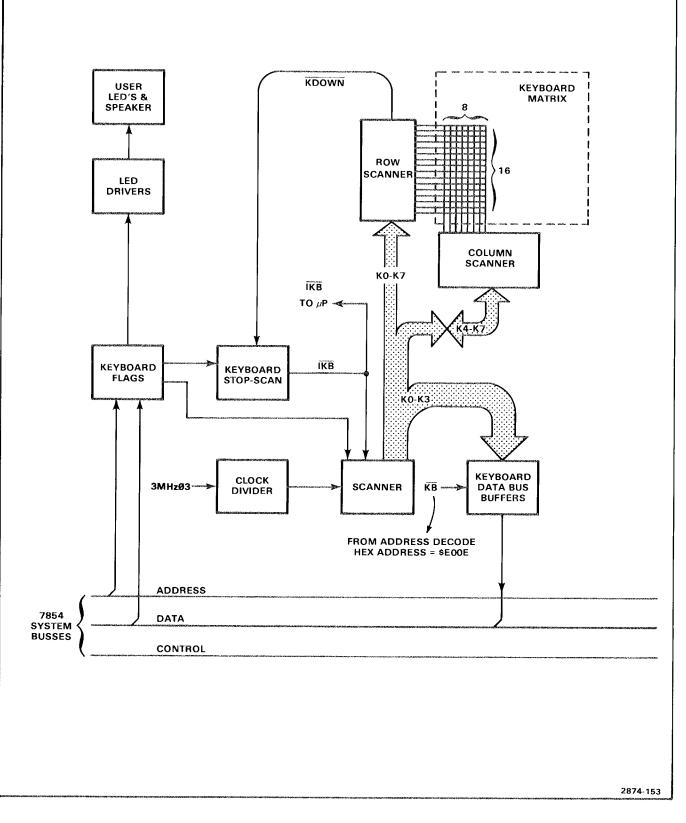


Figure 2-33. Detailed Block Diagram of the Keyboard system

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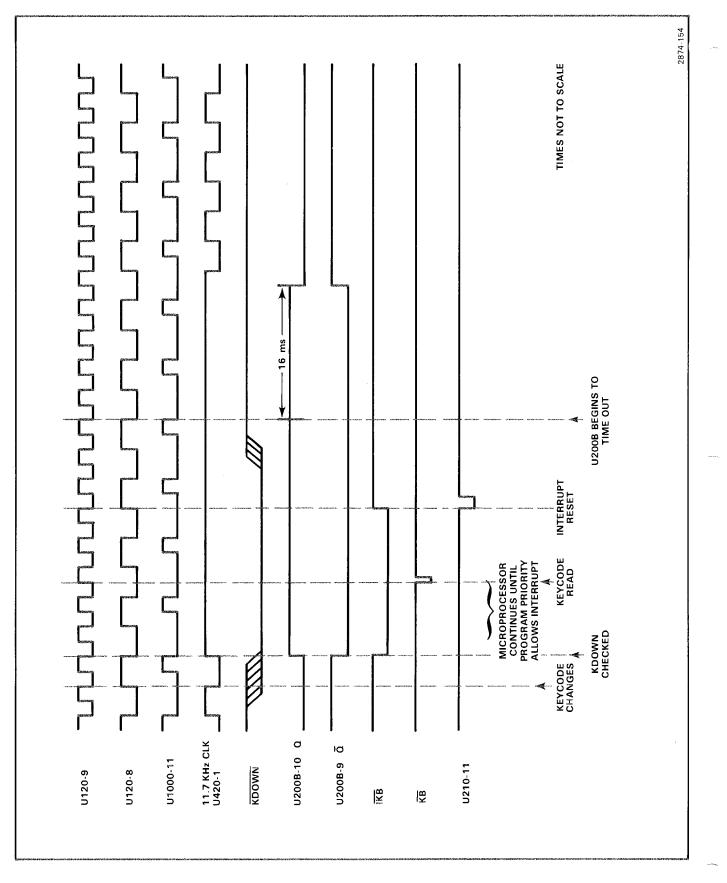


Figure 2-34. Timing Diagram for the Keyboard System.

DATA BUS BUFFER

Data Bus Buffer stage U410 (diagram 27) buffers the keyboard scan keycode to the Data Bus so that the microprocessor may read the keycode of a depressed key. This buffer may be gated on (to apply keycodes to the Data Bus) or forced to a high impedance state (to isolate this data) depending on the level of the $\overline{\text{KB}}$ signal from the Address Decoder stage on diagram 28.

KEYBOARD STOP/SCAN

The Keyboard Stop/Scan stage determines whether the Keyboard Scanner counter, U420, should continue generating the incrementing keycodes or stop at the present keycode when a key is detected as being pressed. The key detection is signaled to this stage by the KDOWN level at input pin 12 of U200B, generated by either the Calculator or Front Panel Keyboard circuits when a key is pressed. Refer to the timing diagram in Figure 2-34 for the following discussion.

Upon power up, a LO flag level caused by RESET, is applied to the set input of U320B; this sets the IKB (keyboard interrupt) level at its Q output HI to ensure that no keyboard interrupt is generated. The preset is then removed so an interrupt may be generated when a key is detected as pressed. At this time, the \overline{Q} output of U200B is HI since no key has yet been pressed. This allows the 11.7 kHz clock to pass through U220A of the Keyboard Scanner stage, and incrementing keycodes are now generated.

When the keycode corresponding to a key that is pressed is generated, the KDOWN level applied to U200B goes LO, indicating that a key has been detected as pressed. This enables the 11.7 kHz clock at the output of U1000D (see timing diagram, Fig. 2-34) to trigger the one-shot, U200B. The input clock to the one-shot is delayed with respect to the incrementing clock applied to the Keyboard Scanner stage to allow the KDOWN level and the new keycode data to settle before the one-shot KDOWN input is checked. On the falling edge of this delayed clock, oneshot U200B is fired and its Q output goes LO. The level change at the output of U200B stops the sequential incrementing of keycodes by disabling the clock through U220A to U420 of the Keyboard Scanner stage. At the same time, the Q output of U200B goes HI and clocks U320B's IKB level LO to generate an interrupt signal to the microprocessor (diagram 28), indicating that a closed key has been detected and should be read. When the microprocessor services this interrupt, it puts the keycode data on the Data Bus and then reads it. The keyboard flag at pin 11 of U210 of the Keyboard Flags stage is then pulsed LO to clear the keyboard interrupt request and then returns HI. This allows U320B to later toggle (when the next key is detected as pressed) from its

preset HI state to generate another keyboard interrupt. When the user releases the key, the KDOWN level returns HI. The one-shot, U200B, times out (approximately 16 ms) and the one-shot returns to its stable state (\overline{Q} HI and Q LO), resuming keycode incrementing until another key is pressed by the user.

KEYBOARD FLAGS

The Keyboard Flags stage provides interface between the instrument and the user as well as providing control levels necessary to perform certain functions within the instrument. It is made up of U210. The three low order address bits at pins 1, 2 and 3 uniquely address one of the 8 output pins 4-7 and 9-12. When enabled by a LO KBFLG level, the CRUOUT level, applied to pin 13 is transferred to the addressed output. These are only changed by being set to their complimentary state or by a RESET command at pin 15 which resets all outputs to a LO level.

Front panel LEDs or an audible warning interface certain types of system status to the user.

The BUSY indicator, a front-panel LED, tells the user that the microprocessor is busy executing the user assigned instruction.

The ERROR indicator LED is illuminated when an error occurs. For example, the LED would light if an inappropriate command (one having restrictions that have not been met), uninterpretable command or a prematurely terminated transmission was generated or if a peripheral device could not properly respond over the GPIB.

An audible warning is provided to the user if the rear panel AUDIBLE ERROR/WARNING switch is open and an error condition occurs. The audible warning is also generated if the microprocessor determines that the results of an operation may not be valid.

An additional flag output at pin 11 of U210 is used to reset U320B in the Keyboard Stop-Scan stage to its HI Q output level, resetting the keyboard interrupt as previously described.

KEYBOARDS

The Keyboard stages of the Front Panel and Calculator Keyboards (diagrams 18 and 19) are made up of 29 and 81 switches, respectively, arranged in a matrix, each with a dedicated function. In addition, several of these keys also have a shift function. For both keyboards, each of these keys is addressed by a combination of the Column and Row Scanner stages. For each keycode that is generated, if the corresponding key is pressed, a LO

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from the Column Scanner stage is applied through the closed switch to the Row Scanner stage and a KDOWN (keydown) is generated. By recognizing the keycode applied to the Column and Row Scanner stages when a key is sensed as being depressed, that key may be identified.

COLUMN SCANNER

The Column Scanner stages of these keyboards consist of U520 and U320 respectively; each is a 3-line to 8-line decoder/demultiplexer. The four most-significant bits of the Keyboard Scanner address developed by the Keyboard and Signature Analysis circuit (see diagram 27) are applied to the A, B, C and $\overline{G2B}$ (gate) inputs of U520 (and U320 when Calculator Keyboard is connected). When the $\overline{G2B}$ level is LO, the three bit address applied to the A, B and C inputs results in a LO at only one of the eight outputs of U520 and U320. These outputs are applied to the switch matrix of the respective keyboard.

ROW SCANNER

The Row Scanner stage of the Front Panel Keyboard consists of U400, U510C, U510D and their associated components. U220A, U220B, U520 and U620 make up the Row Scanner stage of the Calculator Keyboard. The four least significant bits of the Keyboard Scanner keycode developed by the Keyboard and Signature Analysis circuit (see diagram 27) are applied to the A, B, C and STROBE inputs of U400, U520 and U620. When the STROBE input of U400 is LO, the address on the A, B, and C input lines select the information at one of its 8 data input pins DO-D7 to be inverted and applied to output pin 6 of U400. This level applied to U510D is again inverted and results in the KDOWN level. Similarly, U520 and U620 of the Calculator Keyboard circuit select the data from one of 16 lines to generate the KDOWN level. When the KDOWN level is LO, indicating that a key is pressed, the Keyboard Scanner stage of the Keyboard Interface and Signature Analysis circuit stops advancing, and this "frozen" Keyboard Scanner keycode is read by the microprocessor (the keycode of the key just pressed).

The K3 keycode bit from the Keyboard Interface and Signature Analysis circuit is applied to the STROBE input of U400 and to the input of U510C of the Front Panel Keyboard. When this level is LO, U400 is enabled and U510D is enabled due to the output of U510C being HI. When the K3 keycode bit goes HI, however, U400 is disabled and the output of U510C goes LO. This forces the output of U510D to go HI and it stays at this level until the K3 level once again goes LO.

Similarly for the Calculator Keyboard, the K3 keycode bit enables either U520 or U620 to check for a pressed key. If detected, a LO KDOWN level is generated and keycode incrementing ceases.

LED DRIVERS

The LED Drivers stage for the Front Panel Keyboard circuit consists of Q120 through Q330, DS620 through DS721 and their associated components. A HI from the corresponding keyboard flag applied to the base of any of these transistors through the associated base resistor turns on the transistor, illuminating the LED.

Q110 and its associated components compose the output driving stage used to produce an audible warning. The tone produced is generated by software toggling the level of the Audio flag input level to this stage. When the rear panel switch input at P210 is switched to ground, the audible warning is disabled by removing bias from Q110. Software may still toggle the Audio flag level when disabled in this manner but no tone will be produced.

The LED Drivers stage of the Calculator Keyboard circuit consists of U220D, U220E, DS800 and DS1000 and is similar in operation to that of the Front Panel Keyboard circuit in that a HI ERROR or BUSY level, applied to the open collector inverters U220D or U220E, from the Keyboard Interface and Signature Analysis circuit illuminates the corresponding LED on the Calculator Keyboard panel.



VERTICAL AND HORIZONTAL SAMPLER

The Vertical and Horizontal Sampler circuit samples, stores, and buffers the instantaneous analog voltage levels from the Vertical Pickoff Amplifier and the Horizontal Channel Switch and Pickoff circuits (diagrams 8 and 10 respectively) so they may later be displayed on the crt.

A schematic of the Vertical and Horizontal Sampler circuit is given on diagram 20, in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. These stage names are used to aid in identifying the components and portions of circuitry described.

SAMPLING BRIDGE

The Sampling Bridge stage consists of CR245, CR246, CR247, CR248, CR345, CR346, CR347, CR348 and their associated components. The sampling bridges provide a means of switching instantaneous analog voltage levels from their inputs to their outputs. Operation of the vertical and horizontal sampling bridges are identical; therefore only a description of the vertical Sampling Bridge is given. Quiescently, sampling bridge diodes CR245, CR246 CR247 and CR248 are reverse biased due to the current flowing through R236, R237, T237, R241 and R243 biasing CR242 and CR244 on.

With the presence of a strobe pulse of approximately 10 ns duration from the Vertical Strobe stage, the Sampling Bridge diodes are forward biased for most of the pulse duration. The single-ended, positive strobe pulse applied to T233 results in both a positive and negative pulse applied to C234 and C235. These pulses are coupled through these capacitors and applied to T237 which serves to make these pulses equal and opposite. This pulse current flowing through R241 and R243 is greater than, and opposite to, the normal quiescent currents and the Sampling Bridge becomes forward biased.

When the Sampling Bridge is forward biased, the output voltage of the bridge at C245 follows the input voltage developed across R245. When the strobe pulse ends, the diodes are once again reverse biased and C245 holds (stores) the analog voltage level sampled at the input of the Sampling Bridge until the next strobe pulse occurs. This level is maintained since the impedances of the reverse biased diodes of the sampling bridge and the IGFET (insulated gate field effect transistor) to which C245 is connected are very high, preventing appreciable current leakage from occurring.

STROBE INPUT

The Strobe input stage consists of Q206, Q207, DL211 and their associated components. This stage interfaces TTL levels to the Sampler's ±15 volt environment. It also delays the horizontal strobe command with respect to the vertical strobe command. This is necessary because hardware in the analog portion of this instrument delays the vertical signal with respect to the horizontal sweep at all times. In normal operation, the horizontal sweep ramp is applied to the horizontal sampling bridge and the sampled data (after digitizing) is used as a memory address for storing the value of the vertical point just sampled (and digitized). The delay incorporated in the Strobe Input stage is used to recreate the proper X-Y time relationships in memory by delaying the sampling of the horizontal value by a time approximately equal to the amount the vertical signal is delayed to the sampling bridge by the crt delay line.

The VSTB (vertical strobe) command applied to the base of Q206 through R203 is current buffered and applied to the emitter of Q207. This is voltage buffered and applied to delay line, DL211, and transistor Q222 of the Vertical Strobe stage. The output of the delay line, DL211, is applied to the Horizontal Strobe stage and is delayed in order to recreate proper time relationships between vertical and horizontal samples.

VERTICAL AND HORIZONTAL STROBE

The operation of the Vertical and Horizontal Strobe stages are identical, therefore only the Vertical Strobe stage is discussed.

The Vertical Strobe stage is made up of Ω 222, Ω 223, Ω 227 and their associated components. This stage produces a narrow sampling pulse to be applied to the Sampling Bridge stage with the presence of a vertical strobe command from the Strobe Input stage.

The vertical strobe command from the Strobe Input stage is applied to the base of Q222 as either a HI or LO (Q207 operates only saturated or cut-off). When this command goes LO, indicating that a strobe pulse is to be generated, the emitter, and thus the collector of Q223 goes LO, pulling the base of Q227 LO through CR226. This saturates Q227, pulling its collector to about +14.3 volts from its previous -9 volt potential.

This transition causes a reverse current to flow in CR231 for a period of about 10 ns, forward biasing CR232 for this time. This pulse is coupled to T233 of the Sampling Bridge stage.

VOLTAGE FOLLOWERS

The operation of the vertical and horizontal Voltage Followers is identical, therefore only a discussion of the vertical Voltage Follower is given.

The vertical Voltage Follower stage consists of Q250, Q251, Q252, Q256, Q262, Q263, Q273 and their associated components, connected as an operational amplifier voltage follower. Transistors Q251, Q252 and Q256 are each current sources for the remaining transistors within the stage. The analog voltage output of the Sampling Bridge stage is applied to the gate of Q250A of the vertical Voltage Follower stage. Any voltage change at this input gate results in a corresponding change of the output voltage of the stage at the collector of Q273.

If, for example, the input voltage at the gate of $\Omega 250A$ should go more positive, its source, connected to the base of $\Omega 262B$, will also go positive. This causes more current to flow through $\Omega 262B$, making its collector go more negative. At the same time, the collector of $\Omega 262A$ goes positive since $\Omega 262A$ and $\Omega 262B$ act as emitter coupled transistors. These changes applied to the bases of another emitter coupled pair, $\Omega 273$ and $\Omega 263$, cause the output at the collector of $\Omega 273$ to go more positive; to a value equal to the input voltage at the gate of $\Omega 250A$.

CHANNEL SWITCH

The Channel Switch stage is made up of Q284, Q285, Q286, Q296, Q384, Q385, Q485, Q487, Q493, Q452, Q453 and their associated components. This stage

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switches the sample voltages from either the vertical Voltage Follower or the horizontal Voltage Follower stages to the A/D output of the Channel Switch stage.

The H/\overline{V} Sel (horizontal/vertical) switching signal from the Digitizer circuit (diagram 26) is applied to the base of Q452 through R451. If for example, the H/V Sel signal should go HI, the base-emitter junction of Q452 will become reverse biased, turning off Q487 as well. Current through R452 now forward biases Q453 and the voltage across R485 caused by this current forward biases Q485. Emitter current for Q385 A and B flows through Q493 and Q485, allowing Q385A, Q385B, Q384 and Q296 to operate as a feedback amplifier.

The bases of Q385A and Q385B serve as the noninverting and inverting inputs of this amplifier respectively. In its balanced state (no transition occuring), the voltages at these inputs are equal and the output of the stage at the anode of zener diode VR296 is at a stable voltage level. Now, when the voltage applied to the base of Q385A from the Horizontal Voltage Follower stage changes, say in a positive direction, the amplifier inputs are momentarily in an unbalanced condition. Transistor Q385A conducts harder and additional current is drawn from the +15 V supply through R284, VR284, R384, Q384 and R385. This additional current flow through R284 pulls the base of Q296 negative. This transition is inverted at its collector and the output of the stage at the anode of VR296 tends more positive. The voltage divider formed by R294, R291, R290 and R292 applies a portion of this output voltage to the base of Q385B. The output will continue positive until the base of Q385B is at the same potential as the base of Q385A. Once again the input voltages are equal and the amplifier is in a balanced condition. Any subsequent change at the base of Q385A is responded to in a similar manner. Adjustment R290 sets the Gain of this stage and R380 sets the offset bias for this amplifier.

When the H/\overline{V} Sel input from the Digitzer circuit goes LO. Q452 and Q487 are turned on while Q453 and Q485 are turned off. This turns the amplifier stage just mentioned off, and at the same time, emitter current is provided to Q285A and Q285B through Q493 and Q487. Since Q284, Q285A and Q285B now replace (electrically) Q384, Q385A and Q385B respectively, these transistors, along with Q296 form an operational amplifier that operates identically to that previously described for the sampled vertical signal. Potentiometer R280 provides offset adjustment for biasing this amplifier.

DECOUPLING FILTERS

The Decoupling Filters stage consists of several lcr filters, which isolate current and voltage changes on any of the ± 15 volts supply lines from the other supply lines.

DIGITIZER CONTROL LOGIC

The Digitizer Control Logic circuit generates the addresses necessary for storing digitized data, dependent on the number of points per waveform selected by the operator. This stage also produces the control levels required for the digitizer system to request and assume control of the instrument busses in order to store digitized waveform information. A schematic diagram of the Digitzer Control Logic is given on diagram 21, in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. These stage names are used to aid in locating and identifying components and portions of circuitry discussed.

DATA/CLOCK SELECT

The Data/Clock Select stage consists of U1220, U1230, U1320, U1420B, U1510A, U1510B, U1530C and U1530D. This stage determines, from the acquire word (Acquire Word Bus) indicating PPW (points per waveform) resolution, what portion of a memory write address for storing digitized waveform information should be derived from the A or B Word Bus and how much should come from the digitizer circuitry. It then provides proper data switching and the necessary clock sequencing to generate such an address.

Integrated circuit U1220 is a presettable four-bit synchronous up/down counter connected in the countup configuration. When a VSTB (vertical strobe) pulse appears at its LD (load) input, the LO levels at its A, B, C and D inputs appear at its Q outputs. When VSTB returns HI, these LOs are latched into the IC. This LO VSTB level, also applied to U142OB and U151OA, sets their respective Q and Q levels applied to U1320 LO. The LO Ω_{D} level applied to the S (set) input of U1510B sets its $\overline{\Omega}$ output LO. This is applied to the G2 input of U1320, enabling it to read its 1CØ and 2CØ inputs and apply this data to its 1Y and 2Y outputs. When the VSTB level returns HI, U1220 begins counting from 0 at a 10 MHz rate as the SR CLK (shift register clock) becomes enabled with the presence of a HI RNSAR (successive approximation register running) level applied to U1530C through U1320. As U1220 counts, U1230, a 4-bit magnitude comparator, compares the resulting 4-bit word generated by U1220 to that word applied to its A inputs from the Acquire Word Bus. As long as this 3-bit word is greater in magnitude than the magnitude of the word generated by U1220 (remember U1220 started counting at 0), the D level applied to U1510A remains HI. When the two magnitudes become equal however, this level goes LO and the next SR CLK pulse causes the \overline{Q}

output of U1510A to go HI, disabling the SR CLK by switching the 2Y output of U1320 to ground potential. The number of pulses counted thus far represents the number of data bits shifted into the shift registers of the Address Generator stage from the Address Select stage as explained in those descriptions.

A short time later, the ESAR (end from successive approximation register) pulse (indicating that digitizing of a data point is complete) clocks U1420B, switching its Q output to a HI level. This HI, applied to U1320 of the Data/Clock Select stage once again enables the SR CLK by allowing the data at its 1C3 and 2C3 inputs to be transferred to its 1Y and 2Y outputs. Now, data is clocked to the Address Generator stage from the DSAR (successive approximation register data) input applied to the 1C3 input of U1320. As this data is clocked to the Address Generator stage, U1220 resumes counting. When its Qp output tied to U1510B goes HI (count 8), each succeeding SR CLK applied to U1510B clocks the data present at its D input to its Q output. This D input level remains HI until both the Q_B and Q_c outputs of U1220 next go HI (count 14). The next SR CLK (count 15) causes the $\overline{\Omega}$ output of U1510B to go HI and, at the same time, clocks the 15th bit of address data to the Address Generator stage. The HI applied to the G2 input of U1320 disables this IC and thus the SR CLK. Near the beginning of the next digitizer cycle, a VSTB pulse is applied to the Digitizer Control Logic circuit, reinitiating the initial conditions and the entire cycle again.

BUS CONTROL

The Bus Control stage consists of U1330B, U1330C, U1420A, U1430A, U1430E, U1430F, U1520B, U1620B, U1630D, U1730A, U1730B, U1930, C1330 and R1320. This stage is responsible for generating the digitizer bus request to the microprocessor board, indicating that a point is being digitized and will need to be stored, as well as performing the proper handshaking with other circuitry in the instrument for the proper transfer and storage of digitized waveform information.

This stage operates, and is described, in two distinct modes; the first being the Internal Acquire Mode in which the oscilloscope is digitizing waveform data points in a pseudo-random manner. The second mode is the External Acquire mode (or single-shot mode) in which the clock internal to the 7B87 Time Base plug-in or from its external clock input is used to digitize a single sweep in a sequential fashion.

Internal Acquire Mode

When operating in the Internal Acquire Mode, the Bus Control logic stage requests use of the data, address and control busses at the time a data point is sampled and before it is digitized. Requesting control of the busses at this time, as opposed to when the data point is fully digitized and ready for storage, enhances digitizer throughput (the number of data points that the digitizer system may acquire and store in any length of time) by reducing the amount of time that the digitizer has to wait to gain control of these busses.

Initially the LO system RESET level applied to U1520B forces its Q output HI and the \overline{Q} output LO, resulting in a HI applied to U1730B and a HI DMEM (digitizer memory enable) level. The HI applied to the D input of U1730B is clocked into this flip-flop with the presence of a delayed clock pulse applied to it through U1630D, U1330C, R1320 and U1330B. With acquire word bit 12 (from the Acquire Word Bus) applied to U1630D LO (Internal Acquire Mode), a LO to HI transition of the $H/V \overline{Q}$ (horizontal/vertical) level at its other input from the Data/Clock Select stage, results in a HI level applied to U1330C, clocking U1730B after a time delay determined by R1320 and C1330. As U1730B is clocked, the LO resulting at its Q output is applied to U1930. When acquiring, either internally or externally, bit 13 of the acquire word applied to U1930's A select input is always HI. Bit 12, applied to the B select input, is HI only when acquiring externally and, as was mentioned earlier, is now LO since the instrument is acquiring internally. These two select levels allow the data at the 1C1 and 2C1 inputs of U1930 to be applied to its 1Y and 2Y outputs respectively. The LO level applied from U1730B to U1730A through U1930 resets U1730A, ensuring that the digitizer is not requesting the busses. The resulting LO at the Q output is applied to U1730B, resetting its Q output HI. This is the initializing sequence followed when a system reset occurs during power up.

Now that the stage is initialized, it may now monitor the activity of the digitizer. A HI GSF (good signal flip-flop) level from the Z-Axis Amplifier stage (diagram 13) applied to the D input of U1730A indicates that valid data is available to be sampled. When a HSTB (horizontal strobe) occurs, indicating that valid data has been sampled, this HI GSF level is clocked into U1730A and a LO BRDIG (digitizer bus request) is generated at its $\overline{\Omega}$ output. When the microprocessor (diagram 28) recognizes this bus request, it may either ignore it or grant control of the busses to the digitizer, depending on what the microprocessor is doing at that time.

If the busses are not granted to the digitizer, the next delayed clock pulse applied through U1630D, U1330C, R1320 and U1330B to the clock input of U1730B

changes the $\overline{\Omega}$ output level to LO. This resets U1730A through U1930 and BRDIG is removed. At the same time that the digitizer bus request is removed, the LO level at the Q output of U1730A applied to U1730B resets this abort level to a HI, once again establishing initial conditions so that the next valid data point may request the busses as previously described.

If the busses are granted to the digitizer, the LO BGDIG (digitizer bus grant) from the DMA Control circuit (diagram 24) enables U1430E and U1430F. At this time a LO R/W level and a HI MEM (memory enable) level result at their respective outputs. Since the digitizer is a device that may only write to memory, U1430E is connected so that it may only generate a LO R/W level when enabled. The next clock to U1420A through U1630D, resulting when the horizontal data is through being digitized, transfers the LO BGDIG level at the D input of U1420A to its Q output and applies it to U1520B. This resets U1520B and results in a LO MEM and DMEM levels applied to the Mother Board (diagram 37). The resulting LO at the Q output of U1520B is applied to the D input of U1730B. When the clock pulse, having been delayed by U1330C, R1320, C1330 and U1330B to allow this data level to settle, is applied to U1730B, the data is clocked into the IC and its $\overline{\Omega}$ output remains at its HI level. This maintains the bus request and allows the remainder of the bus transfer to occur.

The LO MEM level applied to the DMA Control circuit (diagram 24) from U1430F tells it that the digitizer has recognized that it now has control of the busses. Acknowledging this, the DMA Control circuit applies a RBR (remove bus request) to all DMA devices. Since the LO BGDIG level applied to U1620B is the only bus grant present within the instrument at this time, the LO RBR applied also to U1620B affects only digitizer circuitry as other DMA devices ignore the RBR. The resulting LO at the output of U1620B sets the Q output of U1730B LO This resets U1730A through U1930 and the Digitizer Bus Request is removed. The WE (write enable) level applied to U1520B from the DMA Control circuit now goes LO indicating that transfer of data to memory is now occurring. At the end of data transfer, the WE level returns HI, clocking U1520B. This returns its Q output to its LO level, terminating the LO DMEM and MEM levels. This ends the cycle and the digitizer bus grant is now removed. This cycle takes place each time a data transfer from the digitizer to memory occurs, when in the Internal Acquire Mode.

External Acquire Mode

Operation of the Bus Control stage when in the External Acquire Mode differs from the Internal Acquire Mode in that the IACO (acquire interrupt) level is applied to U1730A

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via U1930 at its reset input while its set input is held LO. This is determined by the now HI level of bit 12 of the acquire word applied to U1930 at its B select input. The LO at the set input of U1730A sets the BRDIG level LO at all times. This bus request may only be terminated by a LO TACQ level, indicating that the external acquire process is complete or has been manually terminated by the user, and is applied through U1930 to the reset input of U1730A. While digitizing data sequentially, as is the case when acquiring in the External Acquire Mode, it is necessary for the digitizer system to maintain bus control to ensure the storage in memory of all sampled data points; so the bus is requested at all times.

The HI mode bit 12, also applied to U1630D at this time, changes the time at which U1420A is clocked in relation to the digitizing sequence. When in the External Acquire Mode, the HI to LO transition of the H/\overline{V} $\overline{\Omega}$ signal, indicating that vertical data has been sampled, applied to U1630D results in a clock to U1420A. This has changed as, when in the Internal Acquire Mode, U1420A is clocked with a LO to HI transition of the H/\overline{V} $\overline{\Omega}$ level, indicating that both vertical and horizontal data has been sampled. This time change that occurs in the clock to U1420A changes the time that the DMEM and MEM levels are generated, allowing only vertical data to be stored into memory, thus decreasing the time required to store enough valid data to represent a waveform.

ADDRESS SELECT

The Address Select stage is made up of U1030, U1130 and U1520A and provides a means for individual bits of the A word and B word to be selected and applied to the Data/Clock Select stage.

The 8 high-order bits from the A Word and B Word Busses of the Address Generator circuit (see diagram 22) are applied to U1130 and U1030 respectively. Only one of these ICs may be enabled at a given time as determined by U1520A. The incrementing three-bit address from the Data/Clock Select stage, applied to the A, B, and C inputs of U1030 and U1130, selects the addressed bit of the enabled IC and applies it to the 1CØ input of U1320 of the Data/Clock Select stage.

U1520A determines, from the acquire word and XY On levels, which Word Bus (A or B) should supply data to the Data/Clock Select stage, and enables the appropriate IC. When the Acquire Word Bus bit-11 is HI, U1520A's Q and $\overline{\Omega}$ outputs toggle, alternately enabling U1030 and U1130, as the XY On signal from the Digitizer Clock circuit (diagram 23) clocks it.

This also generates the DTCSC (dual trace channel switch control) level used elsewhere in this instrument. If the Acquire Word Bus bit-11 should be LO, only U1030 is enabled since U1520A's Q output is latched LO.

INTERNAL ACQUIRE ADDRESS GENERATOR

The Internal Acquire Address Generator stage consists of two 8-bit shift registers, U830 and U930, connected serially to form a 16-bit register, and U1620D. This stage receives the sequential data clocked to it from the Data/Clock Select stage (made up of high order bits from the A or B Word Busses and data from the Digitizer circuit) and, after a 15-bit address word has been accumulated, buffers this word to the Address Bus when properly enabled.

The data applied to the data input of U930 is clocked into the IC and shifted sequentially on the rising edges of consecutive SR CLK pulses applied to the clock input, pin 12, of U930. This data consists of high order bits from either the A Word Bus or B Word Bus and the digital information derived from the digitizing of a data point by the digitizer circuitry, as selected by the Data/Clock Select stage, and is stored in this sequence. When a 15bit address word has been stored in this manner and the Bus Control logic determines that this data may be transferred, a LO applied to U1620D enables the outputs of U830 and U930 and this address word is applied to the Address Bus.



The Address Generator circuit generates unique 15-bit addresses for storage of digitized waveform information in memory (RAM). Memory addresses are generated when initiated by the microprocessor in either the Display Mode or the DMA External Acquire mode. A schematic diagram of the Address Generator circuitry is given on diagram 22 in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. These stage names are used to aid in identifying components and portions of circuitry discussed.

COUNTER

The Counter stage is made up of U200A, U300C, U300F, U400C, U400D, U600, U630, U1200 and U1300. Integrated circuits U600, U1200 and U1300 are presettable up/down counters and are set to count the number of bits necessary to complete display of a waveform for a particular resolution. The upper bits (five

to eight bits) are set directly from data on the Data Bus and direct one of the DMA (direct memory access) devices (under microprocessor control) to a to a particular memory block, for retrieval or input purposes. The lower ten to seven bits represent the changing portion of the generated address.

The data used to set the counter and the preset high order address bits is applied to the data input pins of U630, U1200 and U1300 from the Data Bus and to U600 through U630. With the presence of a LO \overline{WE} (Write Enable) and an \overline{AWRD} (A Word) pulse applied to U400D, this data is latched into U630 and the counters U600, U1200 and U1300 are set. Now, with each consecutive pulse applied to the count up input of U1200 from the output pin 7 of U1120 in the Word/Clock Select stage, the output address to the A Word Bus from the Counter stage advances one count. When U1200 overflows, the count up input of U1300 is clocked by the carry output of U1200. Similarly, U600 is clocked by the Qc output of U1300 through U300B.

In this way, the high order bits direct the DMA device to a specific memory block while the lower order bits generated by the counter sequentially step through the individual memory addresses of this block.

MODE WORD LATCH

The Mode Word Latch stage consists of U200B, U300E, and U1720. Four bits of data, which define the mode in which the instrument is to operate, are clocked in and latched by U1720 with the presence of a DMDWRD (digitizer mode word) or WE (write enable) command. This mode word is applied to the Mode Word Bus, determining the source of the clock and the point at which a Full Once command is generated by the End-of-Count Detector stage.

A WORD BUFFER

The A Word Buffer stage consists of U620 and U730. This stage buffers the sequential addresses generated by the Counter stage to the Data Bus with the presence of a LO control level applied to pins 1 and 19 of U620 and U730. In the single-shot acquire mode, it is used to read the address of the last data point acquired. This address is used to determine the sequence in which data points were entered into memory and thus, the order in which this data should be displayed to properly represent the acquired waveform.

END-OF-COUNT DETECTOR

The End-of-Count Detector stage consists of U700, U1630C and their associated components. The 3 bits of the mode word applied to U700 selects data from one of 8 inputs to appear at its W output. In this way, one of five

outputs of the Counter stage as well as the ERO (End of Readout) input from the Vertical Display and Control circuit (diagram 32) may be monitored.

The mode word, containing waveform resolution information, selects one of these outputs to detect when the Counter stage has counted either 128, 256, 512 or 1024 bits, corresponding to waveform resolution. When the selected output bit of the Counter stage changes state, the W output of U700 applies an inverse of this transition to U1630C. Since the rc network formed by R1630 and C1631 causes any transition at pin 10 of U1630C to be delayed with respect to that at pin 9 of U1630C, a positive-going Full Once pulse is produced at the output of U1630C on any transition of the W output level at U700.

WORD/CLOCK SELECT

The Word/Clock Select stage consists of U320A, U1120, U1830B, and U1400B. This stage, depending on the levels of the A and B inputs of U1120, selects the source of the clock input to the Counter stage and determines the source of the high order bits for the Address Output stage.

The B input of U1120 is bit 11 of the Mode Word. This bit, when HI, indicates that the instrument is in the Display Mode. The A input of U1120 is derived from the IACQ (acquire interrupt) and external clock levels through U1400B and is only high when the instrument is in the Acquire Mode. In this way, only the data at inputs 1C1, 1C3, 2C1 and 2C3 may be transferred to the 1Y and 2Y outputs.

When in the Display Mode (input B HI), the ADDADV (address advance) pulse applied to pin 4 of U1120 is switched to output pin 7 of U1120 and acts as the clock applied to U1200 of the Counter stage. At the same time, the B Word Sel level at pin 12 of U1120 appears at output pin 9 of U1120 and is applied to the Address Output stage, selecting the high order bits of the Address Output stage.

When in the Acquire mode, the display Mode Word bit 11 is LO, the IACQ level at pin 5 of U1400B is HI and the Acquire Word Bus-12 at pin 4 of U1400B is HI. This results in a HI applied to the A input of U1120 and the levels at the 1C1 and 2C1 inputs appear at the 1Y and 2Y outputs respectively. The Aux Clock (external clock address advance) signal is applied through U1120 to the clock input of the Counter stage at pin 5 of U1200 and the DTCSC (dual trace channel switch control) is applied to the Address Output stage, also through U1120. Integrated circuit U320A, when clocked by the output of U1630C of the End-Of-Count Detector stage, disables the clock output of U1120 by applying a HI to pin 1 of U1120. This HI results as the HI mode word bit applied to the D input of U320A (bit 11) is clocked to its Q output. The Q output of U320A produces the IDSY (display interrupt) level to the Microprocessor and Control circuit (diagram 28). The RDSY (reset display) and STPDSY (stop display) inputs to U320A from the Mother Board (diagram 37) serve respectively to enable and disable the clock select portion of U1120

B WORD ADDRESS COUNTER

When acquiring more than one waveform at a time, the data representative of the vertical deflection of each point going into memory must be organized into two memory blocks, each block representing a unique waveform. Since acquisition of data points alternates between waveforms, alternate data words must be directed into different memory blocks. The B Word Address Counter stage generates the secondary addresses required to do this. This stage is made up of U400A, U400B, U800 and U900 and acts very similarly to the setting of the high order bits in the Counter stage.

The B Word Address Counter stage accepts and stores eight bits of a data word from the Data Bus at the inputs of U800. This data is stored by U800 with the presence of a LO WE (write enable) and a LO BWRD (B Word) command at the inputs of U400B which produces a clock to U800. Four bits of the data latched into U800 are applied to U900 and, with the application of either a clock pulse from U400B, a Full Once pulse from U1630C to U400A or both. This results in a LO LD (load) command applied to U900 which sets the four output bits of this counter IC to the data levels at the corresponding inputs. The clock applied to the count up input of U900 is the same clock that is applied to U600. In this way, these two counters (U600 and U900) advance at the same rate, even though they are initially set to different values. The low order bits of the A Word from the Counter stage, in conjunction with the eight bits of data developed by the B Word Address Counter stage produce a unique B Word address as explained in the description of the Address Output stage.

ADDRESS OUTPUT

The Address Output stage consists of U820, U920, U1020, U1400D, U1620A and U1630B. This stage develops, from the A Word produced by the Counter stage and the partial B Word from the B Word Address Counter stage, two unique address words addressing two distinct blocks of memory. These two blocks of memory are alternately addressed when digitizing both channels of a dual vertical plug-in at the same time by alternating

the select level applied at pin 1 of U920 and U1020. These two ICs switch either the A or B high order bits at their inputs to their outputs, determining the highest eight bits of the output address. Integrated circuit U820 buffers the seven lowest bits from the Counter stage to the Address Bus when enabled.

And gate, U1400D, with the presence of a LO Acquire Word bit-12 or a LO DMEM level applied to it through U1620A and a LO ADDBUF (address buffer) level at its inputs, enables U820, U920 and U1020, applying a 15 bit address to the Address Bus. In this way, a 15 bit address consists of the seven least significant bits of the Counter stage and either the eight most significant bits from the Counter stage (making up the A Word) or the eight bits from the B Word Address Counter stage (making up the B Word). Both words are set from the Data Bus and, as mentioned, selection depends on the level to the select inputs of U920 and U1020.

The least significant bit of the A Word Bus applied to U820 through U1630B is inverted with the presence of a HI AWRDLSB (A Word least significant bit) command. This is used when displaying both a digitized and real time waveform. Normally, a stored waveform is presented on the crt by reading the digital data at each of the sequential addresses generated by this circuitry and by displaying the corresponding analog level at a predetermined horizontal displacement on the crt. When displaying both realtime and stored waveforms, however, stored waveform data is read and displayed only at every other sequential address. When a sequential address is left unread, a portion of the realtime sweep is displayed. The resulting display is presented much like a vertical chop display as described in the Mainframe Logic description. When the address of the last point of the stored waveform has been generated, the display of stored data begins again. The data now read and displayed consists of those addresses previously unread. In this way, all data in even addresses is displayed, and then all data in odd addresses is displayed, this cycle continuing until the instrument's mode is changed.



A special high-frequency clock is required for operation of the digitizer in this instrument. The Digitizer Clock circuit develops the necessary 10-MHz "Burst Clock", a series of 11 pulses, when data on the Data Bus indicates that digitizing of an acquired point is to occur. A schematic diagram of the Digitizer Clock circuit is given on diagram 23 in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. These stage names are used to aid in identifying components and portions of circuitry discussed.

CLOCK/SOURCE SELECT

The Clock/Source Select stage consists of U1910A, U2000, U2100 and U2230D. Integrated circuits U2000 and U2100 make up an external clock divider while U2230D and U1910A provide selection of the clock source to the Clock Delay stage.

The external clock rate (Aux Gate B) from the 7B87 Time-Base unit (Ext-Clock input connector) applied to U2000 is divided by factors of two, four, and eight, and appear at the Q_A , Q_B and Q_C outputs of U2000 respectively. These three clock rates along with the original external clock are applied to U2100 and, depending on the control levels applied to its A and B Select inputs from the Acquire Word Bus, one of these four clocks appears at the 1Y output of U2100.

The clock source is selected by U1910A in much the same manner as just described for selection of clock rate by U2100. The levels present at the A Select input (set from the Acquire Word Bus) and at the B Select input, determined by the mainframe DTCSC (dual trace channel switch control) level, select one of the four clock sources at the inputs of U1910A to appear at its 1Y output. These four clock sources include the clock output from U2100, two Source Restart pulses, and an inverted Source Restart pulse.

When the A Select input level of U1910A from the Acquire Word Bus (bit 12) is HI, indicating that the digitizer is acquiring in the External Mode, the 1Y clock output of U1910A alternates between the selected clock output from U2100 and the pulse generated by U1900D (Source Restart stage) and inverted by U2230D, indicating that a point has been completely digitized as the DTCSC level alternates between HI and LO, respectively. In this way, both points acquired from a dual channel vertical plug-in may be digitized with one clock pulse from the horizontal plug-in. Initially, a clock applied at the 1C3 input of U1910A is transferred to the 1Y output and applied to the Clock Delay stage. This triggers the remainder of the digitizer clock circuitry to properly generate digitizing clock pulses. The generation of these pulses will be discussed in the following subsections. After these pulses are generated, a source restart pulse is generated by U1900D and applied to U1910A through U2230D. At this time, if the DTCSC has already switched to a LO level, this pulse appears at the 1Y output of U1910A and

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the Digitizer Clock circuit once again generates the clock pulses necessary to digitize another data point. In this way, the Digitizer Clock circuitry produces the required clock pulses to digitize the data from both channels of a dual-trace vertical plug-in with only one clock pulse from the A Horizontal time base.

When the A Select level is LO, indicating that the 7854 is in the Internal Acquire Mode, the output at pin 7 of U1910A may only be selected from its 1CØ and 1C2 inputs. These inputs are both derived from the source restart pulse previously mentioned so the DTCSC level at the B Select input of U1910A has no effect on the 1Y output level. In this manner, the Digitizer Clock circuit generates the eleven pulses required to digitize a data point, generates a Source Restart Pulse, and applies this pulse as a trigger to once again generate eleven more digitizing pulses. This cycle continues until the A Select level of U1910A goes HI. This results in a continual digitizing process at a rate as fast as electrically possible for this circuit.

CLOCK DELAY

The Clock Delay stage consists of U2210A, U2210B and their associated components. This stage turns off the analog scope portion of this instrument, initiates digitizing of a data point, and then turns the analog portion of the oscilloscope back on when digitizing is complete.

Initially, a clock pulse from the Clock/Source Select stage is applied to U2210A and U2210B. This pulse triggers both of these monostable multivibrators, and each produces a pulse whose width is determined by an external rc network. The pulse generated by U2210B is applied to the Z-Axis and Focus Amplifier circuit on diagram 13, and turns off the analog scope display. At The same time the pulse generted by U2210A is applied to U1900C of the Burst Counter stage and digitizing of a data point is initiated. When the pulse from U2210A ends, digitizing is terminated. At this time the digitized data is stored into memory. After this has occurred, the pulse from U2210B ends and the scope display is restored. The pulses generated by U2210A and U2210B are different lengths, and since both are initiated at the same time, the proper scope off - digitize - store - scope on sequence is always maintained.

SOURCE RESTART

The Source Restart stage consists of U1910B, U1900D and their associated components. It generates the Source Restart pulse to the Clock/Source Select stage.

The inputs to U1910B at 2CØ and 2C2 are derived from the Gated Oscillator stage and are HI when the circuit is not producing digitizing clock pulses. The input at 2C3 is tied to ground potential while that of 2C1 originates in the Clock Delay stage. The 2Y output is selected from these four inputs and depends on the levels of the A and B Select inputs (shown on U1910A of the Clock/Source Select stage).

When in the External Acquire Mode, the LO level from the 2C3 input of U1910B is applied to U1900D. Since U1910A and U1910B both switch together (when (and if) the DTCSC goes LO) the 2C1 input (XYON normally HI) is applied to U1900D through U1910B. This HI level produces a LO pulse at the output of U1900D and is applied to inverter U2230D. Since the 1C1 input has been selected by the A and B Select levels, this HI appears at the Y₁ output of U1910A, initiating another digitizing sequence.

When in the Internal Acquire mode (A Select LO), a HI level is applied to both the 2CØ and 2C2 inputs of U1910B from the Gated Oscillator stage when it has generated eleven digitizing pulses. This HI level is applied to U1900D and at the end of this generated pulse (on the positive transition), the 1Y output applies a triggering clock pulse to the Clock Delay stage, initiating another digitizing cycle. This occurs independent of the DTCSC level, as the 1CØ and 1C2 inputs of U1910A are tied together as are the 2CØ and 2C2 inputs of U1910B.

GATED OSCILLATOR

The Gated Oscillator stage is comprised of U1920A, U1920B, Q2010, Q2020, Q2021 and their associated components. This stage, when properly enabled, produces a repetitive 10-MHz clock at the output of U1900B applied to the Digitizer circuit (diagram 26).

The oscillator within the Gated Oscillator stage is made up of Q2020, Q2021 and their associated components, and operates as follows (assume that Q2020 is off and Q2021 is conducting).

Capacitor C2120 charges negative to a level of about -4.3 volts, forward biasing Q2020. This causes a rapid voltage rise at its emitter which is coupled through C2120 to the emitter of Q2021, reverse biasing it. Transistor Q2020 continues to conduct as C2120 now discharges through R2121. When this voltage at the emitter of Q2021 reaches about -8.2 volts, Q2021 turns on pulling the base of Q2020 to a more negative level, reverse biasing this transistor. Capacitor C2120 once again charges negative through R2113 and the cycle repeats itself. Nand gate, U1900B inverts this output and buffers it at a TTL level to the Digitizer circuit (diagram 26).

The gating of this clock is done by U1920A and U1920B. If the clock has previously been running but is now off, the Q output of U1920B applied to the D input of U1920A is HI and the O output of U1920A is also HI since the last 10-MHz clock pulse applied to its reset input has set it to this level. When a digitizing sequence is to be performed. a pulse from the Clock Delay stage is applied to the clock input of U1920A causing the Q output of U1920A to go LO. This LO applied to the S (set) input of U1920B sets its Q output HI and turns on the 10-MHz oscillator. The Burst Counter stage counts these clock pulses, and when the proper number of pulses has occurred, it generates a LO level and a clock pulse to the D (data) and clock inputs of U1920B respectively, turning the 10-MHz clock off. Generation of these levels will be discussed in the Burst Counter stage description.

BURST COUNTER

The Burst Counter stage counts the 10-MHz output pulses from the Gated Oscillator stage and develops the necessary signals to turn the oscillator off after the preset number of pulses are counted. This stage is made up of U1900A, U1900C, U2030A and U2130.

Integrated circuit, U2130 is a programmable counter that counts down from the preset number applied to its data inputs. The logical levels applied to these inputs are set from bit 12 of the Acquire Word Bus either directly or through U1900A (inverted). The data bits at these inputs are latched into U2130 with the presence of a Start pulse at its Load input. A HI at the inputs of U1900C produces the Start pulse that loads the counter. This same pulse sets the Q output of U2030A HI and applies this to the Gated Oscillator stage. As the 10-MHz clock pulses are counted down from the preset number, a point is reached where the counter overflows and the borrow output of U2130 is applied to U1920B of the Gated Oscillator stage as a clocking pulse. At this time the level at the D input of U1920B (HI) is clocked to the Q output and thus to the base of Q2010. Since this level remains HI, the clock continues running. The next time U2130 overflows, the borrow output clocks U2030A and U1920B once again. Since the previous clock to U2030A caused its Q output to change states, the LO applied to the D input of U1920B is now transferred to the base of Q2010, stopping the 10-MHz clock.

When the output of U1900A is LO, the Q output of U2030A is set LO initially, so the first borrow output to U1920B turns off the 10-MHz clock. This ability to determine whether the clock will be stopped on the first or second borrow output enables the clock to produce either 11 or 22 digitizing pulses.

Eleven pulses are necessary to digitize a vertical or horizontal data point, so only 11 are needed at one time in the Y-T (vertical-versus-time) digitizing mode. When digitizing in the normal X-Y, (horizontal-versus-vertical) mode, or as in the case when digitizing both channels of a vertical plug-in unit in the Y-T mode, 22 pulses (two individual bursts of 11 pulses) are required. In the Y-T (realtime) mode, vertical data points are digitized sequentially at the rate of the clock applied from a 7B87 time base unit to the 7854 mainframe. Digitizing with any other type of time base may only be done in the normal (X-Y) mode. Digitizing in this mode is done in a random (for all practical purposes) manner.



The DMA Control circuit generates the timing sequence and control levels necessary for DMA (direct memory access) devices, internal to the instrument, to take control of the instrument busses. A schematic of the DMA Control circuit is given on diagram 24, in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. These stage names are used to aid in locating and identifying the components and the portions of circuitry discussed.

Three distinct DMA modules exist within the 7854 system (digitizer, readout and display). These modules operate asynchronously with respect to the system microprocessor and the other modules. Each performs its specific operation at a rate completely independent of the others.

In the process of completing one cycle of its operation, each module must directly access memory. This DMA operation is initiated by the individual module asserting its bus request to the DMA Control circuit, requesting use of the system busses as it requires them. These requests are synchronized to the system microprocessor by latching all pending requests on $\Phi 4$ of the system clock and checking requests on the following $\Phi 1$. The latched requests are prioritized and a DMA request is sent to the microprocessor indicating that a DMA module requires service.

Memory cycles must always be completed so, on the next non-memory cycle, the microprocessor signals the DMA Control circuit that the system busses are available for DMA use. The identity of the highest priority requester has been encoded and is now decoded to issue a bus grant to the requesting module. DMA modules may only use the system busses when they are granted specifically to them. The requesting module, sensing that the busses are now available to it, signals the DMA Control circuit with a MEM level when it is ready to use the busses. (Since the digitizer requests use of the busses before it is actually ready to use them, this "tell me when you're ready" approach is required.) This MEM level is latched on $\Phi 2$ of the system clock and up until this time, bus grants may be changed depending on the priorities of bus requests present in the system.

As a DMA module begins using the system busses, its bus request (and thus its bus grant) is latched for the remainder of the cycle to prevent a higher priority bus request from interrupting this memory cycle (all memory cycles must be completed once initiated to ensure valid results). As the DMA cycle nears completion, the DMA Control circuit issues a RBR (remove bus request) command to all modules. The module with the active bus grant recognizes that this RBR is directed to it and removes its bus request if it doesn't require another DMA cycle. Removing its bus request allows a lower priority DMA bus request to be serviced in a similar manner, if present.

BUS REQUEST LOGIC

The Bus Request Logic stage consists of U120, U130, U300A and R130. The Bus Request levels applied to the D inputs of U130 from the digitizer (BRDIG), the readout (BRRO) and the display (BRDSY) circuits are clocked into U130 by the rising edge of Φ4 of the 3-MHz free-running clock. When enabled by a LO level at its El input from inverter U300A, U120 encodes the highest priority LO level appearing at its inputs into a 3-bit binary code. Normally U120 is enabled because the RESET (system reset) level applied to U300A is only LO during power up. These 3 bits, representing the identity of the highest priority bus request pending, are applied from U120's A outputs to the Bus Grant Logic stage. Any time a LO level is applied to one of the inputs of U120 and the IC is enabled, a LO GS output is generated, resulting in LO DMAREQ (DMA request) This tells the microprocessor that a DMA device requires service.

BUS GRANT LOGIC

The Bus Grant Logic stage consists of U220 and U230. This stage generates bus grant levels to the digitizer (BGDIG), readout (BGRO) and display (BGDSY) circuitry. The bus grants are permission for each respective module to use the instrument busses for a transfer of a word to or from memory.

The highest priority bus request applied to the Bus Request Logic stage is encoded and applied from that stage to the D inputs of U230 of the Bus Grant Logic stage. When the enable input levels at pins 4 and 13 are HI as determined by the DMA Timing Logic stage, the data levels applied to the D inputs of U230 appear at the corresponding Q outputs. When the enable goes LO, the outputs do not follow the inputs but are latched at their levels immediately prior to the transition. These output levels are applied to the A, B and C inputs of U220. This IC decodes the information at these inputs, resulting in a LO at one, and only one, of the outputs when properly enabled by the DMA Timing Logic stage. These LO outputs are the bus grant signals to the various DMA devices and result only when the microprocessor has suspended its operation after recognizing that a DMA device requires service, allowing that DMA device to take control of the instrument busses.

DMA TIMING LOGIC

The DMA Timing Logic stage generates the enable levels for the Bus Request Logic and Bus Grant Logic stages as well as the WE (write enable) and RBR (remove bus request) to the memory (RAM and ROM) and DMA (Digitizer, Readout Acquire and Vertical Display and Control) circuits respectively. This stage consists of U100A, U100B, U100C, U110A, U110B, U200C, U210B, U300D, U310A, U310B, U310C, U310F, U320B, C110, and R111.

When power is initially applied to the instrument, the RESET level from the Microprocessor and Control circuit (diagram 28) goes LO during a portion of the power up sequence. This LO sets the $\overline{\Omega}$ output of U210B LO and that of U320B HI (through U100A). At the same time, this disables U120 of the Bus Request Logic stage and U220 of the Bus Grant Logic stage. After power up, the RESET level goes HI and remains at that level for the rest of the instrument's operation. This HI is inverted by U300A and enables U120 by pulling the EI pin LO.

The HOLDA (hold acknowledge) level from the Microprocessor and Control circuit is normally LO (when the microprocessor has control of the instrument busses). This LO level applied to U100B results in a LO at its output. This is inverted by U110A and enables U230 of the Bus Grant Logic stage. When enabled, U230

transfers whatever is at its D inputs to the corresponding Q output. Since the RESET level is now HI, U120 is now enabled and checks for a LO level applied to it by U130. If one or more bus requests are present, the GS (group strobe) output of U120 goes LO, producing the DMAREQ level to the microprocessor, indicating that a DMA module requires service. At the same time the data from the A outputs of U120 is applied through U230 to U220 as previously described.

When the microprocessor has recognized that a DMA request is pending, a HI HOLDA (hold acknowledge) level is generated on the next non-memory cycle, indicating to the DMA Timing Logic stage that it has suspended its internal operations and does not require the instrument busses. This HI HOLDA level applied to U310B enables U220 and the proper bus grant is generated. Inverter U310F is also enabled at this time and the LO Q level of U320B applied to its input results in a HI WE (write enable) level.

This HI HOLDA level applied to U310B also results in a LO applied to U200C. When the readout or display systems are the DMA devices recognized by the microprocessor, the MEM level applied to U200C goes LO soon after the bus grant is given. When the digitizer is the highest priority DMA device requesting service, a possibility exists that it may not be ready to transfer its data when granted the instrument busses (this is because the digitizer requests the busses before it actually needs them to speed up transfer of digitized data). In this case the MEM level goes LO, indicating that it is ready to use the bus, some time after the bus grant is given. In either case, when both the HOLDA level is HI and the MEM level applied to U200C is LO, the output of U200C applied to the D input of U210B goes LO. On the rising edge of the 3-MHz Φ2 clock U210B's Q output toggles HI.

At this time, all inputs to U110B are HI, generating a LO RBR (remove bus request) to all DMA devices. The DMA device that received the bus grant recognizes this RBR level (by gating the remove bus request pulse with the active bus grant) and so removes its bus request.

When the \overline{Q} output of U210B toggles HI, all inputs to U100B are at a HI level, producing a HI applied to U110A. This results in a LO applied to the enable inputs of U230, latching the present data at its inputs into the device. This is the data representing the highest priority bus request and is applied to U220.

Since the RESET and HOLDA levels applied to U100A are HI, the action of the $\overline{\Omega}$ output of U210B toggling HI results in a HI level applied to the R (reset) input of

U320B. On the next rising edge of the 3 MHz Φ 1 clock, the outputs of U320B toggle and a HI is applied to U310F. Since this inverting buffer is enabled, a LO WE level results.

At the same time the Q output of U320B toggled HI, its \overline{Q} output applied a LO to inverter U310A. Capacitor C110 now charges to a HI level through R111. The next rising edge of the 3 MHz Φ1 clock causes U320B to toggle, resulting in a HI WE level (disabling memory) and a HI at its Q output (U210B can't toggle to reset U320B because its D input remains LO). This HI at the \overline{O} output of U320B is applied to U310A and U100C. Since C110 was charged to a HI level and it can't discharge instantly to the LO level now present at the output of U310A, a short positive pulse results at the output of U100C. This is inverted by U300D and applied to U100B. This negative pulse results in a pulse applied to inverter U110A. The resulting positive pulse applied to U230's Enable inputs allows another encoded bus request to be latched into this IC and be applied to U220's inputs. If a new bus request is present, U220 decodes it and the microprocessor allows the DMA device to be serviced.

When the microprocessor determines that it no longer is required to allow DMA devices control of the instrument busses and that the present DMA cycle is complete, its HOLDA level returns to a LO state. This disables U220 and U310F, resets U320B through U100A, and applies a LO to the D input of U210B. On the rising edge of the 3 MHz Φ 2 clock, the $\overline{\Omega}$ output of U210B changes states and the circuit is once again in its initial state. Subsequent DMA requests are handled in a similar manner.



The Digitizer Sweep Counter circuit is used to determine if enough complete sweeps have occured to represent a valid waveform. A schematic of the Digitizer Sweep Counter stage is given on diagram 25, in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. These stage names are used to aid in identifying and locating the components and portions of circuitry discussed.

ACQUIRE WORD REGISTER

The Acquire Word Register stage is made up of U200D, U2230F and U1820. It latches the eight highest order bits from the Data Bus into U1820 with the presence of a LO AMDWRD (A mode word) and a LO WE (write enable) at the inputs of U200D. This produces a clock to U1820 through inverter U2230F, latching these bits into U1820 and applying them to the Acquire Word Bus. Portions of this word are read from this bus by other circuitry within the instrument to determine the mode in which they are to operate.

SWEEP COUNTER

The Sweep Counter stage consists of U1000 and U1100. This stage is an eight-bit pre-settable counter that counts the number of complete sweeps that are detected by the Complete Sweep Detector stage. The eight least significant bits from the Data Bus are loaded into the counter ICs with the presence of a LO level at their load inputs from U200D. Each succeeding pulse from the Complete Sweep Detector stage applied to input pin 4 of U1100 causes the counter to count down from the preset number. When the counter has counted to zero, the next pulse causes the counter to produce a LO pulse at the borrow output of U1000. When this pulse returns to its HI state, the Acquire Stop stage is clocked and sweep counting terminates.

GATE SELECT

The Gate Select stage is made up of U1720 and U2220. It determines, depending on the logic levels applied to its A and B Select inputs from the Acquire Word Bus, the source of the sweep gate pulse to the Complete Sweep Detector stage. The A gate (ASWPG) and B gate (BSWPG) signals are selected when acquiring using the A and B Horizontal plug-ins respectively. The flip-flops at the 2CØ and 2C1 inputs of U1720, made up of individual nor gates (U2220), are used to condition the ASWPG and BSWPG signals, keeping them free from multiple transitions on their falling edges. This is accomplished by having the corresponding Holdoff signal (A or B) reset the flip-flop at the end of the sweep before the erroneous transitions occur. The Ext Stop (external acquire stop) signal from the Delay Gate B of a 7B87 time base unit is selected when acquiring in the External Acquire Mode and is used only when acquiring samples in sequential fashion, at a rate determined by the time base.

COMPLETE SWEEP DETECTOR

The Complete Sweep Detector stage is made up of U1610A, U1610B, U1710A, U1710C, U1830A, U2230A, U2230B and C1610. This stage detects the beginning and end of a sweep gate pulse and, if detected in the proper order (beginning before end), produces a clock pulse to the Sweep Counter stage, indicating that a complete sweep has occurred.

Upon power up, the system RESET input level applied to U1400A goes LO. This applies a LO level to U1710A, resulting in a LO at its output. This is applied to the R (reset) input of U1610A to reset it and also to U1710C. The resulting LO at the output of U1710C is applied to the reset input of U1610B and resets its Q output to a LO.

The first Gate pulse from the Gate Select stage applied to the Complete Sweep Detector stage after the reset level returns to HI, causes the Q output of U1610A to change states, going HI, coincident with the leading edge of this pulse. The HI levels at pins 1 and 2 of U1710A, determined by bits 13 and 12 of the Acquire Word respectively, along with the HI level applied to pin 13 of U1710A produce a HI at the output of U1710A. This HI, in conjunction with the HI Q level from U1610A and the HI Q level from U1610B, applies a HI to the R input of U1610B through U1710C. This enables U1610B to change states when clocked and does so coincident with the end of the Sweep Gate pulse applied through U2230B to its clock input. The Q output of U1610B goes HI while the $\overline{\mathbf{Q}}$ output discharges C1610 until U1710C senses this level as LO. The resulting LO at the output of U1710C is applied to the reset input of U1610B, resetting the Q output LO. This pulse is applied to the Sweep Counter stage and signifies that a complete sweep has occurred.

When using a 7B87 in the External Acquire Mode, the Acquire Word bit 12 applied to U1830A and U2230A is HI, allowing the LO level resulting from both inputs of U200D being LO, to reset the Q output level of U1830A to a LO level. Integrated circuits U1610A and U1610B are reset as previously described. After the reset level applied to U1830A returns to HI, the first Full Once pulse generated by the 7B87 plug-in clocks the Q output of U1830A HI. The HI applied to U2230A from the Acquire Word Bus results in a LO at the S input of U1610A, setting its Q output HI. With the end of the Ext Stop (external acquire stop) gate pulse applied through U1720 to U2230B, U1610B is clocked and a complete sweep pulse is produced and applied to the Sweep Counter stage. In the 7B87 External Acquire Mode, only the end of a gate pulse is necessary to properly generate a complete sweep pulse. This is true because acquisition of all data in this mode is done sequentially, unlike Internal Acquisition.

ACQUIRE STOP

The Acquire Stop stage generates the Acquire Done Clear signal to stop signal acquisition (digitizing) when either it senses that the Sweep Counter has determined that memory is full, the AQS ABORT (acquire single-shot abort) pushbutton on the rear panel has been pressed or when a GPIB device needs to interrupt acquisition. This stage consists of U1400A, U1530B, U2230C, U2030B and R2020.

A LO level applied to an input of U1400A from either the RESET input or from U200D applies a LO level to the R (reset) input of U2030B, resulting in a HI $\overline{\Omega}$ output level. This HI level indicates that the digitizer system should be acquiring data points. When a preset number of sweeps have occured, the Sweep Counter stage produces a Borrow output pulse, indicating that a preset number of sweeps have occurred. As the Borrow output pulse returns to its normally HI state, U2030B is clocked. The Acquire Done Clear level may also be set LO to stop digitizing by applyig a LO level to the S (set) input of U2030B through the rear-panel AQS ABORT pushbutton or by a GPIB device asserting a LO IGPIB (GPIB interrupt) level.

26 DIGITIZER

The Digitizer circuit accepts analog voltage levels from the Vertical and Horizontal Sampler circuits (diagram 20) and converts them to a corresponding 10-bit binary code. These individual 10-bit words are stored in memory (RAM) and used by the microprocessor to reconstruct a complete stored waveform. The digitizer used in this instrument is a "successive approximation" A/D converter and is used to obtain both high resolution and high speed conversions. In use, a successive approximation A/D converter presets the reference level of a comparator to one half of the allowable range for inputs (average voltage level of maximum and minimum allowable input levels). The analog input voltage level is compared to this set reference level and one bit of digital information is set, indicating a greater than or less than condition, depending on the result of this comparison. A shift register is advanced and a new reference level is set for the comparator. This new reference level is equal to either the sum or the difference of the initial reference value and one-half of this value. Depending on the result of this new comparison, a new bit of digital data is set. This process continues, always adding or subtracting a voltage level of one-half the previous value added or subtracted, until all data bits are set. The combination of all set data bits is the digital representation of the applied analog signal.

A schematic of the Digitizer circuit is given on diagram 26 in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. Sub-headings in the following description use these stage names to aid in identifying and locating components and portions of circuitry discussed.

COMPARATOR

The Comparator stage consists of U510, Q513, Q514 and their associated components. It compares the input analog level at pin 2 of U510 to the step-analog level generated by the combination of the Approximation Generator and D/A Converter stages applied to it at pin 3. Its output, at pin 7, is used to set one bit of data in the Approximation Generator stage. Transistors Q513 and Q514 buffer and invert this logic level. This resulting signal is applied to the Approximation Data latch stage to set one bit of serial data.

APPROXIMATION GENERATOR

The Approximation Generator stage consists of Q556, U519B, U554C, U554D, U569A, U569B, U570, U575, U580, U585, U590, U595 and their associated components. This stage, in conjunction with the D/A Converter stage, produces the varying analog-step voltage to which the analog input voltage is compared in the Comparator stage.

A clock pulse applied to U569B, U570 and U519B, through U503D and U503A, produces a HI Q output level at pin 9 of U569B, assuming that the R (reset) input level at pin 13 of U569B is HI. This reset level is HI only when the clock pulse to U519B is HI and the Q10 output of U570, a 10-bit shift register, goes HI due to a shift occurring. At this time, the output of U519B goes HI, clocking U569A to a HI Q output level at pin 6. The next clock pulse to U569B produces a HI Q output level applied to the D (data) input of the shift register, U570. At the same time, U570 is clocked and this HI level at the D (data) input of U570 is transferred to its Q1 output, pin 11. This changes the set level, pin 4 of U569A, to a LO, forcing its $\overline{\Omega}$ output LO. This is applied to U569B as a LO reset pulse and the Q output of U569B goes LO. On the next clock pulse, the Q1 level of U570 goes LO due to the LO at its D input. The previously HI level of Q1 is shifted to the O2 output. Each consecutive clock pulse shifts this HI level by one step until the HI level reaches the Q10 output, at which time the entire cycle repeats itself. This results in a continuous stepping of a HI output bit from output Q1 all the way through Q10 and then back to Q1, all steps occurring coincident with the applied clock.

The data latches, U575 through U595 in the Approximation Generator stage, initially transmit the logic level applied to their set input pins 5 and 12, to their output pins 2 and 15, respectively (after a reset pulse from the previous cycle is applied at pins 4 and 13 to reset output pins 2 and 15 to their LO state). Assume that all latches have just been reset and a HI level has just resulted at the Q1 output of U570. The output at pin 2 of U575 (the most significant bit) goes to a HI state

Theory of Operation-7854

while the remainder of the latch outputs are LO. The D/A Converter stage "reads" this 10-bit data word and produces an output voltage, used as the comparator stage's reference, equal to one-half of the allowable input range for the comparator stage (see general Digitizer description above). This level is compared to the analog input level of the Comparator stage and the logic level output of the comparator is applied to all of the data inputs of the data latches of the Approximation Generator stage. When this comparator output level is HI, an input voltage greater than (more positive) the approximated reference is indicated; when LO, an input more negative than the reference is indicated.

On the next clock pulse to U570, the internally stored HI bit is shifted to the next most significant output, O2 at pin 12 of U570. This shows up as a HI level at pin 15 of U575, which is fed to the clock input, pin 6, for the MSB (most significant bit) latch. This stores the level present at the D inputs in the MSB latch. The new 10-bit word applied to the D/A converter stage is translated to an analog voltage level equal to either the sum or the difference of the original reference voltage and one-half of that value (1½X if the MSB was set HI; ½X if set to LO). This new reference level is compared to the analog voltage at the input of the comparator stage and a new comparison is made. The result of this comparison is applied to the D inputs of all the data latches of the Approximation Generator stage. The next clock pulse shifts the HI bit in the 10-bit shift register, U570, to the next most significant bit and latches the digital result of this new comparison in the 2nd MSB latch. This process continues, always adding or subtracting one-half of the value previously added or subtracted to the reference pin of the comparator, until all 10 bits of the Approximation Generator data latches have been set (see Fig. 2-35). This 10-bit word digitally represent the voltage level at the input of the comparator stage. After the 10th comparison, the latches are reset and the next clock restarts the cycle. Components U554D, R599 and C599 delay the shift of the HI bit to Q10 of U570 to produce the ESAR (end from successive approximation register) pulse used by the Digitizer Control Logic circuit (diagram 21).

D/A CONVERTER

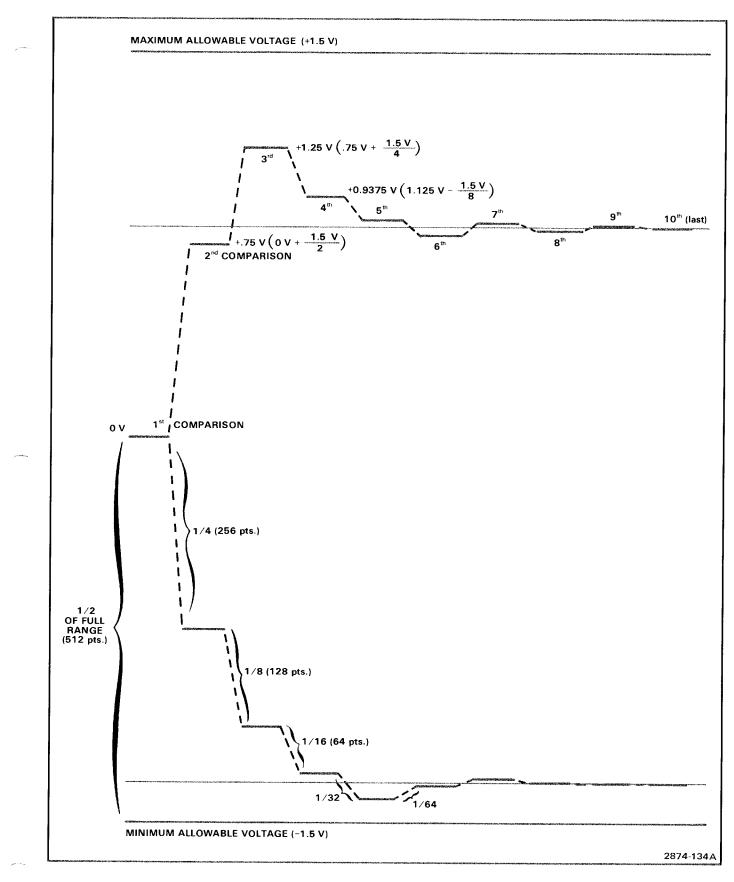
The D/A Converter stage consists of U610, U620, U621A, U621B, U630A, U630B, and their associated components. This stage receives a 10-bit data word from the Approximation Generator stage and converts this data to a unique analog voltage level. This is then applied to the Comparator stage as the reference level for the next sequential comparison.

The data bits that are sequentially set and latched by the Approximation Generator stage are applied to the B inputs of U610 and U620. These 10 bits of data are converted (five by U610 and five by U620) to the unique voltage levels at their Vout outputs, dependent on the fivebit binary code applied to their B inputs. These two voltages are summed and applied to the Comparator stage. Resistor R620, along with the LSB Match adjustment, R623, reduces the effect that the output of U620 has in this summation by a magnitude of 32 in relation to that of U610. Adjusting R623 accurately sets the magnitude for each incremental analog step by varying the reference current in U620. Inverters U621B and U621A are used to set reference currents and thus the voltage output limits of U610 and U620 respectively. The output of this stage at TP620 is limited by these references to a maximum of +1.5 volts and a minimum of -1.5 volts. Between these limits, there are 1024 unique analog voltage step levels that may result at this output, dependent on the 10-bit data word applied to the stage.

APPROXIMATION DATA LATCH

The Approximation Data Latch stage is made up by U503B, U520, U521, U522, U554B, U554E, U554F and their associated components. This stage stores the results of the 10 sequential comparisons made by the Comparator stage and buffers them to the Data Bus when enabled by the Digitizer Control Logic circuit (diagram 21).

Each comparison made by the Comparator stage results in a logic level at the output pin 7 of U510 that is inverted by Q513 and applied to pin 6 of U503B, the input of the Data Latch stage. The 10-MHz Φ1 clock is delayed by U503D, U503A, U554B, R553 and C553 and is applied to the clock input of U520, a 10-bit shift register. This ensures that the Comparator stage has had time to do its comparison and that the data at the D input of U520 has settled and is valid. Each time this delayed clock goes HI, a new bit of data is entered into the register and previous bits are shifted to the next output. After 10 bits of data are stored and shifted, the \overline{H}/V Q input from the Digitizer Control Logic circuit is applied to the clock input, pin 11, of U521 to latch these data levels. The DMEM (digitizer memory) enable level from the Digitizer Control Logic circuit enables the buffers within U521 and U522 and the 10-stored data bits, representing the value of the analog input to the Comparator stage, are buffered to the Data Bus.





VOLTAGE REFERENCE

The Voltage Reference stage consists of U533 and its associated components. This stage sets both the +1.5 volt reference and -1.5 volt reference for the D/A Converter stage. Inverter U533 is connected as a feedback amplifier and both reference voltages are taken from its feedback network.

CLOCK CONDITIONER

The Clock Conditioner stage is made up of U503A, U503C and U503D. This stage shapes (narrows) and delays the clock pulse to the Comparator stage. By inverting the clock pulse and applying it to U503C along with the normal clock pulse, a short duration pulse is produced at the output of U503C at the end of the normal clock pulse. Since the inverted clock applied to U503C has a one-gate longer electrical path than the normal clock, the period of the resultant clock pulse at the output of U503C is equal to the propagation delay time through U503D (see Fig. 2-36).

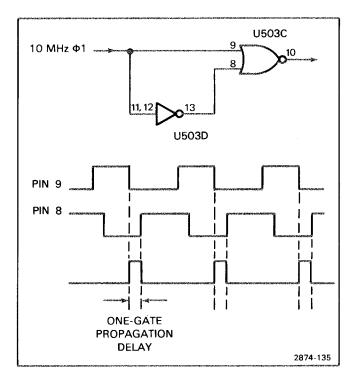


Figure 2-36. Clock Pulse delay.

SIGNATURE ANALYSIS

The Signature Analysis stage shown on diagram 27 is used for troubleshooting the 7854. It is only used in conjunction with the 067-0911-00 7854 Test Interface, consisting of a Diagnostic Memory board containing diagnostic firmware, cabling to the Microlab 1 (also required), a personality card for the Microlab 1 and signature tables for the version of firmware used. A description of the keyboard circuitry shown on diagram 27 is given in the Keyboard System description.

The stage is made up of a signature clock and a software controlled Start/Stop command generator. By sampling levels at a node when certain blocks of circuitry are being exercised in a specific manner by the diagnostic package, a numerical "signature" is developed. When compared to a table of known good signatures, problems can be isolated. By positioning jumpers P220 and P1410 to either the DMA or microprocessor positions, signatures may be developed on either DMA or microprocessor cycles respectively.

The clock circuit consists of U110A, U200A, U1000B, U1410A, U1410B, U220B, U520A and U520D. When the MEM level at the D input, pin 2 of U110A is LO, indicating a memory cycle, the 3 MHz Φ1 input clocks the Q output applied to U220B HI. If the HOLDA (hold acknowledge) level is LO, indicating that the microprocessor has control of the memory, U520D also applies a HI to U220B. If the WAIT command at pin 1 of U520A is LO, indicating that an extended memory cycle is now complete or that a normal memory cycle has occurred, the input at pin 3 of U220B is HI. These three HI levels applied to U220B result in a LO applied to U1410B. On the falling edge of phase 4 of the 3-MHz clock applied to U1410B, the \overline{O} output of the one-shot, U200A, goes LO to set U200A and produce the negative going signature clock. Since U110A is now set, it is ready for the next memory cycle.

If the HOLDA level is HI, indicating that a DMA (direct memory access) device is controlling the memory, the signature clock will not run unless jumpers P220 and P1410 are moved to the DMA position. Operation of the clock is the same as just described except that the \overline{WE} (write enable) level, always required to be LO for a DMA operation, either enables or disables the 3-MHz Φ 4 clock that produces the signature clock.

U1400 and U110B provides a means for software to produce the Start and Stop levels necessary for signature analysis. Address bits 13, 14 and 15 on the Address Bus

cause one of the 8 outputs of U1400 to go LO when a CRUCLK pulse is applied to the enable input at pin 6. This CRUCLK level is set by diagnostic firmware and is used to enable the Start/Stop triggers.

A LO output at pin 10 of U1400 is applied to U110B and produces the HI Start/Stop pulse to the external signature analyzer at pin 9 of U110B while a LO at pin 12 of U1400 resets pin 9 of U110B LO, generating the Start/Stop pulse.

As previously mentioned, a signature for a node is produced by sampling the levels at the node between Start and Stop commands. The timing of these commands, as well as the means in which circuitry is exercised is dependent on the firmware residing on the 7854 Diagnostic Memory Board (067-0961-00) used for troubleshooting. Actual signatures are compared to a table of signatures known to be correct for the version of diagnostic firmware in use. Differences in these signatures indicate that signals at the node in question are incorrect and should be further investigated.

MICROPROCESSOR AND CONTROL

The Microprocessor and Control circuit is shown on diagram 28 in Section 7, Diagrams and Circuit Board Illustrations. The diagram is divided by gray shaded lines separating the circuitry into major stages. The following description uses these stage names to aid in locating and identifying the components and portions of circuitry discussed.

The microprocessor used in this instrument is a single chip 16-bit central processing unit (CPU) with separate address and data busses as well as individual inputs and outputs for control functions. The required operating voltages for the microprocessor and its related circuitry are different than those used elsewhere in the instrument, and so are developed from other supplies by the Auxiliary Regulator circuit (diagram 38).

CLOCK

For proper operation of the microprocessor IC, U700, a four phase clock with specific relationships must be applied to the clock inputs at pins 8, 9, 25 and 28 of U700. These clock pulses are developed by U920 and its associated components.

The crystal between pins 18 and 19 of U920 sets the 48-MHz oscillator frequency for the 4 phase Clock generator stage which is divided internally be a factor of 16 to obtain each of the four phases of the 3-MHz clock. Each phase of the 3-MHz clock lags the preceding clock phase by 90 degrees to provide 4 non-overlapping clock pulses, each with a duty cycle of about 25 percent (see Fig. 2-37). The resonant Ic tank circuit between pins 1 and 2 of U920 prevents the oscillator from oscillating at some subharmonic (a lower frequency) or harmonic (a higher frequency) of the designed operating frequency of the crystal. The clock outputs at pin 8, 9, 11 and 12 of U920 are 12-volt level clocks and drive the microprocessor while the inverted clock outputs at pins 6, 7, 14 and 15 of U920 are TTL levels. These are inverted by the buffers within U1120 and drive other digital circuitry within the instrument that require the various phases of the 3-MHz clock at TTL levels.

The PUP (power up) command input at pin 3 of P105 from the Converter/Rectifiers circuit (diagram 15) resets the microprocessor when power up occurs. Initially, all supplies are at ground potential and the PUP level is LO. The PUP level remains LO until all supplies have come up to their proper voltages. This LO turns Q100 on as soon as the +5V_D supply comes up and a LO FFD input level is applied to U920 through U520E, U220C and U520F. This LO is clocked through U920 to its FFQ output coincident with its Φ 3 clock, resetting the microprocessor. The PUP level remains LO for about 3 seconds, as determined by the Power Up Logic stage of the Converter/Rectifiers circuit. When this PUP level goes HI, indicating that all supplies are at their proper voltages, Q100 is turned OFF

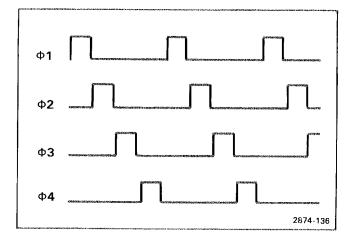


Figure 2-37. Timing relationships of the four phase, 3-MHz clock.

and the RESET level to the microprocessor goes HI. This sequence ensures that all instrument power supplies are up and settled before any operation is attempted. The system reset may be disabled by disconnecting jumper P1120.

INTERRUPTS AND CONTROL

The Interrupts and Control stage provides interface to and from microprocessor, U700, enabling it to change its operational mode to (1) service it peripherals, (2) control its bus and memory functions, and (3) ensure proper timing sequences for data transfer and manipulation. All inputs associated with P130 are for test purposes only and will not be described.

The Ready command applied to pin 62 of U700 through U1110C, tells the microprocessor that the memory will be ready to read or write during the next clock cycle. If, during a memory operation, the proper memory set-up conditions have not been met, this line is LO and the microprocessor enters a wait state. Internal operations of the microprocessor are suspended until the memory systems indicate that they are ready to proceed.

The TSTHOLD command, if present, from the external Microlab 1 test fixture (used only for troubleshooting) is applied to input pin 13 of U900, and is transferred to its output, pin 12, at the beginning of the Φ 4 clock. This normally HI command and the normally HI DMAREQ command from the DMA Control circuit (diagram 24) are applied to the inputs of U1000C. In this configuration, either the TSTHOLD or the DMAREQ command may produce a LO at the HOLD input, pin 64, of the microprocessor. The DMA enable (DMAEN) jumper, P1000, is used to determine if the DMAREQ can control the HOLD function. This jumper is removed to disable DMA requests for test purposes. In the hold state, the address and data busses and the memory control outputs (WE, MEMEN, and DBIN) are forced to a high-impedance state, allowing DMA (direct memory access) devices to have control of the data, address and control busses for data input and retrieval functions.

Interrupt commands from various portions of the instrument are prioritized and encoded by U1200. The highest priority active LO input is encoded onto 3 lines, ICO, IC1 and IC2. The GS (group strobe) output of U1200 goes LO when an interrupt is present at one of the inputs of U1200. This GS command, is applied to U1100D and develops the INTREQ (interrupt request) signal. This interrupt request level and the encoded interrupt

address, as well as the TSTHOLD command and CRUIN level are applied to their related microprocessor inputs on Φ 4 of each clock cycle through U900 as mentioned in the HOLD command description. The CRUIN level may be set by an external jumper while the interrupts may be prioritized or disabled using the external jumpers at the inputs of U1200.

With the presence of an interrupt request at pin 32 of the microprocessor IC, U700, the priority interrupt code levels at input pins 33, 34, 35 and 36 are internally stored and compared to a register containing the priority code of the present instruction being executed. If the priority of the interrupt is greater than the priority of the present instruction, upon completion of the instruction, the interrupt sequence is initiated. Since the priority encoder continuously monitors and encodes all interrupt requests, and the interrupt codes to the microprocessor are updated every clock cycle by U1200, the microprocessor always acts upon the highest priority request first. If the interrupt is not of sufficient priority, the microprocessor will ignore it. Since the interrupt has not been serviced, the interrupt request will remain active (LO) until the program goes to a state of sufficiently low priority to accept the request.

If, during the servicing of an interrupt request, one of higher priority is encountered, the higher priority is serviced and then the microprocessor returns to complete the service of the lower priority request. Upon completion of the request, normal operation resumes until an interrupt of sufficient priority is once again encountered.

The 50-Hz clock input at pin 3 of U320A generates the highest hard wire programmed interrupt of those available, so every 16-20 milliseconds, it is serviced. This is used to display digitized waveforms with the real time clock developed by the Readout Acquire system (see diagram 31). This interrupt is reset by the RRTC (real time clock reset) command developed by U1310 in the CRU Outputs stage, whose operation will be discussed later in this section.

The CRUIN input at pin 31 of microprocessor U700 acts as an input to set specified bits of an internal (the CRU) register. This level is determined by the jumper P1300 at pin 8 of U900 as previously described.

DATA BUS TRANSCEIVERS

The Data Bus Transceiver stage is made up of U500, U600, U510 and U610. Integrated circuits U600 and U610 make up a 16-bit buffer between the Data Bus and the microprocessor's Data input/output (pins 41 through 56) which allows data on the bus to be transferred to the

microprocessor with the presence of a READ command at the enable input, pins 1 and 19 of both U600 and U610. Integrated circuit U500 and U510 compose another 16-bit buffer between the microprocessor Data input/output pins and the Data Bus. When enabled with a WRITE command at pins 1 and 19 of both U500 and U510, data may be transferred from the microprocessor to the Data Bus.

TRANSCEIVER CONTROL

The Data bus control signals, READ and WRITE, are developed by the Transciever Control logic, U520C, U400A, U400B, U400C and U400D, from the control output levels produced by the microprocessor.

During a memory cycle, read or write, the memory enable signal (MEM) applied to pins 2 and 12 of U400 is LO. Assume that the levels at pins 9 and 5 of U400 are also LO and that the R/W (read/write) signal applied to pin 13 of U400D and to pin 5 of U520C is alternating between its HI (read) and LO (write) states. A read (HI) command applied to U520C and U400D forces the WRITE command at pin 8 of U400C HI while it drives the READ level at pin 6 of U400B LO, producing the READ command. If the R/W command goes LO (write), the level at output pin 6 of U400B goes HI while that at pin 8 produces the WRITE command.

Now, if the HOLDA command goes HI, both levels at pins 6 and 8 of U400 go HI, disabling both the read and write data bus transceiver. If the memory enable command goes HI, indicating that the microprocessor is through using the memory for a time, the data bus transceivers are also disabled.

The Wait command at pin 3 of the microprocessor IC is an output buffered by U110C going to the Mother Board (diagram 37). The HI Wait output is produced in conjunction with the Ready command and indicates that the microprocessor is waiting for proper memory conditions to be established before continuing its operation.

The HOLDA (hold acknowledge) output, when HI, indicates that the microprocessor is in the Hold state, and a DMA operation is in process.

The CRUCLK (CRU clock), when HI, indicates that external interface logic should sample the CRUOUT data at pin 30 of the microprocessor IC, U700, the CRUOUT output. This output is tied to the Data input, pin 13, of U1310 through the buffer, U620. The CRUOUT data can be HI or LO, depending upon the particular command being performed by the microprocessor.

A HI R/ \overline{W} output at pin 13 of U620 indicates that all memory write buffers are disabled and are in a condition that data may be read from memory by either the microprocessor or a DMA device when properly enabled by MEM (memory enable) and HOLD.

The MEM output command at pin 15 of U620 indicates that the Address Bus contains a valid memory address. This is present (LO) during both read from and write to memory operations.

The WE (Write Enable) indicates that the microprocessor or a DMA device has data available that is to be written into memory.

CONTROL BUS

The Control Bus stage buffers the control signals from the microprocessor and sets levels to the hardware Control Bus and Address Decoder stages with the presence of a HOLDA command. As long as the HOLDA command is LO, all outputs of the microprocessor are buffered. When the HOLDA command is HI, however, the R/W, WE, MEM and CRUOUT are held at their high impedance state.

The IAQ (Instruction Acquisition) output at pin 7 of the microprocessor goes to its active (HI) state whenever the microprocessor is fetching an instruction from memory. It is used only for test purposes in this instrument.

CRU OUTPUTS

The CRU (hardware control) Outputs stage consists of U1110A, U1110B, U1120A, U1210B, U1310, U520B and U1220B. This stage sets one of the CRU Output levels at output pins 4, 5, 6, 7, 9, 10, 11 and 12 of U1310 depending on the data at its input pin 13 and the address at its address pins 1, 2 and 3. A CRUCLK pulse applied to the enable, pin 14 of U1310 through U520B and U1110A allows the data at the input of U1310 to be transferred and stored at the addressed output. The address data at pins 14 and 13 of U1210B and pins 4 and 5 of U1220B determine (1) if the CRUCLK pulse is applied to U1310 to enable it, (2) the CRUCLK pulse is applied to U210 on diagram 27 to enable the setting of the keyboard flags, or (3) to disable both.

ADDRESS DECODER

A MEM command from the Control Bus output IC, U620, enables U1210A so that the address data at its input pins 2 and 3 causes one of its four output pins 4, 5, 6 or 7 to go LO. If pin 4 is LO as addressed by A14 and A15 indicating a ROM cycle, a ROM (ROM enable) results. If output pin 7 is addressed, the level of the A12 (address bit 12) is distributed to the D input, pin 12, of U1010. If the A, B and D inputs from the address bus are LO and the C input is HI, the output pin 5 of U1010 is LO. Any other value at the inputs will cause this output to be HI.

This output is applied to pin 10 of U1110C and, if LO, the level from A9 (address bit 9) at pin 9 of U1110C is applied to the D input of U910. If HI, the D input is always HI. If the B, C and D inputs are LO, the A Input level selects either output pin 1 or 2 to go LO. Any other input levels drive output pins 1 and 2 HI. Since the MEM level from the Control Bus is LO, the G1 and G2 inputs at pins 18 and 19 of U132O are enabled when pin 1 of U910 is LO, and the four address lines, A, B, C and D at pins 23, 22, 21 and 20 of U132O now select one of U132O's outputs to go LO, depending on the address input data.

If output pin 8 is LO, and the R/W command from the Control Bus stage is HI, indicating a read cycle, the input at pins 9 and 10 of U1220C are both LO, generating the FPR (front panel read) command.

Integrated circuit U1000A, whose inputs are tied to the ROM and GPIB commands, in conjunction with the test jumpers, P121 and P1210, allow both of these address codes to refer to ROM memory, allowing ROM expansion. The new GPIB command is derived from pin 5 of U1210A by moving the wire jumper P1210.

ADDRESS BUFFERS

The Address Buffers stage, consisting of U800 and U810, buffer the address outputs at pins 10 through 24 of the microprocessor IC, U700, to levels capable of properly driving the devices tied to the Address Bus. The buffers are enabled when a LO level is applied to pins 1 and 19 of both U800 and U810. If the HOLDA level from the Control Bus stage should go HI, the address buffer is inhibited. The address enable jumper, P1001, allows the buffers to be disabled by removing the jumper.

29 READ ONLY MEMORY

The Read Only Memory (ROM) circuit contains the stored firmware responsible for the proper operation of this instrument. It provides the control necessary for the microprocessor or a DMA device to access this stored data by using the Address and Data Busses. A schematic of the ROM circuit is given on diagram 29 in section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. These stage names are used to aid in locating and identifying the components and portions of circuitry described.

ADDRESS BUS BUFFER

The Address Bus Buffer stage consists of U130 and U230. This stage, when enabled by a LO applied to the enable inputs of U130 and U230 (pins 1 and 19) from the ROM Control stage, buffers 13 bits of data from the Address Bus to the address inputs of the ICs that make up the Memory state. When this stage is disabled, its outputs go to a high impedance state, isolating the ROM circuitry from the instrument Address Bus.

MEMORY

The Memory stage consists of U100, U110, U200, U210, U300, U310, U400 and U410. The first four of these parts are ROM (read only memory) ICs, while the latter are PROM (programmable read only memory). These memory IC's are addressed and enabled two at a time by applying data to their address inputs and applying a LO level to the selected CS (chip select) inputs, resulting in 16-bit data words applied to the Data Bus Buffer stage. Integrated circuits U100, U100, U200 and U210 are all addressed in the same manner, directly from the Address Bus Buffer stage. Addresses for (U300 and U310 for future expansion) U400 and U410 are the same as long as the Address Bus Buffer stage is enabled. However, when the FPLA (field programmable logic array) stage determines that it is required to address memory (this determination will be discussed in the FPLA stage description), the Address Bus Buffer stage is disabled. At this time U400 and U410 are addressed by a combination of the 6-bit output of the FPLA stage and the four least significant bits applied directly from the Address Bus. This configuration allows for addressing of up to 16 individual data words for every partial address generated by the FPLA stage. (XU300 and XU310 may not be used if not required by the FPLA.)

ROM CONTROL

The ROM Control stage consists of U220, U225, U227, U320, U325, U420 and U425. This stage determines, from various inputs, which ROM pair should be enabled as well as if the Address and Data Busses should be enabled, and does so. In addition, this stage senses when an extended memory cycle will be required and generates the appropriate control level to the microprocessor to initiate such a cycle.

Table 2-4 illustrates the resulting output enable and memory cycle control levels generated by the ROM Control stage for various input combinations. As you will note, this table is separated into two parts. The first describes operation of this stage using static ROM and PROM ICs while the second describes the variations in operation resulting when using edge enabled ROMs. The Static/Clocked Selector, jumper P220, may be connected to accomodate use of either type of memory.

TABLE 2-4 ROM ENABLING

				11	NPUT NA	ME		FLAG		RESULTING
	MEM	ROM	WAIT	A12	A13	A14	A15	PIN 19 OFU120	Φ2*	ENABLE FROM STAGE
	LO	~	~	~	LO		HI	~	2	DATA BUS BUFFERS
	~	LO	~	~	~	~	~	~	~	ENABLE (LO) (PIN 8 OF U325C)
VALID FOR BOTH	~	~	~	~	~	~	~	HI	~	ADDRESS BUS BUFFERS ENABLE (LO) (PIN 6 OF U425C)
"STATIC" AND "CLOCKED"	~	LO	LO	~	~	~	~	LO	~	ROMDLY (LO) (PIN 8 OF U425P)
	LO	~	~	LO	LO	LO	HI	~	2	PROM ENABLE 1 (LO) (PIN 3 OF U420A)
	LO	~	~	HI	LO	LO	HI	~	~	PROM ENABLE 2 (LO)
	~	LO	~	~	~	2	~	LO	~	(PIN 1 OF U320A)
VALID FOR	~	LO	~	~	~	LO	~	ні	~	ROM ENABLE 1 (LO) (PIN 11 OF U420D)
ONLY "STATIC"	~	LO	~	~	~	HI	~	н	~	ROM ENABLE 2 (LO) (PIN 8 OF U420C)
VALID FOR	~	LO	LO	~	~	LO	~	ні	LO	ROM ENABLE 1 (LO) (PIN 11 OF U420D)
ONLY "CLOCKED"	~	LO	LO	~	~	HI	~	HI	LO	ROM ENABLE 2 (LO) (PIN 8 OF U420C)

* Φ2 with falling edge delayed about 40 ns.

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 \sim = indicates that state does not matter

FPLA

U120 is the FPLA (field programmable logic array) stage. This IC enables memory address locations containing either invalid or obsolete data to be bypassed and left unread, enabling valid data from a different portion of memory to be read in its place.

Addresses known to contain valid data are ignored by the FPLA stage. However, when an address whose data is known to be incorrect is applied to the address inputs of U120, its FLAG output at pin 19 goes LO, disabling the address buffers stage through U425C of the ROM Control stage. Also at this time, a predetermined 6-bit address is output at the F0 through F5 outputs of U120. This 6-bit word, in conjunction with the 4 least significant bits on the Address Bus (A1 through A4), are applied to (if used, U300 and U310) U400 and U410 of the Memory stage, addressing the valid "patch" data stored in these PROMs.

The six output lines to memory from the FPLA stage may address 48 individual blocks of memory within (if used, U300 and U310) U400 and U410, while the 4 bits of address bus data applied directly to these ICs from the Address Bus may address up to 16 individual 16-bit words within each of these 48 blocks.

DATA BUS BUFFER

The Data Bus Buffer stage consists of U330 and U430. These are tri-state devices that, when enabled by a LO level applied to their enable inputs (pins 1 and 19), buffer the 16-bit data word read from memory (ROM or PROM) to the Data Bus. When disabled, they go to a highimpedance state, isolating the read only memory from the instrument data bus.



RANDOM ACCESS MEMORY

The Random Access Memory (RAM) circuit provides for the storage and retrieval of digital data by the microprocessor or by a DMA (direct memory access) device on the GPIB. A schematic diagram of the RAM circuit is given on diagram 30, in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. These stage names are used to aid in locating and identifying the components and portions of circuitry described.

MEMORY

The Memory stage is made up of 32 four-bit X 1024 Random Access Memory ICs and provides the actual storage function for data on the data bus. Four, and only four of these ICs may be addressed and enabled at one time. The combination of the four individual 4-bit Data outputs forms a 16-bit memory word, the data format required by the microprocessor. The Memory stage has the capacity to store 8192 sixteen-bit data words.

ADDRESS BUFFERS

The Address Buffers stage is made up of U650, U660A, U660B and U660C. It current buffers 10 bits of the Address bus data to each of the 32 memory ICs address inputs.

RAM CONTROL

The RAM Control circuit selects and enables 4 of the 32 ICs of the Memory Stage to either be read from, or written to, by a data bus device. The RAM Control circuit also determines if the RAM is to be read from, or written to, and produces the appropriate enable levels for each condition.

For the following conditions, it is assumed that the PUP level at the base of Q160 and BPUP (buffered PUP) applied to Q151 through R151 are HI, indicating that all supplies are functioning properly.

Integrated circuit U560 is a BCD to Decimal decoder and produces a LO at one of 10 output pins according to the 4-bit binary address at its inputs (only 8 are used in this application). A LO at 1 of these 8 output pins enables the specific block of memory addressed by address bits A11, A12 and A13 on the address bus. Each block of memory consists of four 1K by 4 bit static RAM ICs. A RAM Disable level applied to the D input pin of U560 is developed by the RAM Control stage from various input levels and disables the Memory stage by applying a HI level to pin 12 of U560, resulting in all 8 of its memory block enable outputs going HI.

If address bit 15 (A15) is HI, MEM (memory enable) is LO, and either address bit 13 (A13) or 14 (A14) is HI (but not both), the output at pin 8 of U550C enables U750B, U750C and U750D to act as a digital switch, producing the READ and WRITE enable levels to the Input/Output Data Buffers according to the level of the R/W (read/write) input command.

If the READ command applied to U550A is LO, indicating that the RAM is to be read, the LO RAM Disable level at the output of U550A enables the block of memory addressed by the remaining three inputs to U560 to be read.

When the WRITE level applied to the input of U660F is LO and the WE level at the input of U660D is LO, indicating that the RAM is to be written to, a LO is applied to U550A at pin 2, resulting in a block of memory being addressed as previously described. Since the BPUP (buffered PUP) level is HI, a LO WP (processor write) level is applied to the write enable inputs of all memory ICs. In this state, the portion of RAM addressed is written to.

INPUT/OUTPUT DATA BUFFERS

The Input/Output Data Buffers stage consists of U450, U460, U350 and U360. Data from the Memory stage is buffered to the Data bus when the READ level developed by the RAM Control stage is LO. When the WRITE level from the RAM Control stage is LO, the data on the Data bus is buffered to the Memory stage. When these buffer enable levels (READ and WRITE) are HI, the corresponding portions of the Input/Output Data Buffers stage go to a high impedance state.

MEMORY BACK-UP POWER SWITCH

The Memory Back-Up Power Switch stage provides a means of maintaining RAM contents when the 7854 power supply is turned off, either intentionally or due to a fault in the normal power system (either external or internal to the instrument), by using an external power source to keep the RAM circuitry turned on.

During normal operation, the PUP (power up) level applied to the base of Q160 is HI. This turns Q161 and Q760 on while back biasing Q162, turning off Q860 (the external power switch transistor). The normal operating current, necessary for RAM operation, flows through Q760.

If the PUP level should go LO, Q160, Q161 and Q760 are turned off. Current stored in the storage capacitors that are attached to the +5 V_B line flows as base current through R166 to turn Q162 on. This saturates Q860 and the external power source now supplies power to maintain the RAM's contents.

If the Ext Battery power is connected to this circuit while the instrument is running, Q855 is turned on, ensuring that Q860 remains off. C862 appears to be shorted to ground for fast voltage transitions, as would be the case when connecting the Ext Battery power to this circuit, and the voltage applied to the base of Q855 through the voltage divider R862 and R865 turns this transistor on, back biasing Q860. This configuration ensures that the Ext Battery power is implemented only when the PUP level goes LO. VR870, Q163 and their associated components comprise a voltage sense switch, sensing the voltage at the Ext Battery input. If this input voltage should rise above about +6.3 volts, Q163 conducts, reducing base current to Q162. This decreases the base drive to Q860, turning it off. In this condition, memory contents will be lost but memory components are not damaged.

WRITE PROTECT

The Write Protect stage, consisting of Q151, U250D and their associated components, ensures that the contents of RAM are not changed when the instrument is turned off and MEMORY BACK-UP POWER is in use. As the instrument power is turned off, the PUP (power up) and BPUP (buffered PUP) levels go LO before the instrument supplies are actually turned off. As these levels go LO, the Memory Back-Up Power Switch stage applies the external MEMORY BACK-UP POWER to the RAM circuit to maintain RAM contents and the collector of Q151 is forced HI. This HI applied to U250D is inverted and applied to U250B, resulting in a HI WP (write protect) level to prevent further writing to RAM. The instrument supplies then turn off and RAM contents are maintained by the MEMORY BACK-UP POWER.



The Readout Acquire circuit provides digital encoding of the analog readout data received from the Horizontal and Vertical plug-in compartments for use by the Display system to develop an alphanumeric readout display. The Readout Acquire circuit has a clock and time slot generator to develop time slot information going to the plug-ins. The counter stages, Row and Column Data Switches and Row and Column Decoder stages provide a means of interpreting the analog character and digital position information for the crt display. The Character Encoders and Buffers stages assign a unique data word for each character, a unique address for character location, and buffer this data to the Address and Data Busses. A schematic of the Readout Acquire circuit is given on diagram 31, Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. The following description uses these stage names to aid in locating and identifying the components and portions of circuitry described.

The definition of several terms follows:

Character—A character is a single number, letter or symbol displayed on the crt, either alone or in combination with other charcters.

Word—A word is made up of a related group of characters. In the 7854 Readout Acquire circuitry, a word can consist of up to ten characters.

Frame—A frame is a display of all words for a given operating mode and plug-in combination. Up to eight words acquired from the plug-ins can be displayed in one frame. Figure 2-38 shows the position of each word in a complete frame when operating the instrument in the scope mode.

Column—One of the vertical lines in the Character Selection Matrix (see Fig. 2-39). Columns C-O (column zero) to C-10 column 10) can be addressed in the 7854 system.

Row---One of the horizontal lines in the Character Selection Matrix. Rows R-1 (row 1) through R-10 (row 10) and R-14 (row 14) can be addressed in the 7854 system; R-14, as shown on the matrix, prevents any information from being encoded from the plug-in and no display is produced.

Time-Slot—A location in a pulse train. In the 7854 readout system, the pulse train consists of 10 negativegoing pulses. Each time-slot pulse is assigned a number between one and ten. For example, the first time-slot is TS-1.

Time-multitplexing—Transmission of data from two or more sources over a common path by using different time intervals for different signals.

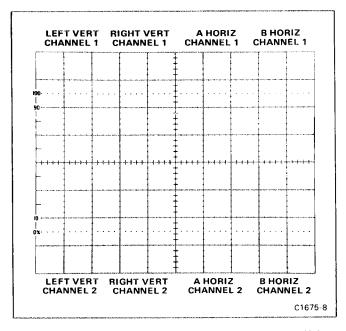


Figure 2-38. Location of Readout words on the crt identifying the originating plug-in and channel.

Display Format

Three different display formats for alphanumeric character display exist, depending on the selected mode of the 7854. Up to 16 lines of 40 characters each may be displayed on the crt when programming the 7854. When the 7854 is in the BOTH (combined SCOPE/STORED) mode, 4 lines of 40 characters each may be displayed. When in SCOPE mode only, displayed characters are broken into "words" and are displayed in only two lines. Only this latter format will be addressed in the following discussion, as the first two are spoken to in the Horizontal/Vertical Display and Control description. Also, in any mode, lines 3-14 are accessible via GPIB. Pressing the ID button produces a readout display on lines 9-10 and 12-13 showing certain types of status information for the 7854.

In the SCOPE mode, up to eight words of readout information may be displayed on the crt. The position of each word is fixed and is directly related to the plug-in unit from which it originated. Figure 2-38 shows the area of the graticule where the readout information from each plug-in unit is displayed. Notice that Channel 1 information from each plug-in unit is displayed on line 1 of the crt while that of Channel 2 is displayed on line 16 (2 lines per division). Figure 2-40 shows a typical display where only Channel 2 of the RIGHT VERT and B HORIZ units is selected for display.

Each word in the readout display can contain up to 10 characters, although the typical display will contain between two and seven characters per word. The characters are selected from the Character Selection Matrix shown in Figure 2-39. In addition, 12 operational addresses are provided for special instructions to the Readout Acquire circuitry. The unused locations in the matrix (shaded area) are available for future expansion of the Readout Acquire circuitry. The method of addressing the locations in the Character Selection Matrix is described in the following discussion.

Developing the Display

The following basic description of the Readout Acquire circuitry uses the block diagram shown in Figure 2-41. This description is intended to relate the basic function of each stage to the operation of the overall readout system. Detailed information on circuit operation is given later.

The key block in the Readout Acquire system is the Timer stage. This stage produces the basic signals that establish the timing sequences within the Readout Acquire circuitry. Period of the timing signal is about 200-250 microseconds. This stage also produces control signals for other stages within this circuit. The Time-Slot

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Theory of Operation—

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¹OPERATIONAL ADDRESS.

UNUSED LOCATIONS. AVAILABLE FOR FUTURE EXPANSION OF READOUT SYSTEM

²DECIMAL POINT CHARACTER. SEE DECIMAL POINT CHARACTER DESCRIPTION IN TEXT.

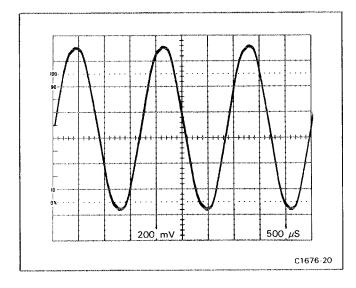
COLUMN C-0 C-1 C-2 C-3 C-4 C-5 C-7 C-6 NUMBER ٥ C-9 C-10 CURRENT (MILLI-0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 ≥1.10 ROW 7 AMPERES) NUMBER R-1 0 0 2 1 3 4 5 6 7 8 9 R-2 0.1 < Ι 1 1 + _ + С Δ > SHIFT¹ PREFIX ADD¹ ADD' SHIFT¹ R-3 0.2 ONE TWO PREFIX IDENTIFY¹ AND ADD ZERO ZEROS ONE ZERO -**B-4** 0.3 m х κ μ n М G Ţ ρ R R-5 0.4 SKIP¹ S V Α W Н d В Ω Ε С R-6 0.5 U Ν L Ζ Y Р F J a D DECIMAL¹ DECIMAL¹ DECIMAL DECIMAL¹ DECIMAL¹ POINT POINT POINT POINT POINT R-7 0.6 LOCATION LOCATION LOCATION LOCATION LOCATION NO. 3 NO. 4 NO. 5 NO. 6 NO. 7 DECIMAL² R-8 0.7 POINT Å R-9 0.8 ADD SPACE R-10 0.9 0¥. ١N DISPLAY¹ R-14 1.3 -- JUMP ≁

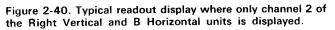
Figure 2-39. Character Selection Matrix for the 7854 **Readout Acquire** system.

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Counter stage receives a trapezoidal voltage signal from the Timer stage and directs it to one of ten output lines. These output lines are labeled TS-1 through TS-10 (timeslots one through ten) and are connected to the vertical and horizontal plug-in compartments. The output lines are energized sequentially, so there is a pulse on only one of the 10 lines during any 200-250 microsecond timing period. After the Time-Slot Counter stage has counted time-slot 10, it produces an End-of-Word pulse which advances the system to the next channel. Two output lines, row and column, are connected from each channel of the plug-in unit back to the Readout Acquire circuitry. Data is typically encoded on these output lines by connecting resistors betwen them and the time-slot input lines. The resultant output is a sequence of ten analog current levels that range from zero to one milliampere (100 microamperes/step) on the row and column output lines. These row and column levels correspond to the rows and columns of the Character Selection Matrix in Figure 2-39. The standard format for encoding information onto the output lines is given in Table 2-5. (Special purpose plug-in units may have their own format for readout; these special formats will be defined in the manuals for these units.)

The encoded column and row data from the plug-in units is selected by the Column Data Switch and Row Data Switch stages respectively. These stages take the analog currents from the eight data lines (two channels from each of the four plug-in compartments) and produce a time-multiplexed analog voltage output containing all of the column or row information from the plug-ins. The Column Data Switch and Row Data Switch are sequenced by the binary channel address code from the Channel Counter stage.

The time-multiplexed output of the Column Data Switch is monitored by the discrete amplifier of the Column Decoder stage and if it senses that no column current has been encoded in a time-slot, an output level to the

Table 2-5

Standard Readout Format

Time-Slot Number	Description
TS-1	Determines decimal magnitude (number of zeros displayed or prefix change information)
TS-2	Indicates normal or inverted input (no display for normal).
TS-3	Indicates calibrated or uncalibrated condition of plug-in variable control (no display for calibrated condition).
TS-4	Scaling.
TS-5 TS-6 TS-7	Not encoded by plug-in unit. Left blank to allow addition of zeros by readout system.
TS-8	Defines the prefix which modifies the unit of measurement.
TS-9 TS-10	Defines the units of measurement of the plug-in unit. May be standard units of measurement (V, A, S, etc.) or special units selected from the Character Selection Matrix.

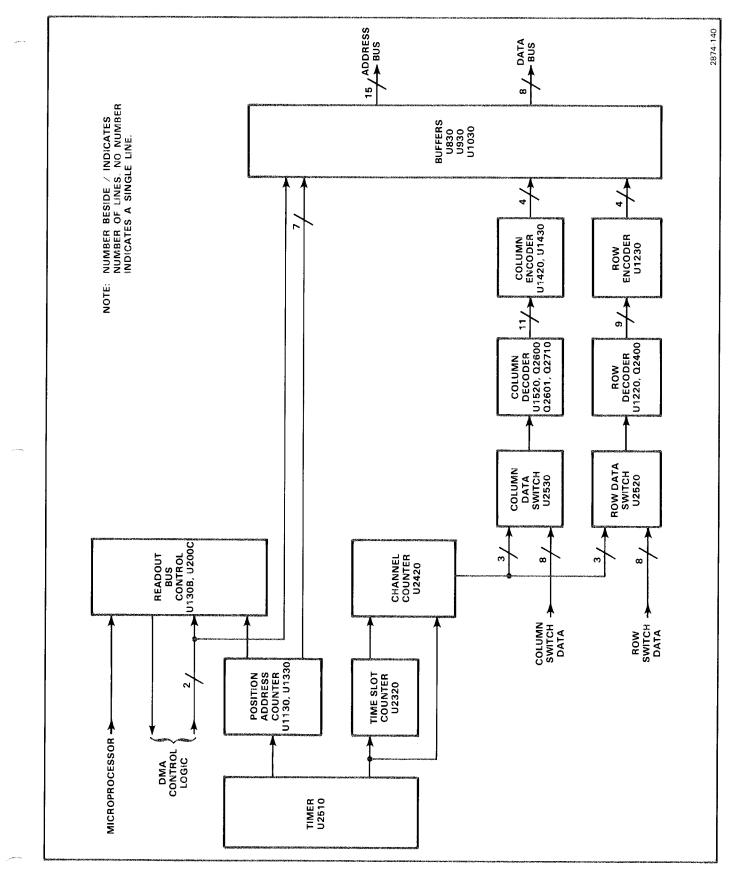


Figure 2-41. Detailed Block Diagram of the Readout Acquire system.

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Theory of Operation-7854

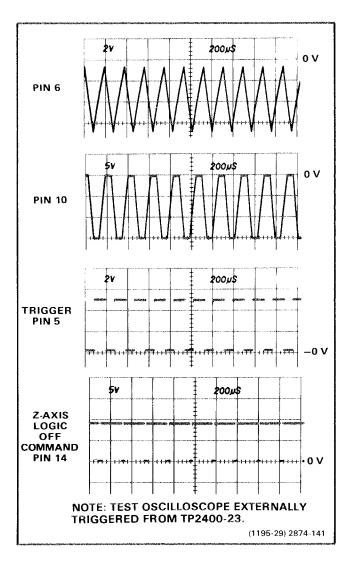
Character Encoder stage generates a unique "skip" data word and no display will be produced. Skip is used to produce spaces in a display or to completely blank out a portion of a line.

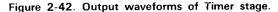
The analog outputs of the Column Data Switch and Row Data Switch are connected to the Column Decoder and Row Decoder stages respectively. These stages sense the magnitude of the analog voltage input and produce an output current on one of ten lines. The outputs of the Column Decoder stage are identified as C-1 through C-10 (column 1 through 10) corresponding to the encoded column information. Likewise, the outputs of the Row Decoder stage are identified as R-1 through R-10 (row 1 through 10) corresponding to the encoded row information (R-9 is not used). In addition, R-14 may be encoded to cause the display to jump to the next display position. The primary function of the row and column outputs is to select a character from the Character Selection Matrix to be produced by the Display D/A circuit.

TIMER

Timer U2510 establishes the timing sequence for all circuits within the Readout Acquire system. This stage produces four time-related output waveforms (see Fig. 2-42). The triangle waveform produced at pin 6 forms the basis for the remaining signals. The basic period of this triangle waveform is about 200-250 microseconds as controlled by rc network R2611-C2612. The triangle waveform is clipped and amplified by U2510 to form the trapezoidal output signal at pin 10. The amplitude of this output signal is exactly 15 volts as determined by U2510 (exact amplitude necessary to accurately encode data in plug-in units; see Encoding the Data). The trigger output at pin 5 provides the switching signal for the Time-Slot Counter stage. Transistor Q2500 buffers this signal and is used in the Position Address Counter stage and Readout Bus Control circuit (diagram 32).

The 5-kHz Φ 2 signal at pin 14 and the Fast Trigger output (5-kHz Φ 1) are used in the Display D/A and Amplifier circuit (diagram 32) to determine the rate of character display.





TIME-SLOT COUNTER

Time-Slot Counter U2320 is a sequential switch which directs the trapezoidal waveform input at pin 8 to one of its 10 output lines. These time-slot pulses are used to interrogate the plug-in units to obtain data for the Readout Acquire system. The Trigger pulse at pin 15 switches the Time-Slot Counter to the next output line; the output signal is sequenced consecutively from timeslot 1 through time-slot 10. Figure 2-43 shows the time relationship of the time-slot pulses. Notice that only one line carries a time-slot pulse at any given time. When time-slot 10 is completed, a negative-going "End-of-Word" pulse is produced at pin 2 to reset the Channel Counter IC. Pin 16 is a Reset input for the Time-Slot Counter. When this pin is held LO, the Time-Slot Counter resets to timeslot 1. The Time-Slot Counter is reset in this manner when U1330B of the Position Address Counter stage detects that 80 characters have been acquired and stored in memory; i.e., all 8 plug-in channels have been encoded and stored in memory.

CHANNEL COUNTER

The Channel Counter, U2420, is a binary counter that produces the channel address code for the Column and Row Decoder stages. This code instructs these stages to sequentially select and display the eight channels of data from the plug-ins. Table 2-6 gives the eight combinations of the channel address code and the resultant channel selected with each combination.

Encoding the Data

Data is conveyed from the plug-in units to the Readout Acquire system in the form of an analog (current level) code. The characters that can be selected by the encoded data are shown on the Character Selection Matrix (see Fig. 2-39). Each character requires two currents to define it; these currents are identified as the column current and the row current, corresponding to the column and row of the matrix. The column and row data is encoded by programming the plug-in units. Figure 2-44 shows a typical encoding scheme using resistors for a voltagesensing amplifier plug-in unit. Notice that the ten TS (time-slot) pulses produced by the Time-Slot Counter stage are connected to the plug-in unit. However, timeslot 5, 6, 7 and 10 are not used by the plug-in unit to encode data when using the Standard Readout Format. (See Table 2-5 for Standard Readout Format.) The amplitude of the time-slot pulse is exactly -15 volts as determined by the Timer stage. Therefore, the resultant output current from the plug-in units can be accurately controlled by the programming resistors in the plug-in unit.

For example, in Figure 2-44 resistors R10 through R90 control the row analog data, which is connected back to the Readout Acquire system. Figure 2-45A shows an idealized output current waveform of row analog data, which results from the time-slot pulses. Each of the row levels of current shown in these waveforms correspond to 100 microamperes of current. The row numbers on the left-hand side of the waveform correspond to the row in the Character Selection Matrix (see Fig. 2-39). The row analog data is connected back to the Readout Acquire system via terminal B37 of each plug-in interface connector of the Main Interface circuit (diagram 3).

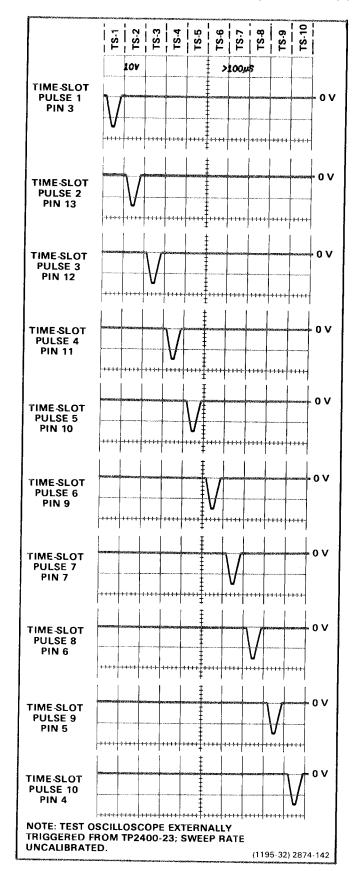


Figure 2-43. Time relationship of the Time Slot (TS) pulses produced by U2320.

Table 2-6 Channel Address Code

Pin 11 of U2420	Pin 8 of U2420	Pin 9 of U2420	Channel Displayed
LO	LO	LO	Channel 1 Left Vertical
LO	LO	НІ	Channel 2 Left Vertical
LO	НІ	LO	Channel 1 Right Vertical
LO	Hi	HI	Channel 2 Right Vertical
HI	LO	LO	Channel 1 A Horizontal
HI	LO	HI	Channel 2 A Horizontal
н	HI	LO	Channel 1 B Horizontal
HI	НІ	Н	Channel 2 B Horizontal

The Column analog data is defined by resistors R110 through R190. The program resistors are connected to the time-slot lines by switch closures to encode the desired data. The data, as encoded by the circuit shown in Fig. 2-44, indicates a 100-microvolt sensitivity with crt display inverted and calibrated deflection factors. This results in the idealized output current waveforms shown in Fig. 2-45B at the column analog data output, terminal A37 of the plug-in interface.

Resistor R111, connected between time-slot 1 and the column analog data output, encodes two units of current during time-slot 1. Referring to the Character Selection Matrix, two units of column current, along with the two units of row current encoded by resistor R10 (row 3), indicates that two zeros should be added to the display.

Resistor R120 adds one unit of column current during time-slot 2 and, along with one unit of current from the row output, the Readout Acquire system is instructed to add an invert arrow to the display. Resistor R130 is not connected to the time-slot 3 line, since the deflection factor is calibrated. Therefore, there is no column current output during this time-slot and no display on the crt.

During time slot 4, two units of column current are encoded by R140. There is no row current encoded during this time-slot, resulting in the numeral 1 being displayed on the crt. Neither row nor column analog data is encoded during time-slots 5, 6 and 7 as defined by the Standard Readout Format. During time-slot 8, two units of column current and three units of row current are encoded by resistors R181 and R80, respectively. This addresses the μ prefix in the Character Selection Matrix.

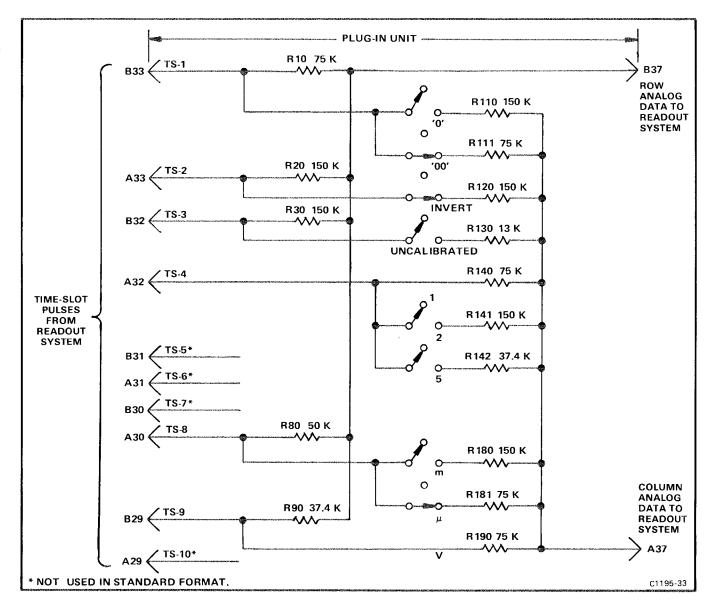


Figure 2-44. Typical encoding scheme for Voltage-Sensing plug-in unit. Coding shown for a calibrated deflection factor of 100 microvolts (inverted).

The final data output is provided from time-slot 9 by R190 connected to the column output and R90 to the row output. These resistors encode two units of column current and four units of row current to cause a V (volts) to be displayed. Time-slot 10 is not encoded, in accordance with the Standard Readout Format. The resultant crt readout character display will be $\oint 100 \ \mu V$.

In the above example, the row analog data was

time-slot 3 and the column analog data output line. This encodes 10 units of column current (see shaded area in time-slot 3 of the waveform shown in Fig. 2-45B). Since one unit of row current is also encoded during this time-slot by R30, a > symbol is added to the display. The crt readout will now show $\psi > 100 \mu$ V. In a similar manner, the other switches can change the encoded data for the column output and thereby change the readout character display. See the descriptions which follow for decoding this information.

Theory of Operation-7854

senses the attenuation ratio of the probe (with readoutcoded probes only). The probe contains a circuit that provides additional column current. For example, if a 10X attenuator probe is connected to a plug-in unit encoded for 100 microvolts as shown in Figure 2-45, an additional unit of current is added to the column analog data during time-slot 1. Since two units of current were encoded by R111 (see Fig. 2-44), this additional current results in a total of three units of column analog current during this time slot. Referring to the Character Selection Matrix, three units of column current, along with the two units of row current encoded by R10, indicates that the prefix should be shifted one column to the left. Since this instruction occurs in the same time-slot that previously indicated that two zeros should be added to the display and only one instruction may be encoded during a timeslot, the zeros do not appear in the display. The crt readout will now be changed to 1 mV (readout program produced by plug-in same as for previous sample).

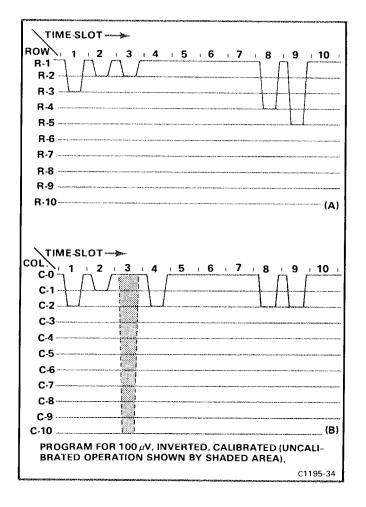


Figure 2-45. Idealized current waveforms of: (A) Row Analog data. (B) Column Analog data.

Three other lines of information are connected from each of the plug-in compartments to the Readout Acquire system. The column and row analog data from Channel 2 of a dual-channel plug-in are connected to the Readout Acquire system through terminals A38 and B38 of each plug-in interface connector, respectively. Force readout information is encoded on connector terminal A35; the function of this input is described under Column and Row Data Switches.

The preceding information gave a typical example of encoding data from an amplifier plug-in unit. Specific encoding data and circuitry is shown in the individual plug-in unit manuals.

COLUMN AND ROW DATA SWITCHES

The encoding data from the plug-in units is connected to the Column and Row Data Switch stages. A column-data line and a row-data line convey analog data from each of the eight data sources (two channels from each of the four plug-in compartments).

The Column Data Switch U2530 and the Row Data Switch U2520 receive the channel address code from the Channel Counter stage. This binary code directs the Column Data Switch and the Row Data Switch as to which channel should be the source of the encoding data. Table 2-6 gives the eight combinations of the Channel Address Code and the resultant channel selected with each combination. These stages have eight inputs and provide a time-multiplexed output at pin 7, which includes the information from all of the input channels. The eight inputs to each stage originate in the plug-in units.

In addition to the encoding data inputs from the plug-in units, inputs VR, VL, HA and HB are provided to the Column Data Switch from the VERT MODE and HORIZ MODE switches to inhibit the readout character display for any plug-in unit(s) not selected for display (see diagram 2). When a plug-in unit is selected, a HI level is applied to inhibit the input for the opposite channel. The channel inhibit lines are LO only when the associated plug-in unit has been selected for display. When a unit is not selected, the respective line is HI to forward bias the associated diodes; CR2430-CR2431, CR2432-CR2433, CR2434-CR2435 or CR2436-CR2437. The forwardbiased diodes cause encoded data from the inhibited channel to bypass the Column Data Switch inputs. However, since it may be desired to display information from special-purpose plug-in units (even though they do not produce a normal waveform display on the crt), a feature is provided to over-ride the channel inhibit. This is done by applying a LO to the associated force readout (VRFRO, VLFRO, HAFRO or HBFRO) input. The LO level diverts the HI channel-inhibit current and allows the data from this plug-in unit to reach the Column Data Switch, even though it has not been selected for display by the Mode Switch and Calibrator circuit, diagram 2.

COLUMN AND ROW DECODERS

The Column Decoder U1520 and Row Decoder U1220 sense the magnitude of the analog voltages at their inputs (pin 10) and produce a decimal output on one of ten lines corresponding to the column or row data encoded by the plug-in unit. These outputs provide the column digital data and row digital data, which is used by the Character Encoders stage.

The level sense amplifier made up of Q2710A, Q2710B, Q2601, Q2600 and their associated components sense the analog level of the time multiplexed analog column signal. If this level indicates that data is present to be decoded by U1520 the output of Q2600 goes HI. If, however, it is sensed that no data is to be decoded by the Column Decoder, the collector of Q2600 is LO. This is applied to the Character Encoders stage to indicate a "skip" condition.

The network at the input of the Row Decoder, made up of Q2400 and its associated components, is a row-14 detector that produces a command to disable row data. This row current is encoded by a special-purpose plug-in to cause all or part of a word to be deleted. Whenever row 14 (thirteen units of row current, or 1.3 milliamperes) is encoded, the base of Q2400 is pulled negative enough that this transistor is turned off. With Q2400 off, outputs 1-10 can no longer sink any current so they are pulled HI. No display is produced.

Row Match adjustment R2200 sets the gain of the Row Data Switch to match the gain of the Row Decoder for correct output. Column Match adjustment R2600 performs the same function for the Column Data Switch stage.

CHARACTER ENCODERS

The Character Encoder stage translates the decimal output information coming from the Row and Column Decoders into a unique 8-bit data word defining the encoded character in a binary form.

The row encoder IC, U1230, receives, at its inputs, the data from the Row Decoder IC, U1220, in the form of 9 binary bits, only one of which may be LO. This LO level applied to one input pin of U1230 results in a 4-bit binary code associated with that pin at its outputs.

The Column Encoder ICs, U1420 and U1430, operate in much the same manner in that a LO input level is encoded to a 4-bit binary code associated with the LO input pin. A LO on any of the input pins of U1430 produces a HI EO (enable output) level at its output pin 15. This HI tied to the \overline{EI} (enable input) input pin 5 of U1420 disables this encoder (U1420) and its outputs go to a high-impedance state. A unique 4-bit binary code for the LO input line is derived from the 3 encoded outputs of U1430 and this enable level.

If no LO level is applied to U1430's inputs, its EO output is LO, enabling U1420. Any LO level at the input pins of U1420 is encoded to the unique, 3-bit binary code associated with that pin. These 3 encoded bits, along with the now LO enable level from U1430, form a unique, 4-bit binary code representing the output of the Column Decoder stage.

The two unique, 4-bit codes representing the row and column data encoded by the plug-in being interrogated, together, form a unique, 8-bit data word representing one, and only one, character that may be displayed on the crt.

POSITION ADDRESS COUNTER

The Position Address Counter stage generates 80 unique character position addresses representing physical display locations on the crt. It is made up of U1130, U1330B, Q2500 and their associated components.

The Timer stage clock output is applied to the clock input of U1130 through the emitter-follower buffer transistor, Q2500. Together, U1130 and U1330B make up a decimal 80 counter, with the one-shot multivibrator (U1330B) triggering on the falling edge of count 80 to reset the Position Address Counter (U1130) to zero. The Channel Counter stage, U2420, is also reset by this HI one-shot pulse, while U1930D inverts this pulse to reset the Time Slot Counter, U2320. Since the Position Address Counter clock input coincides with that of the Time Slot Counter, a unique position address is generated for each of any 80 consecutive time slot pulses generated and encoded by the Readout Acquire system. Q2500, causes a LO BRRO level to be generated. The DMA Control Logic circuit responds with a LO BGRO signal, enabling the buffers stage. After the encoded character data and character position data is read, a RBR (remove bus request) command is given by the DMA Control Logic circuit, which resets the BRRO (readout bus request) level.

BUFFERS

The Buffers stage is made up of 3 tri-state buffer ICs, U830, U930 and U1030, which buffer the encoded readout character and position data onto the Data and Address Busses respectively. A BGRO (readout bus grant) command from the DMA Control Logic system is required to enable the buffers; otherwise, they are in their high-impedance state and isolate the Readout Acquire system from the Data and Address Busses.

The 8 most significant bits of the position address are generated by hardwiring the inputs of U930 either HI or LO (set to hexidecimal address DFxx). The low order bits (xx), as they are generated, define the lower portion of this address and readout information is sequentially stored in this (DFxx) memory block. When readout character data is retrieved from this block of memory, the 8 most significant bits of the 16-bit data word are ignored since it only takes the 8 lower bit to uniquely define a character from the Character Selection Matrix.

READOUT BUS CONTROL

The Readout Bus Control stage, made up of U130B and U200C, generates the BRRO (readout bus request) signal to the DMA Control Logic circuit.

The ROACQEN (readout acquire enable) level from the microprocessor is quiescently LO and that of the BGRO (readout bus grant) and RBR (remove bus request) are HI, so that any clock pulse applied to pin 11 of U130B from the Timer stage through Q2500 causes no change in the \overline{Q} output level. When the ROACQEN command goes HI, the next clock pulse from the Timer stage, through



VERTICAL/HORIZONTAL DISPLAY AND CONTROL

A schematic of the Vertical Display and Control circuit is given on diagram 32 and the Horizontal Display and Control circuit is shown on diagram 33 in Section 7 of this manual (Diagrams and Circuit Board Illustrations). These circuits provide the proper control voltages for operation of oscilloscope deflection and Z-Axis Amplifier circuitry when displaying digitally-processed waveforms or characters.

When in the stored mode (displaying digitally processed data), two types of information may be displayed on the crt; digitized waveforms or alphanumeric readout characters. Digitized waveforms may be displayed in one of two possible sub-modes, while alphanumeric characters may only be displayed in one manner. The two possible waveform sub-modes are the X-Y (horizontal versus vertical) and Y-T (vertical versus time) sub-modes while the alphanumerics are displayed in the character sub-mode.

In the X-Y sub-mode, both stored horizontal and vertical data are simultaneously displayed on the crt with respect to each other. In the Y-T sub-mode, stored Y data points are displayed with respect to time by sequentially addressing memory and displaying the retrieved Y-data in the horizontal location on the crt corresponding to the addressed memory location. The character sub-mode is used only when displaying alphanumeric readout characters.

In addition, X-Y and Y-T sub-modes may be entered, alternating between portions of real time information being displayed, when the oscilloscope is in the BOTH (stored and real time information) mode. When in the SCOPE (real time display) mode, the character sub-mode may be entered, alternating between portions of real time display information, to display alphanumeric readout information. Since the Vertical Display and Control circuitry varies in operation between each of the three sub-modes described, and due to the great number of interacting control and signal lines in this portion of circuitry, a written circuit description at this point would be cumbersome and confusing. Therefore, Table 2-7 is given at the end of this section, listing each of these signal and control lines by name, giving a description of how that signal will function in each of these three sub-modes. Refer also to the following Block Diagram description for Figure 2-46 explaining how each basic block of circuitry, defined by gray shaded lines on the schematic, relates to the remainder of the display system.

BLOCK DESCRIPTION

The Vertical/Horizontal Display and Control circuits provide the proper voltages to the oscilloscope deflection and Z-axis amplifiers for displaying digitally-processed waveforms and characters.

Since the operation of the Display and Control circuitry differs greatly depending on the selected operating mode, the following description is divided into waveform and character operating modes. Waveform mode is further divided into X-Y (horizontal vs. vertical) and Y-T (vertical vs. time) operation. As a further aid toward understanding the operation of this section, the circuitry is described in terms of major functional blocks with waveform and character data flow diagrams provided (see Fig. 2-46). Data flow is further described with the aid of Table 2-7, listing the applicable input and output signals and their basic functions. Characteristic waveforms are referenced in the table and illustrated in Section 7 at the rear of this manual (see the Display System Waveforms and Timing Diagrams pullouts in the Diagrams section). Refer to Figure 2-46, Waveform Data Flow, for detailed information concerning data flow between major functional blocks. for sake of clarity, inputs to the Control Logic block are not shown tied to the small blocks that make it up. At this time, simply assume that signal lines are connected where necessary.

Waveform Mode

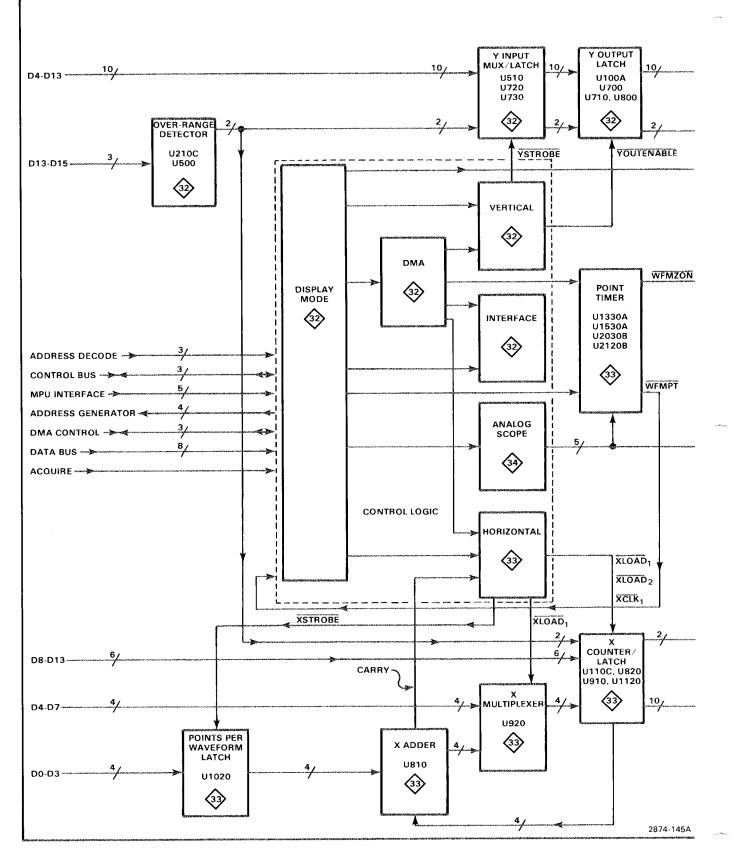
Y-T OPERATION. The initial conditions for the Vertical D/A Converter are set by the microprocessor through the Address Decode lines to the display Control Logic stage. The DMA Control Logic stage then sends a bus request (BRDSY) to the DMA Control circuit (diagram 24) which acknowledges the bus request with a bus grant (BGDSY) back to the DMA Control Logic stage. The Interface Control Logic stage produces the required signals to enable the

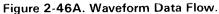
Address Generator circuit (diagram 22), allowing it to drive the Address Bus and call data from the RAM (random access memory) circuit (diagram 30). The RAM circuit puts the data from the accessed memory location onto the Data Bus and the Vertical Control Logic stage then latches the vertical data bits 4 through 13 into the Y Input Mux/Latch stage using the YSTROBE signal.

While the Y Input Mux/Latch stage is latching in data bits 4 through 13, the Overrange Detector stage is looking at the 3 most significant bits from the Data Bus (13 through 15) which contain vertical display position information. The data from the Y Input Mux/Latch and Overrange Detector stages is latched into the Y Output Latch stage producing 10 bits of digital waveform information to the Vertical D/A (digital to analog) Converte: stage and two bits to the Vertical Current Summer and Amplifier stage. The output from the Overrange Detector indicates whether the digital waveform information (i.e. data bits 4 through 13) will result in an on-screen display.

The Vertical D/A Converter produces an analog current output that corresponds to the vertical information in data bits 4 through 13. If the Overrange Detector stage indicates that the data bits are on-screen, the analog current output is converted to a voltage by the Vertical Current Summer and Amplifier stage and fed through the Output Selector stage to drive the oscilloscope Vertical Amplifier circuit. (See Vector Generator for vector display discussion.) However, if the Overrange Detector indicates that the waveform data bits are off-screen (i.e., either high or low), the Vertical Current Summer and Amplifier stage selects a current level that will produce a singlevalue off-screen display.

The initial conditions for the X Counter/Latch in the horizontal section are set by the microprocessor at the same time as those for the the Y Input Mux/Latch in the vertical section. For the first displayed point, the operation of the circuits from the X Counter/Latch to the horizontal (X) output is the same as that for the vertical (Y) circuitry just described. When these two corresponding output voltages are present at the crt deflection plates, the Control Logic stage turns on the Point Timer stage. This drives the oscilloscope Z-Axis circuit and turns on the display intensity. The display intensity remains on for about 5 microseconds to provide a spot at the prescribed horizontal and vertical coordinates. When this time has elapsed, the Z-Axis intensity is turned off by the Point Timer stage. Thus, the first point on the waveform is displayed.





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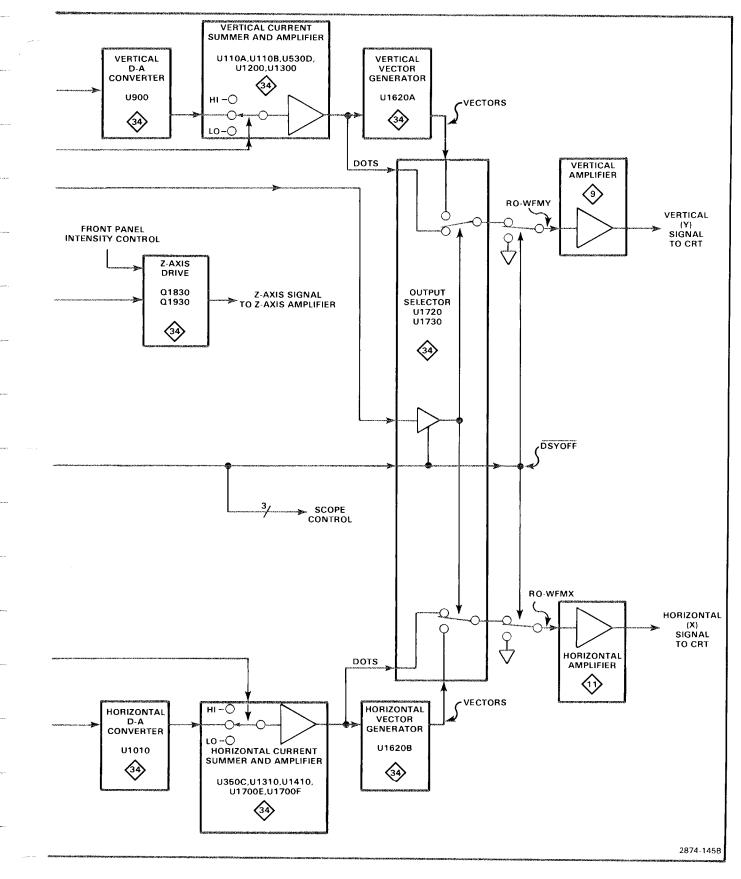


Figure 2-46A. Waveform Data Flow (continued)

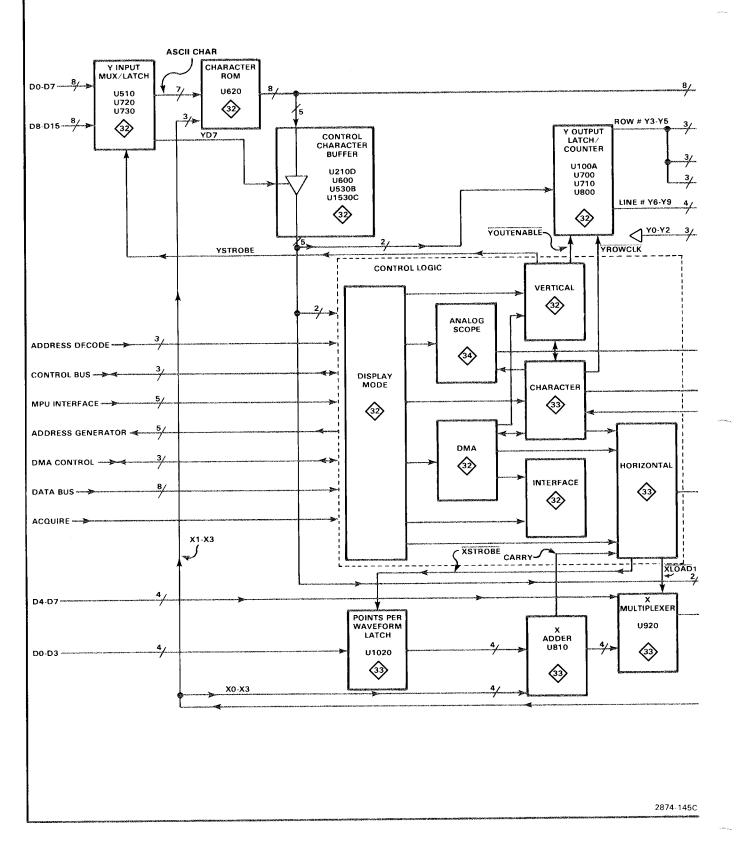


Figure 2-46B. Character Data Flow.

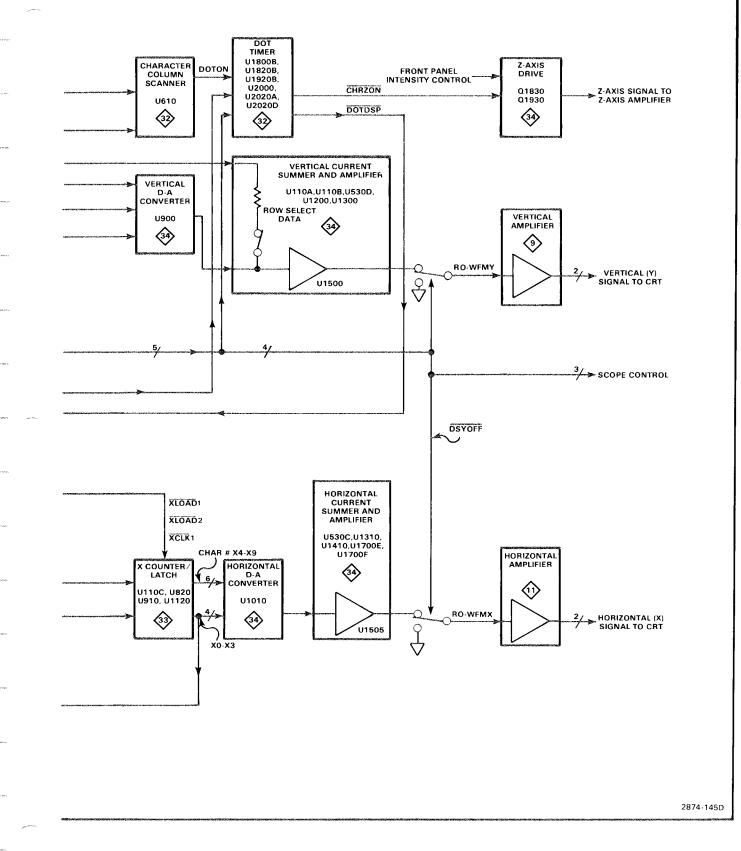


Figure 2-46B. Character Data Flow. (continued)

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2-97

Subsequent displayed points on the input waveform are processed by the vertical (Y) circuitry in the same way as described previously. However, the Address Generator circuit shown on diagram 22 now increments by one so that the address generated accesses the next memory location in RAM. This process repeats for each successive displayed point. When the number of selected points per waveform have been displayed, the Display Mode Control Logic stage detects the overflow from the Address Generator and interrupts the microprocessor.

Coincidently, the horizontal (X) display circuitry is also processing the horizontal data for subsequent display points but in a somewhat different manner. Before the first point is displayed, horizontal data bits 8 through 13 are latched into the X Counter/Latch stage by the display Control Logic stage (via address decode lines from the microprocessor). Horizontal data bits 4 through 7 are also latched into the X Counter/Latch circuit from the X Multiplexer stage. After the first point is displayed, data bits 4 through 7 are fed to the X Adder circuit where they are added to the 4-bit points per waveform data word from the Points per Waveform Latch. The corresponding 4-bit output from the X Adder circuit is then clocked back into the X Control/Latch circuit through the X Multiplexer. By iterating this sequence, the X Latch essentially functions as a variable increment counter and the remaining points are displayed successively in fixed horizotal increments that correspond to the selected points per waveform (resolution).

This process can be more fully explained by examining the data output from the X Adder stage at a resolution setting of 1024 points per waveform. For example, if data bits 4 through 7 for the first displayed point were 0000 and the points per waveform data was 0001, which is the data word for a resolution of 1024 points per waveform (i.e., 1000 = 128, 0100 = 256, 0010 = 512, and 0001 =1024), then the sum of these two data words would be 0001 at the output of the X Adder stage. Thus, 0001 is clocked into the X Counter/Latch and the circuit then operates as previously described. Consequently, the second point is displayed at a horizontal coordinate that corresponds to 1/1024th of the distance across the crt display area.

Now, for the third point, the 4 data bits in the X Counter/Latch are 0001 which is added to 0001 (i.e., the data word for 1024 points per waveform) in the X Adder circuit. The sum at the output of the X Adder is then 0010 and the third point is displayed at a horizontal coordinate that is an increment of one from the previous point.

Thus, the X Latch/Counter continues to count by one for each successive displayed point independent of the data on the Data Bus. For the resolution settings of 512, 256 and 128 points per waveform, the X Counter/Latch counts by 2 (0010), 4 (0100) and 8 (1000) respectively between each displayed point which results in resolutions 2, 4 and 8 times less than that for 1024 points per waveform.

When the X Adder stage overflows past 15 (i.e., 1111) a second and third counter in the X Counter/Latch stage continues the count until all the selected points per waveform are displayed.

X-Y OPERATION. In X-Y operation, the vertical (Y) circuitry operates the same as described for Y-T Operation. The horizontal (X) circuitry operates as follows:

Like Y-T operation, the initial conditions for the Horizontal D/A Converter are set by the microprocessor through the Address Decode lines to the Horizontal Control Logic stage. The DMA Control Logic stage then sends a bus request to the DMA Control circuit (diagram 24) which acknowledges the bus request with a bus grant back to the DMA Control Logic stage. The Interface Control Logic stage then enables the Address Generator (diagram 22).

Unlike Y-T operation, the Address Generator now generates two addresses related to a single point. First, an A Word generator addresses a block of memory in RAM to produce vertical data. Secondly a B Word generator addresses another block of RAM to produce horizontal data. The DMA Control Logic stage generates two consecutive bus requests; one for vertical data and one for horizontal data. Thus, the A Word generator calls for vertical data from the RAM during the first bus request and this data is latched into the Y Input Mux/Latch. The remaining vertical (Y) circuits function as described previously under Y-T Operation. During the second bus request, the B Word generator calls for horizontal data from the RAM and this data, comprised of data bits 4 through 13, along with the Overrange Detector output, is latched into the X Input Counter/Latch. The Horizontal D/A Converter produces an analog current output that corresponds to the horizontal data input.

The Overrange Detector circuit determines whether the display will be on-screen; if not, the current summing switch selects a current that results in a single-valued off-screen display.

The Horizontal Current Summer and Amplifier transforms the analog current output from the Horizontal D/A Converter into a voltage output that is fed through the Output Selector to the oscilloscope Horizontal Amplifier circuit. (See Vector Generator for vector display discussion.) When the horizontal (X) and vertical (Y) output voltages are present at the deflection plates, the Control Logic stage turns on the Point Timer stage to drive the oscilloscope Z-Axis circuit and turn on the display intensity. The display intensity remains on for about 5 microseconds to provide a spot at the prescribed horizontal and vertical coordinates. When this time has elapsed, the intensity is turned off by the Point Timer stage. Thus, the first point on the waveform is displayed.

Subsequent sampled points on the input waveform are displayed in the same manner as described previously. Basically, the horizontal circuits function similarly in both Y-T and X-Y operation. Note, however, that in X-Y operation the Points per Waveform Latch and X Adder stages are not used and the position of each displayed point is determined strictly from data latched in from the RAM.

As in Y-T operation, the Counter Stage (A word generator) on diagram 22 increments by one memory location until the selected number of points per waveform are displayed. The Control Logic stage then detects the overflow from the Address Generator circuit and interrupts the microprocessor to shut down the display.

VECTOR GENERATOR. In the previous discussions for both Y-T and X-Y Operation the outputs of the X and Y Current Summer and Amplifier circuits are fed to the Vertical and Horizontal Amplifiers through the Output Selector stage to produce a display comprised of dots or points. The Vector Generator stage allows the generation of a continuous waveform by drawing a line segment between each displayed point. The output voltages from the Horizontal and Vertical Current Summer and Amplifier stages are applied to the Horizontal and Vertical Vector Generator stages and the operator may switch the Output selector to display in DOTS or VECTor mode. In VECT mode, the 5 microseconds that the intensity is on, the output voltage at the crt deflection plates starts at an initial value and changes to a final. Now, instead of dots or points displayed, a line is drawn between each point to produce a vector display.

CHARACTER MODE. In character mode, the crt display is divided up into 16 lines and 40 columns for character display. With this format, 40 characters may be displayed in any of 16 individual lines for a total of 640 characters displayed on the screen. Each character is defined as an 8 (column) \times 8 (row) dot matrix with spacing between characters achieved as explained in the Display D/A and Amplifier description. See Figure 2-47 for the matrix representation of individual characters within the 7854 Character Set.

As in the Waveform mode, the microprocessor sets up the Y Input Mux/Latch and the X Counter/Latch which produce the inputs to the Vertical and Horizontal D/A Converters. This sets the corresponding vertical and horizontal analog outputs to specific voltages which correspond to the starting point for a character display; the upper left-hand corner of the crt. The display is then started in Character mode and the DMA Control Logic produces a bus request to the DMA Control circuit (diagram 24) which answers with a bus grant. When the DMA Control Logic stage gets the bus grant, it turns on the Address Generator circuit on diagram 22, producing the required address for memory access. The RAM then puts 16 bits of data onto the data bus and eight bits (0 -7) are latched into the Y Input Mux/Latch. Of those 8 bits, the 7 least significant bits represent a character in ASCII code and the 8th bit is a control bit for circuitry on the display board. The ASCII code at the output of the Y Input Mux/Latch now selects the appropriate character out of the Character ROM, which has 8 outputs corresponding to one full column of the 8 × 8 character matrix. Each of the individual outputs correspond to one of the 8 rows of the matrix. If the dot of a specific row is to be displayed, the corresponding output of the ROM will be HI. If it is not to be displayed it will be LO.

The Character Column Scanner now begins to clock the individual rows of each column, looking first at the upper portion of the column. The Y Output Latch/Counter produces 3 binary coded inputs to the Character Column Scanner and, as it counts down, it looks sequentially at each one of the 8 outputs of the character ROM. Looking at the first output, it determines whether it is HI or LO. If HI, the Dot Timer turns on. At the same time, the Dot Timer shuts off the Y Output Latch/Counter so it does not sequence to the next row of that particular column. The Z-axis is turned on and, since the Horizontal and Vertical D/A Converters are producing currents to drive the Vertical and Horizontal Amplifiers, a dot is produced at a specific location on the crt. Each dot is turned on for about 600 nanoseconds and when this time has elapsed, the dot timer shuts off allowing the Y Output Latch/Counter to start counting again.

As it counts, the Y Output Latch/Counter decrements the inputs to the Character Column Scanner and looks at the next row of the column. It continues to scan down each row of the column until it sees that another dot should be displayed, at which time the dot timer will turn back on, shutting off the Y Output Latch/Counter. That dot will be displayed at the point on the crt determined by the new (decremented) value at the vertical output. When it reaches the bottom of the column (the eighth row), the Y Output Latch/Counter will underflow (borrow), incrementing the X Counter/Latch by one. This increments the Character ROM to the next column (with

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	0	0	-	0		18	34	200	CONTRACTOR OF CONTRACTOR OF CONTRACTOR	1 822	2 88 98		represen th the ex Bit 8 is layable) JL (Null) O, and CF	
	0	0	0	fan.			33 33	49 49	•••••	,	97		All characters are represented with an 8-bit binary code. The 7 least significant bits correspond to representation (with the exception of special characters and control characters). The 8 ^m bit is the character indicator. Bit 8 is LO (= O) for all displayable characters while it is HI (=1) for all control characters (undisplayable). Control characters affect the position of the text cursor. The control characters (undisplayable). Control characters affect the position of the text cursor. The control characters is a follows: NUL (NUI) -0. ETX (Fand Text) -3. Lf (Line Feed) -10. CR (carriage Return) -13. Home Position) -30, and CR/LF (Carriage Return and Line Feed) -31. The control characters are individual to a sterisk.	
	0	0	0	o	* •	16	32	48 48	64	80	96 •	112	* All characters are represented with an 8-bit binary code. The 7 least significant bits correspond to ASCII representation (with the exception of special characters and control characters). The \mathbb{R}^m bit is the control character indicator. Bit 8 is LO (=O) for all displayable characters while it is H (=1) for all control characters affect the position of the text cursor. The control characters are as follows: NUL (NuII) -0. ETX (End of Text) -1. (Line Feed) -10. (CR (Carriage Return) -13. RS (Home Position) -30, and CR/LF (Carriage Return and Line Feed) -31. The control characters are indicated with an asterisk.	
	4	С		്ഗ	0	likener	0	Saus.	0	420	0	*****	*	
		3 El a	2	9	0	0	~	6	0	o	6au	6		
		ā	٥	2	0	0	o	0	gen	6.11.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.		-	J	

Figure 2-47. 7854 Character Set.

a new set of data), and again the Y Output Latch/Counter begins to count down. The Column Scanner sequentially checks each of the 8 outputs of the Character ROM to see if it is HI or LO. If HI, the dot timer again is turned on, shutting off the Y Output Latch/Counter and a dot is displayed at the new horizontal and vertical deflections. This happens for each consecutive column up to the fifth column. The X Latch/Counter detects the end of the fifth column and the next three columns of the 8 × 8 matrix are not displayed. The X Counter/Latch shuts off the scanning and the Y Output Latch/Counter and the X Counter/Latch are now held in a specific state. Skipping these three columns provides horizontal spacing between characters.

The Control Logic then produces another bus request and the DMA Control circuit gives back a bus grant. When the first character was retrieved from memory, the Address Generator stage produced a specific address, of which data bits 0 - 7 were latched into the Y Input Mux/Latch. For the second character, the address has not incremented and this memory location will be read again, this time latching data bits 8 - 15 into the Y Input Mux/Latch.

Two characters, each 8 bits wide, are put into each memory address, thereby using 100% of memory. At the end of display of this second character, the memory address is incremented for display of the next two characters. When 8 bits are latched into the Y input, the lower 7 represents and ASCII character and the 8th bit is called the control bit. There are 5 control characters that control the position of a character on the crt screen. If the eighth bit (the control bit) that was latched in is HI, the character is a control character. Control characters are not displayed but rather affect position. The different control characters are a Line Reset to reset the display to a new line, Line Feed to move down a line, Carriage Return to go back to the beginning of that line, Home Key to return the display to the upper left hand corner of the crt and End of Text to interrupt the microprocessor after it has displayed all the character, the microprocessor can start a new display cycle in any mode that is necessary.

The End of Text control character is used to interrupt the microprocessor instead of the Address Generator as previously described because the Address Generator only overflows at 128, 256, 512 or 1024 increments and the possibility of displaying almost any number of characters up to 640 exists. This character is read only after all displayable characters have been displayed.

Of the 10 outputs to the Vertical D/A Converter stage, the upper four bits represent the 16 lines on the crt screen, while the next 3 bits represent the 8 individual rows within the character itself. The lower 3 input bits are unused. In the Horizontal D/A Converter, the upper 6 bits represent 64 possible characters of which only 40 are displayable. The lower 4 bits represent 16 individual columns within a character, only eight of which are used (See Display D/A and Amplifier description).

Signal Name	Edge Conn. In/Out	Sub- Mode	Wave Form No.	Description
ADDADV	P109-4 OUT	ALL	21	Address Generator advance: positive edge active; indicates that address generator should be incremented to the next address.
ADDBUFF	P109-7 OUT	ALL	9,10,11	Address Generator Buffer enable: active LO; enables the address generator buffers to drive the system address bus.
ADRDLY		ALL		Address Delay: indicates a delay time, allowing the Horizontal D/A and Amplifier and the Vertical D/A and Amplifier to settle to new values.
		CHARACTER	38	Allows access time for character ROM whenever address inputs to ROM change.

TABLE 2-7 Signal Line Description Table

TABLE 2-7(CONT) Signal Line Description Table

Signal Name	Edge Conn. In∕Out	Sub- Mode	Wave Form No.	Description
		X-Y	39	Starts during BGDSY. Lasts for ~ 950 ns.
		Y-T	40	Starts during BGDSY. Lasts for ~ 1.1 μ s.
ADSTRB		X-Y Y-T	43 44	Address Strobe: on rising edge, one-shot multivibrator is triggered, enabling the Z-Axis for display of a point.
ADXD	P109-P IN	ALL	26	Address Horizontal Display: memory address Hex E012; active LO; indicates that the microprocessor is sending information to the horizontal circuitry via the data bus.
ADYD	P109-N IN	ALL	1	Address Vertical Display: memory address Hex E014; active LO; indcates that the microprocessor is sending information to the vertical circuitry via the data bus.
AWD'.SB	P109-3 OUT	X-Y		A Word Address Generator Least Signficant Bit: active HI; for cursor display, to control the polarity of the A Word address generator.
BGDSY		ALL	CHAR 15 X-Y 16 Y-T 17	Bus Grant Display: active HI, indicates that the DMA controller has given authorization to the display DMA Control Logic to use the system address, data and control busses.
BGDSY	P109-F IN	ALL		Active LO; inversion of BGDSY.
BRDSY	P109-C OUT	ALL	22,23,24	DMA Bus Request for Display: active LO; indicates that Display Control Logic would like to use the system busses to obtain information from memory.
BRWDSEL	P109-5 OUT	Х-Ү	14	B Word Address Generator Select: active HI; indicates that B Word Address generator should be used instead of A Word Address generator.
CHR		ALL		Character Mode Bit: active LO; inverted display mode word bit 8 indicating that display is in character mode.
CHR		CHARACTER		Character Mode Bit: active HI; display mode word bit 8 indicating that current display is for character display.
CHR/WFM	P109-P OUT	ALL		Character or Waveform Display: HI indicates character display while LO indicates waveform display to Auto Focus circuitry in the analog portion of the instrument.
CHRIDLE		CHARACTER		Character Mode Idle: active LO; indicates that the character display mode is idle and no characters are being displayed.
CHRSCAN		CHARACTER	27	Character Scanning: active HI; indicates that the 5×8 dot matrix of a character is being examined for information concerning which dots should be displayed.

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TABLE 2-7(CONT) Signal Line Description Table

	Siganl Name	Edge Conn. In∕Out	Sub- Mode	Wave Form No.	Description
ī	CHRSCAN		CHARACTER	28	Inversion of CHRSCAN.
Ĉ	CHRZON		CHARACTER	37	Character Z-Axis Drive On: active LO; indicates that current flows to the Z-Axis to control the intensity of each displayed dot of a character.
Ĉ	COLADV		CHARACTER	5	Character Column Advance: active LO; indicates that the present column of the character has finished being scanned and the next column should begin.
C	COLSELO COLSEL1 COLSEL2		CHARACTER		Character Column Select 0,1,2: binary coded lines indicating which of 5 columns is currently being scanned.
C	CR		CHARACTER		Carriage Return: active LO; 1 of 5 control character lines indicating that the current character position should be reset to the beginning of the line.
C	CURS		X-Y		Cursors mode bit: active HI; display mode word bit 9 indicates that current X-Y display is for cursors.
Ĉ	MDWRD	P109-16 IN	ALL	20	Display Mode Word: Memory Address HEX E000 active LO; indicates that the microprocessor is setting up the mode of the next display cycle.
D	OTDSP		CHARACTER	41	Dot Display: active LO; indicates that the dot timer has recognized that the present dot of 5 × 8 matrix should be displayed.
D	ΟΟΤΟΝ		CHARACTER	7	Dot Display On enable: active HI; indicates that column scanner has recognized that present dot of 5×8 matrix should be on and enables the dot timer accordingly.
D	OTSTB		CHARACTER	6	Dot Strobe: negative edge active; determines if Z-Axis should turn on to display a dot of a character.
Ď	SPIDLE		ALL.		Display mode Idle: active LO; indicates that the display circuitry is no longer in the process of displaying anything; display is idle.
D	SPIDLE		ALL		Inversion of DSPIDLE.
D	νSY		ALL		Display mode bit: active HI; indicates that system is in display mode.
Đ	DSYOFF		ALL		Display Off: active LO; indicates that the display analog outputs and analog control signals may produce a realtime display.

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TABLE 2-7(CONT) Signal Line Description Table

Signal Name	Edge Conn. In∕Out	Sub- Mode	Wave Form No.	Description
DSYON		ALL		Display On: active HI; enable signal for analog control logic indicating that a stored point (character or waveform) may be displayed.
		X-Y Y-T		HI at all times during a display cycle.
DSYWE		ALL	12	DMA Display Write Enable: active LO; indicates that information on the data bus is valid and should be latched on rising edge.
ECHR		CHARACTER		Even Byte of Character Word: active HI; indicates that the character control logic is selecting the even byte of the 16-bit character word (D8-D15) for the vertical input latch data.
ENDCHR		CHARACTER	35	End Column of Character: active LO; indicates that the present column of the character being scanned is the last column of that character.
EOC		CHARACTER		End of Character: active LO; 1 of 5 control character lines indicating that the control character has been scanned as much as needed.
ERO	P109-6 OUT	CHARACTER		End of Character Readout: active LO; indicates that the current character display cycle is finished.
ETXT		CHARACTER		End of Text: active LO; 1 of 5 control character lines indicating that the character buffer is empty and character display is complete.
FPL		Х-Ү Ү-Т		First Point Latch: active LO; indicates that the next point or the present point to be displayed is the first point of the waveform.
HI		Y-T		Out or Range, HI: active HI; indicates that vertical point from memory is off the displayable screen (>5 divs above center screen); from overrange detector.
		Х-Ү		Also indicates that horizontal point from memory is off the displayable screen (>5 divs to right of center screen).
IDSY	P109-L			Display Interrupt: active LO; interrupt to microprocessor indicating that display cycle is finished.
L F		CHARACTER		Line Feed: active LO; 1 of 5 control character lines indicating that character display should increment the line count.

TABLE 2-7(CONT) Signal Line Description Table

Signal Name	Edge Conn. In∕Out	Sub- Mode	Wave Form No.	Description
LO		Y-T		Out of Range, LO: active HI; indicates that vertical point from memory is off the displayable screen (>5 divs below center screen); from overrange detector.
		Х-Ү		Also indicates that horizontal point from memory is off the displayable screen (>5 divs to the left of center screen).
LR		CHARACTER		Line Reset: active HI; 1 of 5 control character lines positioning vertical output latch/counter to the last line (line 16).
MEM	P109-17 OUT	ALL		Memory Enable: active LO; indicates that information on the address bus is valid to use (is stable). This is a contro bus line.
OCHR		CHARACTER		Odd Byte of Character Word: active HI; indicates that the character control logic is selecting the odd byte of the 16-bit character (DO-D7) for the vertical input latch data.
RBR	P109-D IN	ALL	8	Remove DMA Bus Request: active LO; control line from DMA controller indicating that Bus Request should be removed.
RESET	P109-T IN	ALL		System Reset: active LO; indicates that display circuitry should be initialized.
ROINT	P109-9 IN	CHARACTER		Character Readout Intensity Control: analog level of 0 V to -15 V ⁻ controls intensity of displayed characters.
ROOF	Р109-К IN	CHARACTER	n fan gelek kan besken en sen en e	Readout Off: active LO; turns off character readout.
ROWSELO ROWSEL1 ROWSEL2		CHARACTER		Character Row Select 0, 1 and 2: binary coded lines indicating which of the 8 rows of a character is being scanned.
RO-WFMX	J12 OUT	ALL		Readout-Waveform Display Horizontal Information; analog level of about -4.5 V to +4.5 V; horizontal analog information to drive horizontal amplifier.
RO-WFMY	J11 OUT	ALL		Readout-Waveform Display Vertical Information: analog level of about -4.5 V to +4.5 V; vertical analog information to drive vertical amplifier.
RO-ZAXIS OUT	P110-E	ALL		Readout-Waveform Z-Axis Current Drive: 0-3.5 mA; Z-Axis drive to control intensity of display.

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TABLE 2-7(CONT) Signal Line Description Table

Signal Name	Edge Conn. In/Out	Sub- Mode	Wave Form No.	Description
RT		ALL.		Real Time mode bit: active HI; display mode word bit 12 indicating that realtime waveform is to be interlaced with the digital display.
RTMOFF		ALL		Real Time Display Off: active HI; indicates that the analog scope should be shut off so display may use crt.
RTMZOFF	P109∍r OUT	ALL		Real Time Z-Axis Off: active LO; indicates that display system is to use crt. Analog Z-Axis is disabled.
R∕₩	P109-U OUT	ALL		READ/WRITE control bus line: HI indicates a read from data bus. LO indicates a write to data bus.
STADSY	P109-12 IN	ALL	19	Start Display: active LO; hardware control flag from microprocessor indicating that a display cycle should start. Cycle begins on rising edge.
VECT		X-Y Y-T		Vector mode bit: active HI; indicates that waveform should be displayed in vector mode. Display mode word bit 3.
WÊ	P109-18	ALL		Write Enable: active LO; control bus signal indicating that data on the data bus is valid.
WFMINT	P109-N	X-Y Y-T		Waveform Intensity Control: analog level 0 V to -15 V; controls intensity of waveform points.
WFMPT		Х-Ү Ү-Т	45	Waveform Point Display: active LO; indicates that a point from memory has been obtained and point has begun to be displayed. When in both stored and scope mode (BOTH), only alternate points of waveform will be displayed.
WFMZON		Х-Ү Ү-Т	46	Waveform Display Z-Axis On: active LO; turns the crt Z-Axis current drive on.
WS1 WS2		CHARACTER		Waveform input Select 1 and 2: active HI; together select the odd or even byte of the character word to be latched into the Y Input Mux/Latch.
		Y-T X-Y		When WS1 is LO, D4-D7 is selected. When WS2 is LO, D8-D11 is selected.
XCLK		ALL		Horizontal Clock: active HI.
		CHARACTER	30	Increments the horizontal counter by 2 to form the next column of the character.
		X-Y	31	Latches the horizontal information on the data bus into the horizontal latch.
		Y-T	32	Increments the horizontal counter by the points per waveform variable stored in the points per waveform latch.

TABLE 2-7(CONT) Signal Line Description Table

Signal Name	Edge Conn. In/Out	Sub- Mode	Wave Form No.	Description
XCLK1 XCLK2		ALL		Inversion of XCLK.
XDMA		X-Y	13	Horizontal Point Direct Memory Access: active LO; indicates that the present or next DMA cycle will contain horizontal information instead of vertical information.
хні		Х-Ү		Horizontal Offscreen Right: active HI; indicates that point is off screen (>5 divisions right of center screen).
XLO		X-Y		Horizontal Offscreen Right; active HI; indicates that point is off screen (>5 divisions right of center screen).
XLOAD1		X-Y Y-T	34	Horizontal Load 1: active LO; indicates that information from the data bus is being loaded into a portion of the horizontal latch.
XLOAD2		X-Y Y-T	29	Horizontal Load 2: active LO; indicates that information derived from present horizontal location and the points per waveform information will be loaded into the 4 LSB of the horizontal latch on the next XCLK1.
		CHARACTER		Enables the 4 LSBs of the horizontal latch to increment by 2 on next $\overline{\text{XCLK1}}$.
XSTROBE		CHARACTER	33	Horizontal Increment Strobe: active LO; indicates that microprocessor is loading the character column increment (=2) into the points per waveform latch.
		Y-T		Indicates that microprocessor is loading points per waveform increment information from the data bus into the points per waveform latch.
XWE		X-Y		DMA Horizontal Write Enable: active LO; indicates that the information present on the data bus is valid horizontal information.
XY		X-Y Y-T		X-Y mode bit: active HI; display mode word bit 5; when HI, indicates that current display cycle is in X-Y mode; when LC indicates that current display cycle is in Y-T mode.
XYINH	P109-s OUT	ALL		Horizontal-Vertical Analog Inhibit: active HI; indicates that horizontal and vertical analog sections have been disabled so digital display can use crt.
XYON	P110-4	ALL		Analog scope Horizontal-Vertical ON: active LO; indicates the analog data from plug-ins is to be sampled.

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TABLE 2-7(CONT) Signal Line Description Table

Signal Name	Edge Conn. In/Out	Sub- Mode	Wave Form No.	Description	
YD7		CHARACTER		Vertical Input Latch Data Bus 7: active HI; control character bit indicating that remaining 7 bits represent a control character.	
ҮНІ		Х-Ү Ү-Т		Vertical Off Screen Up: active HI; indicates vertical point is off crt screen; >5 divs above center screen.	
YLO		X-Y Y-T		Vertical Off Screen Down: active HI; indicates vertical point is off crt screen; >5 divs below center screen.	
YOUTENABL	Ē	X-Y Y-T	2 3	Vertical Output Latch Enable: active LO; indicates that data from the Vertical Input Mux/Latch is being transferred to the Vertical Output Latch/Counter.	
YROWCLK		CHARACTER	42	Vertical Row Clock: active LO; decrements the row counter portion of the Y Output Latch/Counter on every other count of the 6-MHz Φ1 clock.	
YSTROBE		X-Y Y-T	4	Vertical Input Latch Strobe: active HI; indicates that vertical information from the data bus is being latched into the Vertical Input Mux/Latch.	
		CHARACTER		Indicates that character information is being latched into vertical input latch.	
ZON		ALL		Z-Axis On enable: active HI; indicates that the digital display may turn on the Z-Axis if appropriate.	
3 MHz Φ1	P109-13 IN	CHARACTER	25	Three-megahertz clock, phase 1: active HI; free-running clock from microprocessor board. Frequency of 3-MHz with about 25% duty cycle. Used for timing purposes.	
3 MHz ФЗ	P109-14 IN	ALL	25	Three-megahertz clock, phase 3: active HI; free-running clock from microprocessor board. Frequency of 3-MHz with about 25% duty cycle. Used for timing purposes.	
6 MHz Φ1		CHARACTER	36	Six-megahertz clock, phase 1: active HI; free-running clock with frequency of about 6-MHz with about 50% duty cycle. Used for timing purposes.	
8 KHz		CHARACTER		Eight-kilohertz mode bit: active HI; when LO, indicates that characters should be displayed one immediately following the preceding one with no time delay between characters. When HI, indicates that characters should be displayed one every 100-125 μ sec. Scope mode only.	
5 KHz Φ1 5 KHz Φ2		CHARACTER	18	Five-kilohertz phase 1 and 2; from Timer in RO Acquire circuitry; indicates when the next character readout should begin (in SCOPE mode only).	reda



DISPLAY D/A AND AMPLIFIER

The Display D/A and Amplifier circuitry provides conversion of the 10-bit vertical and horizontal binary data codes from the Vertical and Horizontal Display and Control circuits to analog voltage levels, providing vertical and horizontal deflection for digitized waveforms and characters to be displayed on the crt, either in dot or vector formats. A schematic of the Display D/A and Amplifier circuit is given on diagram 34 in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. The following description uses these stage names to aid in locating and identifying the components and portions of circuitry described.

HORIZONTAL AND VERTICAL D/A CONVERTER

The Horizontal and Vertical D/A (digital to analog) Converters operate in the same manner. Therefore, only the Horizontal D/A Converter will be discussed, with any differences noted applicable to the Vertical D/A Converter.

The Horizontal D/A Converter stage consists of U1010 and accepts 10-bit binary codes from the Horizontal Display and Control circuit (diagram 33) at its inputs, pins 4 through 13, representing unique horizontal crt displacements. This 10-bit code allows for the sinking of 1024 unique analog currents at its output, pin 3, from the Horizontal Current Summer and Amplifier stage, each resulting in a unique horizontal displacement of the crt beam (see Figure 2-48).

The voltage reference levels at input pins 15 and 16 determine the maximum amount of current the device may sink at its output, pin 3, in the case of all 10 inputs being HI. The $-V_{REF}$ is a HI impedance input and the -10 volt level determined by voltage divider R1103 and R1102 is sensed at pin 15, resulting in a similar level at pin 16. This causes 1 mA of current to flow in R1110. This current is doubled internally to 2 mA and is the maximum current the device may sink at pin 3. This current may be divided into 1024 (2¹⁰) equal parts, any multiple of which is representative of a valid 10-bit code at the device's input pins.

Pin 16, the $+V_{\text{REF}}$, is also tied to the Horizontal Current Summer and Amplifier stage to change this reference level in the case of a character, rather than a digitized waveform display. This function will be discussed in the Horizontal Current Summer and Amplifier stage description.

The Vertical D/A Converter stage varies from the above description only in that its inputs are derived from the Vertical Display and Control circuit (diagram 32) and that the voltage reference level at pin 16 is always fixed.

HORIZONTAL CURRENT SUMMER AND AMPLIFIER

The Horizontal Current Summer and Amplifier circuit algebraically adds currents from various functional sources resulting in a combined current flowing in R1511 via R1513 and Gain adjustment R1300. This current results in a voltage at output pin 6 of U1505 that varies inversely and proportionally to any current dependent voltage change applied to input-pin 2 of U1505. A change in current within the Horizontal Current Summer and Amplifier stage and thus the output voltage at pin 6 of U1505 may be caused by several different events occuring.

Assume that the semiconductor switches U1410 and U1310A are open and U1310B is closed due to the CHR (character) level being HI and the X HI and X LO levels being LO. This is the condition present when a digitized waveform is being displayed. Any change of data at the inputs of the Horizontal D/A Converter results in a change in current flowing in R1511 and thus a change in the voltage at the output of U1505.

If the overrange detector determines that a point of a waveform to be displayed will be outside of the normal crt display area (as in the case of expanding a waveform horizontally), either the X HI or X LO levels from the Horizontal Display and Control circuit will go HI when these points are to be displayed. This HI opens U1310B and closes either U1410A or U1410B, depending on which side of the normal crt display area the point to be displayed would fall. When one of these switches closes, a predetermined amount of positive or negative current flows in R1511. Any horizontal value outside of the normal crt display area results in only two possible horizontal displacements, regardless of what the magnitude of its displacement would have normally been.

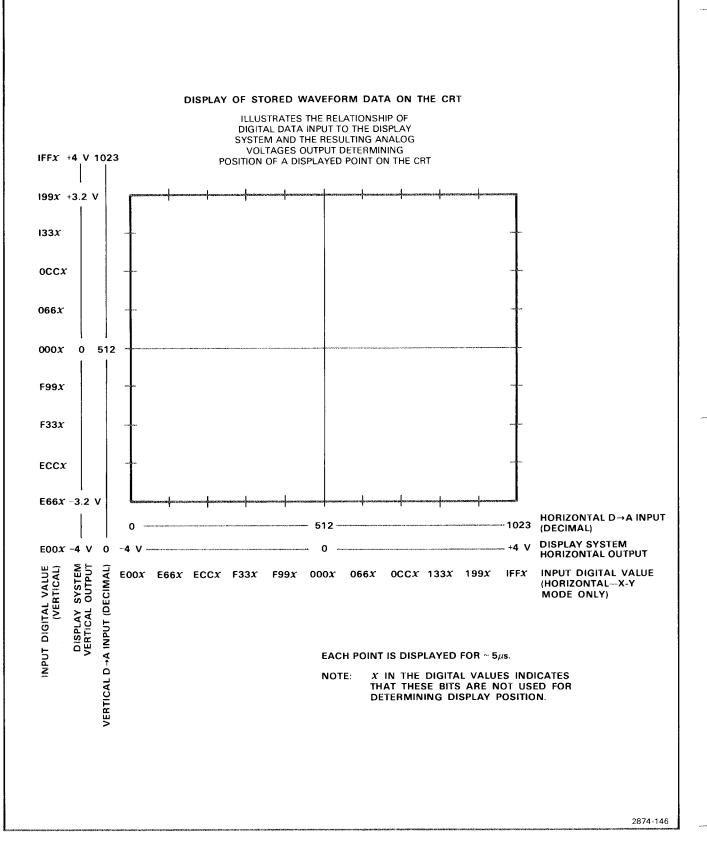


Figure 2-48. Crt Display.

Assume now that the switches within U1410 are open, U1310B is closed, and U1310A now closes with the presence of a LO CHR level at pin 3 of U1310A from the Vertical Display and Control circuit (diagram 32). These are the conditions necessary for the display of an alphanumeric character on the crt. Normally, when displaying a digitized waveform, the data applied to the inputs of the D/A Converter, U1010, resulted in a specific current flowing through R1511. Now, however, since U1310A is closed, additional current sinking capability is added to U1010 due to the increased reference current from ground to pin 16 of U1010 through R1210, U1310A, R1200 and R1105. This effectively increases the "apparent" gain of the Horizontal Current Summer and Amplifier stage.

During normal high resolution display of a digitized waveform, it takes 1024 horizontal points or steps to sweep the crt beam from one side of the crt display graticule to the other. During the display of a line of 40 alphanumeric characters, however, only 640 of these horizontal points would be used. By increasing the "apparent" gain of the Horizontal Current Summer and Amplifier stage, these 640 steps will sweep the crt beam completely across the face of the crt. The CHG (character horizontal gain) adjustment, R1200, is used to accurately adjust this gain so that the 40 alphanumeric characters fill the horizontal length of the crt graticule. The Horizontal Offset adjustment, R1205, is used to center the alphanumeric display on the crt. Horizontal Gain adjustment, R1300 sets the overall gain of this stage.

VERTICAL AND HORIZONTAL VECTOR GENERATOR

Operation of the Vertical Current Summer and Amplifier stage is similar to that just described for the Horizontal Current Summer and Amplifier when displaying digitzed waveforms. Switches within U1300 are normally open while U1200A is normally closed to pass the signal currents from the Vertical D/A Converter, U900, to the current amplifier, U1500. As before, if the microprocessor determines that point to be displayed will be outside the predetermined limits (±5 cm from graticule center) either the Y HI or Y LO level from the Vertical Display and Control circuit will go HI. This opens U1200A and either a positive or negative current flows in R1603, depending on whether the upper or lower limit has been exceeded. Only two vertical deflections are possible for points outside the predetermined limits.

During display of an alphanumeric character, the switches with U1300 are once again open while U1200A and U1200B are closed.

Each alphanumeric character is displayed in the form of a 5×8 dot matrix within a larger 8×8 matrix, (see Fig. 2-47). Since each character is only 5 columns wide, the other three columns form a separating boundary between characters, thus, adequate horizontal spacing is achieved. The vertical component of each character, however, uses all of the eight vertical positions available. To keep characters from blending into those above and below them, each character must be reduced in height (see Fig. 2-49).

This is accomplished by applying currents to the input of the current summer, U1500, that subtract from the total vertical deflection of a character. The 3-bits of the binary code determining which of the 8 possible vertical positions for a point within a character display are applied to current limiting resistors R900, R1001, and R800. Each of the eight possible binary addresses from the Vertical Display and Amplifier circuit (diagram 32), causes a unique amount of current to be subtracted from the vertical deflection current for that character, thereby shrinking the displayed character from what it would have been.

Potentiometer R1106 (CVO) provides adjustment for vertically offsetting the alphanumeric readout display, while R1100 (CVG) sets the gain of the vertical portion of the readout display.

VERTICAL CURRENT SUMMER AND AMPLIFIER

Operation of the Vertical and Horizontal Vector Generators is identical, therefore only a discussion of the Horizontal Vector Generator will be given.

The analog voltage steps at the output of the Horizontal Current Summer and Amplifier stage, pin 6 of U1505, resulting when digitized information is to be displayed, are applied to the input voltage divider of the Horizontal Vector Generator stage, R1512 and R1610. These resistors, along with C1601, L1611, C1610, L1610, C1512 and C1612 form an rcl network that changes these sudden analog steps into a smooth transition from one level to the next. This resulting voltage is applied to the voltage follower, U1620B, to be current buffered. The gain of this stage is set by the Horizontal Vectors Gain adjustment, R1621, and the offset in the position of the vector display may be varied by Horizontal Vectors Offset adjustment, R1620.

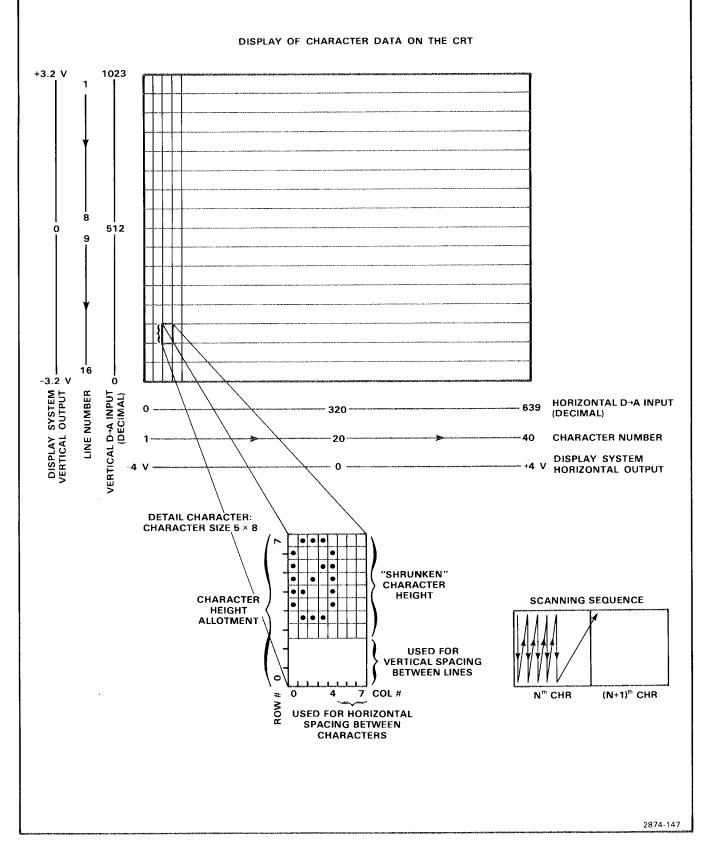


Figure 2-49. Display of Character on crt.

OUTPUT SELECTOR

The Output Selector stage provides selection of either dot or vector display of digitized waveforms and amplification of the selected signal.

The Output Selector IC, U1720, selects either the dot or vector mode of displaying digitized waveforms depending on the level of the Vect (vector) command at its input pins 1, 8, 9 and 16. When U1720 is enabled, and the Vect command is LO, horizontal and vertical information for a dot display is applied to the Vertical and Horizontal Amplifier circuits (diagrams 9 and 11 respectively). If the Vect command is HI, information for a vector display is applied to these amplifiers. When U1720 is disabled, no digital display information may be applied to the Vertical or Horizontal Amplifier circuits. At this time U1730 is enabled and both outputs are tied to ground potential. Alphanumeric characters are always displayed in dot mode.

Z-AXIS DRIVE

The Z-Axis Drive stage consists of Q1830A, Q1830B, Q1830E, Q1930A, Q1930B, Q1930E and their associated components. This stage determines the intensity of a stored waveform or alphanumeric readout display. The WFMINT (waveform intensity) and ROINT (readout intensity) levels are derived from user adjustable potentiometers on the Front-Panel Controls circuit, diagram 17.

The adjustable analog voltage levels applied to the emitters of Q1830E and Q1930E through R1832 and R1930 determine the amount of current that will flow in the RO-ZAXIS line. When the CHRZON and WFMZON levels are HI, all currents flowing in Q1830E and Q1930E pass through Q1830A and Q1930A respectively. However, when the CHRZON or WFMZON level is LO, the corresponding adjustable analog current flowing in Q1830E or Q1930E now flows through Q1830B or Q1930B respectively. This current is applied to the Z-Axis and Amplifier circuit (diagram 13) and provides the drive signal for display of stored waveforms or readout characters.

ANALOG SCOPE CONTROL LOGIC

The Analog Scope Control Logic stage generates time related control signals used to change the operating modes of the analog portion of this instrument. For the following discussion, refer to the Display D/A and Amplifier schematic and its accompanying timing diagram on diagram 34 in Section 7, Diagrams and Circuit Board Illustrations.

When either the XYON level goes LO (indicating that analog plug-in information is to be sampled) or the RTMOFF level goes LO (indicating that the real-time scope display is on), the DSYOFF (display off) level at the output of U2010D goes LO. RTMOFF is HI whenever the real-time display is shut off as indicated by the RT (real time display) level being LO. Otherwise RTMOFF alternates betwen HI and LO as determined by the WFMPT (waveform points from memory) or CHRSCAN (scope mode character) display control levels.

As DSYOFF goes LO, the Output Selector stage is disabled through Q1820 and U1720. This also grounds the RO-WFMX (horizontal readout-waveform) and RO-WFMY (vertical readout-waveform) outputs through U1730.

When DSYOFF goes LO, ZON (display Z-axis on) is turned off immediately, disabling the Z-Axis current drive. After a delay of about 100-150 ns (caused by R2310, R2311 and C2310), XYINH (X-Y inhibit) and CHR/WFM (character/waveform select) go LO. RTMZOFF (real-time Z-axis off) goes HI about 250-300 ns after DSYOFF goes LO as determined by R2302, R2312 and C2400.

When DSYOFF returns HI, indicating that the display system is in control of the crt display, the Output Selector stage is re-enabled and its outputs are disconnected from ground; RTMZOFF goes LO without a delay. XYINH goes HI after about 100-150 ns, inhibiting real-time deflection signals, and the CHR/WFM level is set depending on the CHR (character) input level to U2010C. About 900-1100 ns after DSYOFF returns HI (determined by R2300 R2301 and C2300), ZON returns HI to allow display of stored waveform or character information.



The GPIB (general purpose interface bus) provides a communication and control link so that multiple instruments may interact with each other under the direction of a system "controller". The circuitry providing GPIB interface functions is shown on the GPIB schematic, diagram 35 in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. These stage names are used to aid in locating and identifying the components and portions of circuitry discussed.

All interface and control functions of the 7854 GPIB circuitry are adherent to IEEE standard 488-1978.

THE IEEE 488-1978 STANDARD

The IEEE 488-1978 standard defines a byte-serial bitparallel interface system electrically, functionally and mechanically as well as specifying terminology and system limitations. This system implements a 3-wire handshake system with each data transfer from a *"talker"* to one or more *"listeners"*. A *"talker"* is a GPIB device sending data while a *"listener"* is one that receives data from a *"talker"*. All GPIB information is transferred at standard TTL levels using negative logic (i.e. LO=true).

The GPIB interface has 16 external connections which are used for 3 separate types of functions. Inputs DI01 through DI08 (data input/output) are used specifically for transfer of data between GPIB devices.

Five other lines are used to manage the flow of information over the interface lines. The ATN (attention) level, when active, disables the current talker and listeners and makes all devices listen to the controller. IFC (interface clear) is used to put the interface system into a known quiescent state. The SRQ (service request) line is used to indicate to the controller that a device on the bus is in need of service and an interrupt is requested (the controller determines which devices may talk or listen at any time). The REN (remote enable) command selects either a remote or local source of device programming. The EOI (end or identify) line is used to signal the end of a multiple byte transfer and is used in conjunction with ATN to execute the parallel polling sequence.

The three remaining lines are associated with the handshake process and are the DAV (data valid), NRFD (not ready for data) and NDAC (data not accepted) lines. Their timing relationships during the handshake process are shown in Figure 2-50. Each data byte transferred by the interface system uses the handshake process to exchange data between source (typically a talker) and acceptor (typically a listener). The following list of events is related by number to the state changes shown in Figure 2-50.

THE HANDSHAKE PROCESS

1. The source (talker) initializes the active LO DAV (data valid) to a HI level, indicating that data is not valid.

2. The acceptors (listeners) initialize the active LO NRFD (not ready for data) level to a LO (none are ready for data) and set the active LO NDAC (data not accepted) level to LO (none have accepted data).

3. The source checks for an error condition (both NRFD and NDAC at a HI level) and then sets a data byte on the DIO (data in/out) lines. After the data has been placed on the DIO lines, the source delays to allow the data to settle on these lines.

4. When the acceptors have all indicated readiness to accept the first data byte, the NRFD level goes HI.

5. The source, upon sensing the HI NRFD level, sets the DAV level to a LO, indicating that the data on the DIO lines has settled and is valid.

6. The first (fastest) acceptor sets the NRFD level LO, indicating that it is no longer ready for new data, and accepts the present data. The remaining acceptors follow at their own rates.

7. The first acceptor sets its NDAC level to a (passive) HI, indicating that is has accepted the data. (NDAC remains LO due to the other acceptors actively driving NDAC LO. The term "passive" means that if any other device is "actively" driving this line to the opposite state, the passive level is overridden.)

8. As the last (slowest) acceptor accepts the present data, the NDAC level goes to a (passive) HI, indicating that all acceptors have accepted the data.

9. The source, having sensed the HI NDAC level, sets DAV HI. This indicates to the acceptors that the data on the DIO lines must now be considered invalid.

10. The source may change the data on the DIO lines at this time and now delays to allow this data to settle if changed.

11. The acceptors, upon sensing the HI DAV level (step 9, above), set the NDAC level LO in preparation for the next cycle. The NDAC line goes LO when set by the first acceptor.

12. The first acceptor indicates that it is now ready for the next data byte by setting its NRFD level to a (passive) HI. (NRFD remains LO due to other acceptors actively driving it LO.)

13. When the last acceptor indicates that it is ready for the next data byte, the NRFD level goes (passive) HI.

14. The source, sensing that NRFD is HI, sets the DAV level LO, indicating that the new data on the DIO lines has settled and is valid.

15. The first acceptor sets the NRFD level LO, indicating that it is not ready to accept any change of data, then accepts the present data. The other acceptors follow at their own rates.

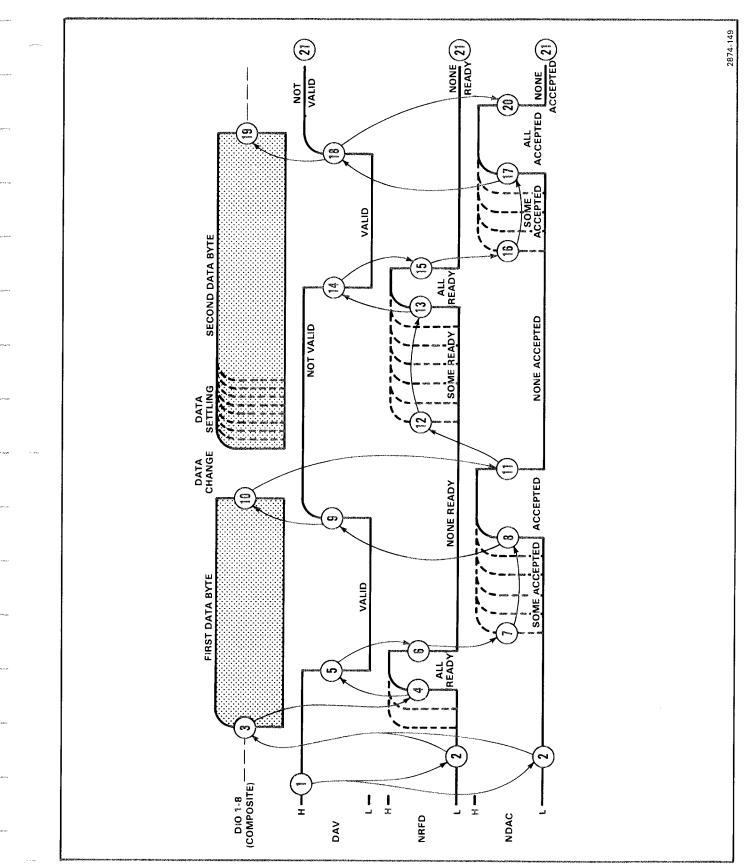
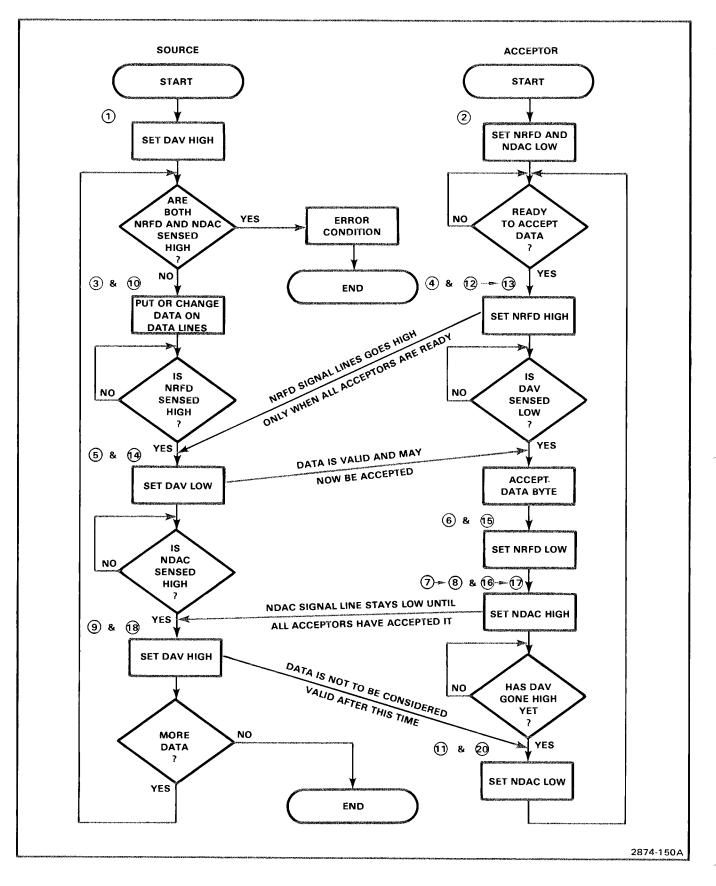
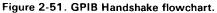


Figure 2-50. GPIB Three Wire Handshake state diagram.

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16. The first acceptor sets its NDAC level to a (passive) HI, indicating that it has accepted the data (as in step 7 above).

17. The last acceptor sets the NDAC level (passive) HI, indicating that it has accepted the data (as in step 8 above).

18. The source, having sensed that NDAC is HI, sets DAV HI (as in 9).

19. The source removes the data byte from the DIO signal lines after setting DAV HI.

20. The acceptors, upon sensing the HI DAV level, set NDAC to a LO level in preparation for the next cycle.

21. Note that all three handshake lines are at their initial states (as in steps 1 and 2 above).

GPIA

The GPIA (general purpose interface adapter) consists of U220, a 40-pin IC specifically designed for GPIB applications. The purpose of the GPIA is to provide interface between the IEEE 488 Standard instrument bus and the microprocessor.

Sixteen of the pins of this IC are related directly to the 16 pins of the GPIB interface connector discussed in the IEEE 488-1978 Standard description above. One of these, the \overline{EOI} is under the control of the T/\overline{R} 1 (transmit/recieve) level. In addition, eight pins (DO-D7) are bi-directionally buffered to the Data Bus for transfer of data to and from the Data Bus.

The R/W (read/write) level, in conjuction with the three register select pins (RSO, RS1 and RS2) tied to the address bus of the microprocessor system, address one of 15 registers internal to the GPIA IC. These registers are used for data storage, status monitors and interrupt functions. The \overrightarrow{ASE} (address switch enable) output is also addressed by these four lines and, when addressed, allows an external, user definable data byte (set by switches on the rear panel) to be placed on the Data Bus. This data byte represents the "address" of this instrument within a more complex GPIB system as addressed by the controller over the GPIB.

The RESET line is used to initialize the GPIA chip during the power up sequence. A LO RESET level is required to initialize the IC. The \overline{CS} (chip select) input is used to select the GPIA. The \overline{CS} must be LO to select the device. The IRQ (interrupt request) line is tied to the interrupt bus of the microprocessor and indicates, when LO, that the GPIA requires service by the microprocessor. The T/R 2 (transmit/receive) output provides selection of whether this instrument is transmitting or receiving data over the GPIB by controlling the bi-directional buffers to the GPIB. The Clock input for the GPIA stage is the $\Phi 2$ pin. The DMA (direct memory access) control pins and the trigger input pin are not used in this instrument. The remaining pins of the GPIA IC are power supply connections.

MPU INTERFACE

The MPU (microprocessor unit) interface stage consists of U330A, U330B, U430A and U430B. These ICs are tristate buffers controlled by the Control and Timing Logic stage. When enabled, U430B and U330A buffer the eight most significant bits from the Data Bus to the GPIA. Data from the GPIA is buffered to the eight most significant bits of the data bus when U430A and U330B are enabled.

GPIB INTERFACE

The GPIB Interface stage conists of U110, U120, U130 and U310 which are bi-directional non-inverting buffering transceivers. The sixteen lines of the GPIB are connected (buffered) to the GPIA and vice-versa through these devices, providing current levels compatible with the IEEE 488-1978 standard. The transmit/receive outputs, T/\overline{R} 1 and T/\overline{R} 2, of the GPIA determine which of the GPIB lines are in the transmit or receive mode at any time.

CONTROL AND TIMING LOGIC

The Control and Timing Logic stage consists of U510, U520, U530, U610, U620, U630, Q700, Q701 and their associated components. It provides the necessary logic for interfacing microprocessor control and clock signals to the GPIA as well as providing additional logic for controlling Data Bus and GPIB interface functions.

The GPIA IC, U220, was designed to be used with a microprocessor other than the one used in this instrument, therefore some signal inconsistencies exist. One such case is in the characteristics of the clock required by U220 and that produced by the microprocessor clock. Integrated circuits U510C, U620A and U620B together create a free-running Φ 2 clock pulse compatible with U220 that is asynchronous to the microprocessor clock. Shift register U520, in conjunction with U530B, U610A and U630F produce a similar clock synchronized to the system microprocessor. One or the other of these clocks is used, depending on microprocessor status.

In the initial stage (when the GPIB is not being used), the HI GPIB level applied to U530C generates a HI GPIB DLY level going to the microprocessor. This tells the microprocessor that it doesn't have to wait on the GPIB, and normal microprocessor operation continues.

Since U220 is a state device, meaning that a clock is required for it to change states internally, a clock must be supplied to U220 so that it may perform its GPIB interface functions. This clock is developed from the 3-MHz ϕ 1 clock and may be either free-running or synchronized to the system microprocessor. The synchronized clock is developed by U520 while U620A and U620B develop the free-running clock which allows the GPIB circuit to monitor GPIB activity external to the instrument.

On power up, the RESET level momentarily goes LO to set the \overline{Q} output of U610A HI (through U630B and U630F). Now, the first HI GPIB level applied to U510C through U630E results in a HI at U620A's J input. The ϕ 1 clock to U620A toggles its Q output, pin 12, at a 1.5-MHz rate. Since the GPIB level is HI at the J input of U620B, its Q output at pin 9 also toggles and a 750-kHz clock is developed. this is applied through U510D to the clock input of U220 pin 6. The HI GPIB level applied to U630E is inverted and disables the synchronized clock by holding U520 in its reset state.

If the GPIB is required to communicate with the microprocessor to do a memory cycle, a clock synchronized to the system microprocessor is required. This is done by using a shift register to synthesize a clock with the proper characteristics using the existing 3-MHz ϕ 1 clock. Figure 2-52 shows a timing diagram to further clarify the following description of the GPIB memory clock cycle.

When it is determined that the microprocessor needs to use the GPIB for a memory cycle, the free-running GPIB clock must be terminated in an orderly manner before the synchronized clock is started to insure that all data transfers are valid.

When the GPIB level goes LO, indicating the beginning of a GPIB cycle, a LO GPIB DLY is generated telling the microprocessor to wait while the clock source for U220 changes. Also at this time, the J input of U620B goes LO and the input at pin 9 of U510C goes HI. If the $\overline{\Omega}$ output of U620B is HI at this time, the output of U510C applied to the J input of U620A will go LO. If the Q output is LO, the next clock applied to U620B will toggle it HI and a LO results at the J input of U620A. In either case, the LO level at the J input of U620B, thus stopping the free-running clock.

While the free-running clock was being used (GPIB HI), U520 was held in a reset condition (all outputs LO) by the LO level at the output of U630E. Now though, when the GPIB level goes LO, U520 is enabled and begins shifting the data level at its A input to its Q outputs with consecutive 3-MHz Φ 1 clocks. After the \overline{Q} output of

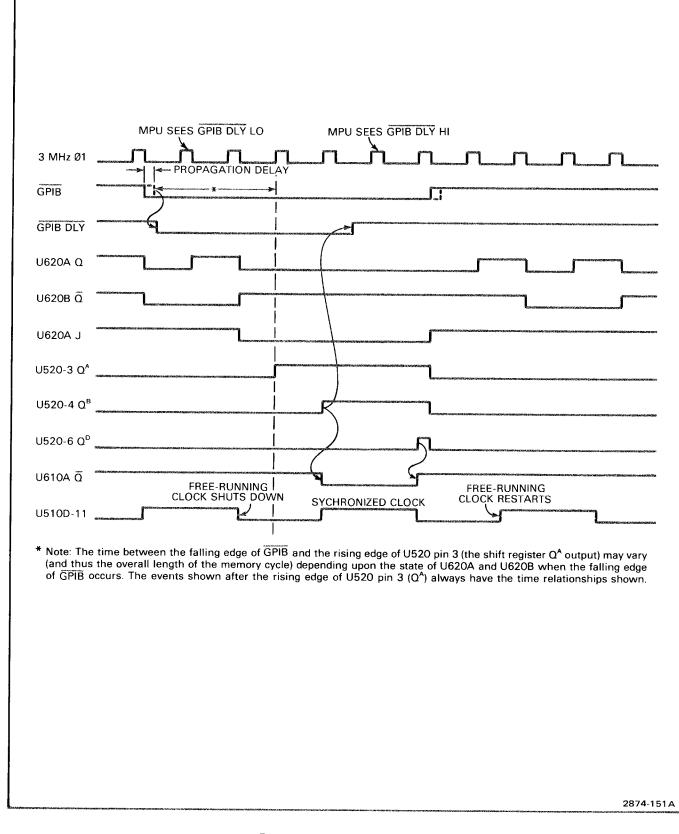
U620B goes HI, indicating that the free-running clock is being turned off, a HI is clocked to U520's Q_A output on the rising edge of the next 3-MHz Φ 1 clock. This is applied to the clock input of the flip-flop U610A.

Previously, when the \overrightarrow{GPIB} level was HI, U610A was held in a set condition due to the LO applied to pin 10. Its Q output to the \overrightarrow{CS} (chip select) input remained HI, disabling the GPIA chip. Now, when the \overrightarrow{GPIB} level goes LO indicating a GPIB cycle, the level at U610B's set input goes HI, enabling the flip-flop. The pulse applied to U610B's clock input from the Q_A output of U520 clocks whatever logic level is present at U610B's D input to its Q output. A LO at the Q output of U610B applied to the \overrightarrow{CS} input of U220 enables the GPIA chip.

Setting of the D input level to U610B (which eventually determines whether U220 is enabled) is accomplished by U510A, U510B and U630A. Some data registers within U220 are always cleared when read. Each address applied to the address pins of U220 actually addresses two registers, a read register and a write register. The microprocessor used in this instrument always reads an address before writing to it. Because of this, writing to a register may destroy data in the corresponding read register. This type of data loss is prevented by setting Address bit 5 (A5) applied to U510A HI. By doing this, a HI R/W (read) level will not enable U220 (through U510A and U510B) while a LO R/W (write) level will, preventing unwanted reads from occuring. A read from U220 by the microprocessor may only occur by setting A5 LO.

Since the RESET (system reset) level is HI and the QD output of U520 is LO, the output of U530B is LO and the HI reset level applied to U610A through U630F enables the flip-flop, U610. The next 3-MHz Φ1 clock to U520 shifts the HI QA output level to its QB output, clocking U610A's Q level LO (it was initially set HI by the system reset, RESET, through U630B, U530B and U630F upon power up). This LO O level applied to U510D produces the positive-synchronized Φ2 clock to U220. The HI level at the Q_{B} output of U520 is also applied to U530C through an rc delay network, removing the LO GPIB DLY signal to the microprocessor after about 70 ns. This indicates that the clock source for U220 has been switched from the free-running to the synchronized clock and that the remainder of the microprocessor cycle will be long enough to complete the GPIB cycle. The 3-MHz Φ1 clock to U520 continues to shift the HI bit to each of its outputs and when the HI is shifted to its QD output, U610A is reset through U530B and U630F, terminating the Φ 2 clock to U220.

When the $\overrightarrow{\text{GPIB}}$ cycle is finished, GPIB returns HI, resetting U520 and U610B to their initial states and restarting the free-running clock. When U610B is set, U220 is disabled as $\overrightarrow{\text{CS}}$ goes HI.





Theory of Operation-7854

Integrated circuits U530A, U530D and U630A provide control of the MPU Interface stage. When the \overline{GPIB} level is LO and the R/ \overline{W} level is HI, indicating a read from GPIB cycle, U430A and U330B of the MPU Interface stage are enabled, buffering data from the GPIA stage onto the Data Bus. When both of these levels (R/ \overline{W} and \overline{GPIB}) are LO indicating a write to GPIB cycle, U330A and U430B are enabled, buffering the data on the Data Bus to the GPIA stage. If the \overline{GPIB} level is HI (GPIB not in use), U330 and U430 are in a high impedance state, isolating the Data Bus from the GPIA stage.

Inverters U630C and U630D provide buffering and inversion of the T/R 2 (transmit/receive) level to provide enable levels for the GPIB interface stage. Transistors Q700 and Q701 allow the microprocessor to terminate a GPIB transmission by asserting a LO GPIBEOI (GPIB end or identify) level.

GPIB ADDRESS SELECTOR

The GPIB Address Selector stage consists of U410, R201, R202, R203, R204, R205, R301, R302, R303 and a multiple SPST switch on the rear panel. When the address to read register 4 is applied to pins 5, 37, 38 and 39 of U220, the ASE (address select enable) level applied to pins 1 and 19 of U410 goes LO, enabling the user definable "address" of this instrument (set by the multiple switch closures to ground on the rear panel) to be buffered onto the Data Bus. This is the user definable "address" of this instrument within a more complex GPIB system. The resistors mentioned are pull-up resistors.

is connected and the internal fuse, F12, is intact. It does not signify that the MEMORY BACK-UP POWER voltage is within the proper operating limits between +6.0 and +6.5 volts dc; merely that it is applied.

Switch S110 is an externally settable GPIB address selector. This instrument's GPIB address is set by either opening or closing the individual rocker switches within S110.

The STOP EXTERNAL WAVEFORM ACQUIRE switch, S15, is a pushbutton switch used to stop waveform acquisition when acquiring externally (see the Digitizer Sweep Counter discription). The AUDIBLE ERROR/WARNING switch S16 is used to either enable or disable the audible warning circuit.

Connector J15 is located on the rear panel. It provides a user programmable TTL output level (for simple on/off or similar control) to a peripheral device.

Connector J410 is a GPIB connector adhering to the IEEE 488-1978 GPIB Standard and provides for using the 7854 in GPIB configurations.

The cabling associated with P108 connects the MPU (microprocessor unit) to both the Front Panel Keyboard circuit and to the Rear Panel Connector board. Connector P208 is an RS-232 connector that connects the external Calculator Keyboard to the MPU board via the Rear Panel Connector Board and P108.



REAR PANEL CONNECTOR

The Rear Panel Connector circuit consists of S15, S16, S110, Q14, VR13, VR16, CR12, CR15, DS15 and their associated components. A schematic of this circuit is given on diagram 36 in Section 7, Diagrams and Circuit Board Illustrations.

Zener diode VR13, silicone-controlled rectifier Q14 and their associated components make up an overvoltage protection circuit for the Memory Back-Up Power Input. If the input voltage exceeds about +15 volts, the voltage applied to the gate of Q14 fires this SCR, sinking all current to ground. If this current exceeds 1.5 amperes, fuse F12 will blow and the overvoltage will be isolated from the RAM power line. LED DS15 illuminates to indicate to the user that the MEMORY BACK-UP POWER



The Mother Board circuit supplies the majority of interconnection between boards in the digital portion of this instrument. It is a multi-layered printed circuit board with 10 individual edge-card multi-pin connectors designed to accept the various microprocessor related boards using bus configurations. A schematic of the Mother Board circuit is given on diagram 37 in Section 7, Diagrams and Circuit Board Illustrations. This schematic shows all interconnecting signal lines on the Mother Board and the name of each. Table 2-8 gives a brief description of each signal and its function. Arrows on signal lines indicate signal origin, with an out-arrow indicating that the signal may be generated by the board assigned to that connector. As will be noted, many signals may be generated by more than one circuit.

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TABLE 2-8 Mother Board Signal Definitions

Signal Name	Definition
A1-A15	Address bus lines, 1 to 15.
ADDADV	Address Advance; from Display board to increment Address Generator by one.
ADDBUFF	Address Buffer control; from Display board.
ADXD	Address X Display; firmware address E012.
ADYD	Address Y Display; firmware address E014.
АНО	A Hold Off; from A time base to Contro Logic.
AMDWRD	Acquire Mode Word; firmware address E00A.
AOSTOP	Acquire Stop; rear-panel push buttor closure to ground to end externa acquire.
ASWPG	A Sweep Gate; from Main Interface.
AUDIO	MPU flag bit to front panel for control o the audio speaker.
AUXGATEB	Auxiliary Gate B; from B plug-in (788) clock).
AWRD	A Word; read or write to A Word firmware address E002.
AWRDLSB	A Word LSB; inversion of A word Ist from Display system to Control Logic.
BAT	Battery; back-up power for RAM.
BGDIG	Bus Grant to Digitizer; from DMA Control Logic circuitry.
BGDSY	Bus Grant to Display; from DMA Contro Logic circuitry.
BGRO	Bus Grant to Readout; from DMA Control Logic circuitry.
вно	B Hold Off; from B time-base to Contro Logic.
BRDSY	Display Bus Request; from Display to Control Logic DMA circuitry.
BRRO	Readout Bus Request; from Readour acquisition to DMA Control Logic circuitry.

Signal Name	Definition
BSWPG	B Sweep Gate; from B time-base to Control Logic.
BWRD	B Word; from MPU to Control Logic; firmware address E004. This is a write only address
BWRDSEL	B Word Select; control signal from Display system to Control Logic.
CHR/WFM	Character or Waveform select; from Display system to Z-Axis for autofocus circuit.
CLSAR	Clear Successive Approximation Register; signal from Control Logic to clear successive approximation register.
D0-D15	Data bus lines, 0 to 15.
DELAYGATEB	Delay Gate B; from B plug-in pin B9 to Control Logic where it's called STPTRG.
DMAREQ	Direct Memory Access Request; from Control Logic to MPU.
DMDWRD	Display Mode Word; from MPU to Control Logic and Display system; firmware address E000.
DMEM	Delayed Memory Enable; from Control Logic to Digitizer.
DSAR	Data from Successive Approximation Register; data out in serial form.
DSPRT	Display Real Time; from Control Logic to front-panel mode switch.
DTCSC	Dual Trace Channel Switch Control; used in Digitizer to control two waveform acquire.
ERO	End Readout; control signal from Display system.
ESAR	End of Successive Approximation Register digitizing cycle; from Digitizer to Control Logic.
EXTSIG	External Signal; from MPU to rear panel.
FPR	Front Panel Read; from MPU to front- panel mode switch; firmware address E010.

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TABLE 2-8 (CONT) Mother Board Signal Definitions

Signal Name	Definition						
FPW	Front Panel Write; from MPU to front- panel mode switch; firmware address E010.						
GPIB	GPIB control signal; from MPU to GPIB; firmware addresses from E040 to E060.						
GPIBDLY	GPIB Delay; control signal from GPIB to MPU to extend memory cycle.						
GPIBEOI	GPIB End or Identify; CRU flag line from MPU to GPIB providing firmware control to set and remove EOI.						
GND	Ground.						
GNDA	Ground analog; for analog signals only.						
GSF	Good Signal Flip-Flop; signal from Z- Axis to Control Logic indicating sweep is present.						
НА	A Horizontal; readout inhibit from front- panel mode switch to readout acquisition portion of Display board.						
HB	B Horizontal; readout inhibit from front- panel mode switch to readout portion of Display board.						
HOLDA	Hold Acknowledge; MPU grants busses to DMA Control Logic circuitry.						
HSTB	Horizontal Strobe; from sampler to Control Logic.						
H/VQ	Horizontal/Vertical $\overline{\mathbf{Q}}$; from Control Logic to Digitizer.						
H/VQ	Horizontal/Vertical Q; from Control Logic to Digitizer.						
IACQ	Acquire Interrupt; from Control Logic to MPU to indicate the appropriate number of sweeps has occured.						
IDSY	Display Interrupt; from Control Logic to MPU indicating Display is finished.						
IGPIB	GPIB Interrupt; from GPIB to MPU.						
J1A35	Readout acquisition, Left Vertical, force readout.						
J1A37	Readout acquisition, Left Vertical, Channel 1 column analog data.						

Signal Name	Definitions		
an manana da sha da dhibbi an shadha da 1966 an maran hawa sa sananana wa			
J1A38	Readout acquisition, Left Vertical, Channel 2 column analog data.		
J1B37	Readout acquisition, Left Vertical, Channel 1 row analog data.		
J1B38	Readout acquisition, Left Vertical, Channel 2 row analog data.		
J2A35	Readout acquisition, Right Vertical, force readout.		
J2A37	Readout acquisition, Right Vertical, Channel 1 column analog data.		
J2A38	Readout acquisition, Right Vertical, Channel 2 column analog data.		
J2B37	Readout acquisition, Right Vertical, Channel 1 row analog data.		
J2B38	Readout acquisition, Right Vertical, Channel 2 row analog data.		
J3A35	Readout acquisition, A Horizontal, force readout.		
J3A37	Readout acquisition, A Horizontal, Channel 1 column analog data.		
J3A38	Readout acquisition, A Horizontal, Channel 2 column analog data.		
J3B37	Readout acquisition, A Horizontal, Channel 1 row analog data.		
J3B38	Readout acquisition, A Horizontal, Channel 2 row analog data.		
J4A35	Readout acquisition, B Horizontal, force readout.		
J4A37	Readout acquisition, B Horizontal, Channel 1 column analog data.		
J4A38	Readout acquisition, B Horizontal, Channel 2 column analog data.		
J4B37	Readout acquisition, B Horizontal, Channel 1 row analog data.		
J4B38	Readout acquisition, B Horizontal, Channel 2 row analog data.		
MEM	Memory enable; control signal from MPU to entire system.		

TABLE 2-8 (CONT) Mother Board Signal Definitions

Signal Name	Definition Power Up; signal from power supply.		
PUP			
RBR	Remove Bus Request; from DMA Control Logic circuitry to DMA devices.		
RDSY	Reset Display Interrupt; from MPU to Control Logic.		
RESET	System Reset.		
RNSAR	Run Successive Approximation Register; from Digitizer to Control Logic.		
ROACQEN	Readout Acquire Enable; from MPU to Display system to enable the DMA readout acquire circuitry.		
ROINT	Readout Intensity; from front pane READOUT INTENSITY control to Display board. (Character intensity only).		
ROM	Read Only Memory; address decoded output from the MPU board.		
ROMDLY	Rom Delay; control signal from ROM to MPU to extend memory cycle.		
ROOFF	Readout Off; front-panel switch (closure to ground or open) to Display board.		
ROZAXIS	Readout Z-axis; Z-axis intensity curren drive from Z-Axis board to Display board.		
RTMZOFF	Real Time Z-axis Off; from Display system to Main Interface to turn off rea time analog Z-axis drive.		
R/W	Read/Write; control signal; bus line.		
SPARE	Unused connector pins.		
STADSY	Start Display; from MPU to Contro Logic.		
STPDSY	Stop Display; from MPU to Control Logic.		
TS1-TS10	Time slot lines; 1 to 10.		
VL	Left Vertical readout inhibit.		
VR	Right Vertical readout inhibit.		

Signal Name	Definition		
VSTB	Vertical Strobe; from Digitizer to sampler.		
WAIT	μΡ Waiting; from MPU to GPIB and ROM to signal memory cycle is being extended.		
WE	Write Enable; control signal from MPU to system; bus line.		
WFMINT	Waveform Intensity; from Display board to Z-axis to control stored waveform intensity.		
WFMLT	Waveform Light; from MPU to front panel indicating stored waveform is being displayed.		
XYINH	X-Y Inhibit; from Display board to Main Interface to allow Display system to drive X and Y axis of crt.		
XYON	X and Y axis On; from Control Logic to Horizontal and Vertical Channel Switches to control real time display.		
XYON	Same as XYON, but levels are inverted.		
50Hz	Real Time clock; from display system to MPU		
ЗМНzФ1	Φ1 clock; from MPU to Control Logic, GPIB and Display system.		
3MHzΦ3	Φ3 clock; from MPU to Control Logic		
ЗMHzФ4	Φ4 clock; from MPU to Control Logic.		
10MHzΦ1	Digitizer clock, delayed; from Control Logic to Digitizer.		
10MHzФ2	Digitizer clock, regular; from Control Logic to Digitizer.		
+15V	+15 Volt power; analog supply.		
+12VD	+12 Volt power; digital supply.		
+5V	+5 Volt power; analog supply.		
+5VD	+5 Volt power; digital supply.		
+5VDS	+5 Volt Sense; sense line back to Auxiliary Regulator.		
-5VC	 -5 Volt power; cleaned supply for analog only. 		

C. See

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100° ***

Signal Name	Definition	Signal Name	Definition	
-5VD +5VDS	-5 Volt power; digital supply. +5 Volt Sense; sense line back to	-15VC	-15 Volt reference; from Main Interface to Control Logic, Digitizer, and Display system for reference.	
4	Auxilary Regulator.	50Hz	Real Time clock; from Display system to	
-15V	-15 Volt power; analog supply.		MPU.	

TABLE 2-8 (CONT) Mother Board Signal Definitions



The Auxiliary Regulator converts existing supply voltages to the voltages required for proper operation of the microprocessor and its related digital circuitry. A schematic diagram of the Auxiliary Regulator is given on diagram 38, in Section 7, Diagrams and Circuit Board Illustrations. The schematic is divided by gray shaded lines separating the circuitry into major stages. Subheadings in the following discussion use these stage names to aid in locating and identifying the components and portions of circuitry described.

+12 VOLT REGULATOR

The +12 Volt Regulator stage consists primarily of U40. It is a 3 terminal device that drops the +17 volt supply to a regulated +12 volts.

+5 VOLT REGULATOR

The +5 Volt Regulator consists of U10A, U10B, Q13, Q14, Q15 and their associated components. The voltage divider formed by R4 and R3 is referenced to the regulated +5 volt supply through CR4 and CR3. The ratio of R4 and R3 sets the reference voltage at pin 2 of U10A to +5 volts. The series regulator transistor, Q15, is driven by the emitter followers Q13 and Q14. The output of U10B is normally about +13 volts. Integrated circuit U10A sinks current through CR11 in varying amounts, depending on the voltage sensed at the output through R31, to provide only enough drive current to the base of Q13 to maintain a +5 volt output at the emitter of Q15. Should excessive current be drawn through current sense resistors, R26 and R27, the output of U10B will go

negative, reducing current drive to Q13. This drastically reduces output current at the emitter of Q15, providing current foldback protection, in case a short circuit on the supply line should occur.

-5 VOLT SWITCHING SUPPLY

The -5 Volt Switching Supply is derived from the -17 volt unregulated supply. The voltage divider formed by R72 and R71 provides the reference voltage for the supply (about -5.1 volts) at the base of Q76. Current flowing through Q76 flows through R79 to turn on Q79. Current flows from a 0 volt potential if the supply has not been turned on previously, or from a -5 volt potential if it has been running, from the stored charge in C68 through T66 and Q79 to turn on the switching transistor, Q66. This charges the filtering capacitors C68, C84, C91 and C92 more negative through the series inductors T66, L68 and L84. At the same time, the base of Q76 is pulled more negative, due to the charge transfer through R74 and C74. This serves to reinforce this transition, turning on Q66 harder. Also, at this time, the voltage at the base of Q77 is going negative, as C68 charges through T66. When this charging voltage reaches a condition where the base of Q77 is more negative than the base of Q76, Q76 is turned off. This turns Q79 and Q66 off. Current still flowing through T66 is returned to ground through CR66 and L66. The primary function of the etched circuit board inductor L66, is to prevent reverse recovery transients of CR66 from affecting the ground potential. As the voltage at the base of Q77 goes more positive due to the filter capacitors discharging through the load, a point is reached where the base of Q76 is once more positive with respect to the base of Q77. This once more turns on Q76, Q79 and Q66, and the cycle repeats itself.

EXCESSIVE CURRENT STOP

(a)

The Excessive Current Stop stage turns the -5 volts switching supply off should excessive current be drawn through the circuit.

The output of U86A and thus of U86B is normally about -13 volts, reverse biasing CR96. If excessive current is drawn through the circuit, the dc component of the voltage across L84 becomes large. This voltage is lowpass filtered by R81, R82 and C86 and increases until it is sufficient to drive the output of U86A positive. This transistion drives the output of U86B positive, forward biasing CR96. This turns off Q76, Q79 and Q66, turning off this supply until the output of U86B goes negative again. Components C95 and R95 provide a positive feedback path for the positive transition, latching the output of U86B positive until approximately 1 second after the output of U86A has gone negative. This time is determined by the discharge rate of C95 through R95 and R88. During this time the supply remains off.

FAULT PROTECTION

The Fault Protection circuit consists primarily of VR55 and Q58. It provides protection of the load if an excessive voltage condition should exist in the -5 volt supply. Under a light load condition (<100 mA), the regulation is not as effective and -5 volt supply output may tend more negative. When this happens, VR55 will begin to conduct, turning on Q58, which forces the output of U86B positive, turning off the supply. The load is also protected in case the -5 volt switching regulator should fail. If, for instance, the switching transistor, Q66, should short from emitter to collector, the output voltage will rapidly approach -17 volts. If this happens, the cathode of VR55 will go negative enough to forward bias CR96, putting an error signal on the fault sense line. This immediately turns off all supplies, including the unregulated -17 volts, until the fault is corrected.

MAINTENANCE

This section contains information for performing preventive maintenance, troubleshooting, and corrective maintenance for the 7854 Oscilloscope Mainframe.

PREVENTIVE MAINTENANCE

Preventive maintenance, when performed on a regular basis, can often forestall instrument breakdown and may improve instrument reliability. The severity of the environment to which the instrument is subjected will determine the frequency of maintenance. A convenient time to perform preventive maintenance is preceding electrical adjustment of the instrument.

CABINET PANEL REMOVAL



Dangerous potentials exist at several points throughout this instrument. When the instrument is operated with the covers removed, do not touch exposed connections or components. Some transistors have voltages present on their cases. Disconnect power before cleaning the instrument or replacing parts.

The side, top, and bottom cabinet panels provide protection to personnel from operating potentials present within the instrument. In addition, they reduce radiation of electromagnetic interference from the instrument. The cabinet panels are held in place by slotted fasteners. To remove the panels, turn each fastener counterclockwise a quarter turn with a large screwdriver. Lift the panels away. Operate the instrument with the panels in place to protect the interior from dust.

CLEANING

The 7854 should be cleaned as often as operating conditions require. Accumulation of dirt in the instrument can cause overheating and component breakdown. Dirt on components acts as an insulating blanket and prevents efficient heat dissipation. It also provides an electrical conduction path which may result in instrument failure. The side panels reduce the amount of dust reaching the interior of the instrument. Operation without the panels in place necessitates more frequent cleaning.



Avoid the use of chemical cleaning agents which might damage the plastics used in this instrument. Exercise care when cleaning Hypcon connectors; see cleaning instructions under Hypcon Connectors in this section. Use a nonresidue type of cleaner, preferably isopropyl alcohol, totally denatured ethyl alcohol, or a Freon TF cleaner such as Spray-On #2002. Before using any other type of cleaner, consult your Tektronix Service Center or representative.

EXTERIOR

Loose dust accumulated on the outside of the instrument can be removed with a soft cloth or small brush. The brush is particularly useful for dislodging dirt on and around the front-panel controls. Dirt which remains can be removed with a soft cloth dampened in a mild solution of detergent and water. Abrasive cleaners should not be used.

CRT

Clean the plastic light filter, implosion shield, and the crt faceplate with a soft, lint-free cloth dampened with denatured alcohol.

The crt mesh filter (furnished with Option 3 only) can be cleaned as follows:

1. Hold the mesh filter in a vertical position and brush lightly with a soft, No. 7 water color brush to remove light coatings of dust or lint.

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2. Greasy residues, or dried-on dirt, can be removed with a solution of warm water and a neutral-pH liquid detergent. Use the brush to lightly scrub the filter.

3. Rinse the filter thoroughly in clean water and allow to air dry.

4. If any lint or dirt remains, use clean low-pressure air to remove it. Do not use tweezers or other hard cleaning tools on the filter, as the special finish may be damaged.

5. When not in use, store the mesh filter in a lint-free dust-proof container, such as a plastic bag.

INTERIOR

Cleaning the interior of the instrument should only be occasionally necessary. The best way to clean the interior is to blow off the accumulated dust with dry, low-velocity air (approximately 5 lb/in^2 .) Remove any dirt which remains with a soft brush or a cloth dampened with a mild solution of detergent and water. A cotton-tipped applicator is useful for cleaning in narrow spaces, or for cleaning more delicate circuit components.



Circuit boards and components must be dry before applying power to prevent damage from electrical arcing.

The high-voltage circuits should receive special attention. Excessive dirt in this area may cause high-voltage arcing and result in improper instrument operation.

VISUAL INSPECTION

The 7854 should be inspected occasionally for such defects as broken connections, improperly seated semiconductors, damaged or improperly installed circuit boards, and heat-damaged parts. The corrective procedure for most visible defects is obvious; however, particular care must be taken if heat-damaged parts are found. Overheating usually indicates other trouble in the instrument; therefore, correcting the cause of overheating is important to prevent recurrence of the damage.

SEMICONDUCTOR CHECKS

Periodic checks of semiconductors are not recommended. The best check of semiconductor performance is actual operation in the instrument. More details on semiconductors are given under Troubleshooting later in this section.

PERIODIC ELECTRICAL ADJUSTMENT

To ensure accurate measurements, check the electrical adjustment of this instrument after each 1000 hours of operation, or every six months if used infrequently. In addition, replacement of components may necessitate adjustment of the affected circuits. Complete adjustment instructions are given in Section 4, Performance Check and Adjustment. This procedure can be helpful in localizing certain troubles in the instrument, and in some cases, may correct them.

TROUBLESHOOTING

The following information is provided to facilitate troubleshooting the 7854 Oscilloscope mainframe. Analog and Digitial Troubleshooting Techniques are covered separately, with detailed analog troubleshooting information covered in this manual and detailed digital troubleshooting information included with the specialized digital diagnostic equipment recommended in Digital Troubleshooting Equipment list. Tektronix, Inc. recommends either this diagnostic equipment be purchased or digital failures be referred to the local Tektronix, Inc. Service Center.

The following data in conjunction with information in other sections of this manual will aid in isolating and repairing a defective component or assembly. A good understanding of circuit operation is an invaluable troubleshooting tool. Refer to Section 2, Theory of Operation.

TROUBLESHOOTING AIDS

DIAGRAMS

Complete schematic diagrams are given on the pullout pages in Section 7, Diagrams and Circuit Board Illustrations. The component circuit number and electrical value of each component in this instrument are shown on these diagrams. (See the first page of the Diagrams and Circuit Board Illustrations section for definitions of the reference designators and symbols used to identify components in this instrument.) Important voltages and numbered waveform test points are also shown on the diagrams. Important waveforms, and the numbered test points where they were obtained, are located adjacent to or preceding each diagram. The portions of circuits mounted on circuit boards are enclosed with heavy, solid-black lines.

3-2

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CIRCUIT BOARD ILLUSTRATIONS

To aid in locating circuit boards, an illustration showing the circuit board location appears on the back of the foldout page immediately preceding the schematic diagram. An illustration of the circuit board(s) is also included here to identify the physical location of components and waveform test points that appear on the respective schematic diagram. Each circuit board illustration is arranged in a grid with a locator index to facilitate rapid location of components contained in the corresponding schematic diagram.

SERVICE IDENTIFICATION TAG

A service identification tag (applicable only to the digital portion of the 7854) is affixed to the rear-panel (See Fig. 3-13 later in this section) to inform service personnel of of the applicable version of diagnostic firmware, 067-0961-XX, and signature table, 070-2972-00.

A new Service Identification Tag is issued each time it is determined that the installation of a particular field modification will affect the diagnostic firmware and/or related signature tables.

Parts Notice

When modifications are ordered, a Parts Notice is issued stating the revision of Diagnostic Firmware and Signature tables required. It also lists other modifications, if any, that are required in addition to the one being ordered to support the firmware and signature tables. No signature tables will be provided with field modifications.

TROUBLESHOOTING CHART

A troubleshooting chart is provided in Section 7, Diagrams and Circuit Board Illustrations to aid in locating a defective circuit. The shaded blocks on the Troubleshooting Chart indicate circuit(s) that may cause the indicated malfunction. The circuits listed are discussed in detail in Section 2, Theory of Operation.

TROUBLESHOOTING TREE

Digital troubleshooting trees are provided in the 067-0911-00 service manual to aid in locating a defective circuit in the digital portion of the 7854.

The Troubleshooting Tree directs the technician to the applicable signature table and provides specific instrument-under-test set-up conditions.

ADJUSTMENT AND TEST POINT LOCATIONS

To aid in locating test points and adjustable components called out in the various sections of the Performance Check and Adjustment procedure, Adjustment and Test Point Locations foldout pages are provided in Section 7, Diagrams and Circuit Board Illustrations.

COMPONENT COLOR CODING

The instrument contains brown composition resistors, some metal-film resistors, and some wire-wound resistors. The resistance values of wire-wound resistors are usually printed on the component body. The resistance values of composition resistors and metal-film resistors are color coded on the components using the EIA color code (some metal-film resistors may have the value printed on the body). The color code is read starting with the stripe nearest the end of the resistor. Composition resistors have four stripes, which consist of two significant figures, a multiplier, and a tolerance value (see Fig. 3-1). Metal-film resistors have five stripes consisting of three significant figures, a multiplier, and a tolerance value.

The values of common disc capacitors and small electrolytics are marked on the side of the component body. The white ceramic and epoxy-coated tantalum capacitors used in the instrument are color coded using a modified EIA code (see Fig. 3-1).

The cathode end of glass-encased diodes is indicated by a stripe, a series of stripes, or a dot. The cathode and anode ends of metal-encased diodes can be identified by the diode symbol marked on the body.

SEMICONDUCTOR LEAD CONFIGURATIONS

Lead configurations for semiconductor devices used in the 7854 Oscilloscope are shown in Figure 3-2.

MULTI-PIN CONNECTORS

Pin 1 on multi-pin connectors is designated with a triangle. A triangle, dot or square printed on circuit boards denotes pin 1. When a connection is made to a circuit board, the orientation of the triangle on the multi-pin holder is determined by the index (triangle, dot or square) printed on the circuit board (see Fig. 3-3). Some multi-pin connectors are keyed with a plastic pin that protrudes through a hole on the circuit board. Proper mating with the multi-pin connector and the pin(s) on the circuit board with the hole on the circuit board.

Some multi-pin connectors are equipped with a locking mechanism to more readily secure the connector to the circuit board. To remove these connectors, grasp the connector body and pull perpendicular to the circuit board. These connectors should not be removed by pulling on the wire leads; this causes the locking mechanism to clamp onto the circuit board pins.

ANALOG TROUBLESHOOTING EQUIPMENT

The following equipment is useful for troubleshooting the analog circuitry of the 7854 Oscilloscope mainframe:

1. Analog Test Board (067-0912-00)

The 7854 Analog Test Board (067-0912-00) is used to isolate the analog circuitry from the digital portion of the 7854 Oscilloscope for testing, calibrating or troubleshooting. The Analog Test Board consists of a single circuit board and a ten-conductor ribbon cable with connectors at either end.

(2)

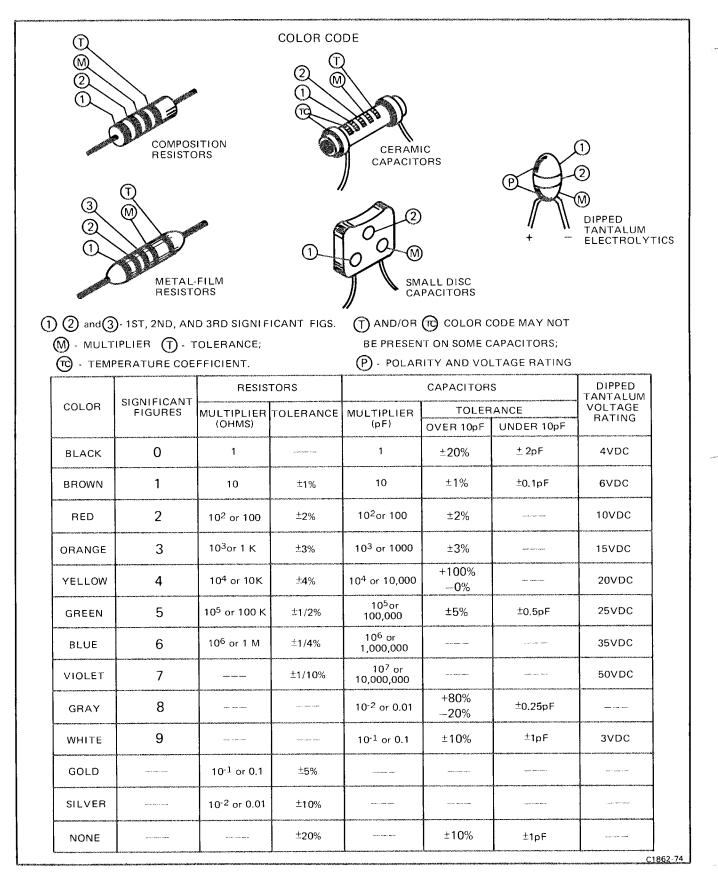


Figure 3-1. Color code for resistors and capacitors.

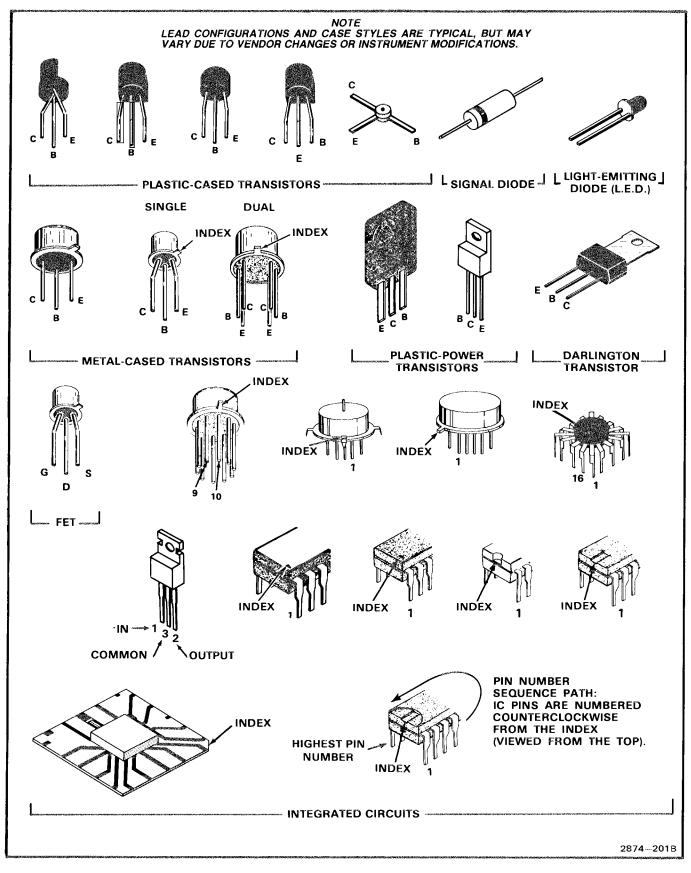


Figure 3-2. Semiconductor lead configurations.

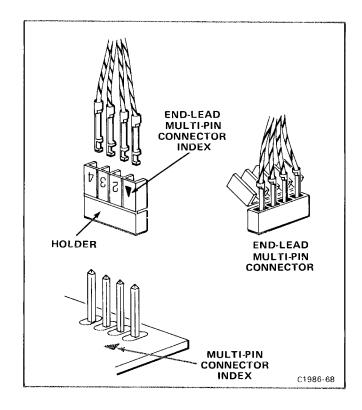


Figure 3-3. Orientation of multi-pin connector holders.

The Analog Test Board plugs into the A29-Display board slots, P109 and P110, of the 7854 digital backplane. The ten-conductor ribbon cable connects to P9 of the A2-Mode Switch board. See Figure 3-4.

All digital subsystem boards must be removed from the 7854 digital backplane to avoid bus contention and to assure proper operation. Refer to Figure 7-1 in the foldout section for circuit board locations and Chassis-Mounted Plug-on Boards Removal later in this section. The principle function of the Analog Test Board is to monitor the 9 plug-in mode switches and, depending on the state of the Mode Switches, generate control signals for the mainframe Logic board, (A14). These control signals are normally generated within the digital backplane. The Test Board also allows the use of an 067-0587-XX Calibration Fixture for test and calibration of the vertical channel switch circuitry (A19).

To install the Analog Test Board (067-0912-00) proceed with the following instructions:

- a. Turn off the power to the 7854.
- b. Remove the protective covers.

c. Separate the Display and Acquisition units of the 7854. Refer to Figure 3-12 and Display Unit Kickstand text.

d. Remove the digital circuit board support.

e. Remove all plug-in chassis mounted boards (A25-Digitizer, A26-Control Logic, A27-MPU, A28-RAM, A29-Display, A30-GPIB and A31-ROM).

f. Install the Analog Test Card in the slot that housed the A29-Display board.

- g. Connect the cables as indicated in Figure 3-4.
- 2. Transistor Tester

Description: Dynamic-type tester.

Purpose: Test semiconductors.

Recommended type: TEKTRONIX 577/177 Curve Tracer, TEKTRONIX 576 Curve Tracer, 7CT1N Curve Tracer plug-in unit and a 7000-series oscilloscope system, or a 5CT1N Curve Tracer plug-in unit and a 5000-series oscilloscope system.

3. Digital Multimeter

Description: 10 megohm input impedance and 0 to 1 kilovolt range, ac and dc; ohmmeter, accuracy, within 0.1%. Test probes must be insulated to prevent accidental shorting.

Purpose: Check voltages and resistances.

Recommended type: TEKTRONIX DM 501 Digital Multimeter.

4. Test Oscilloscope with Plug-in's.

Description: Frequency response, dc to 100 megahertz minimum; deflection factor, 5 millivolts to 5 volts/division and 1 milliampere to 1 ampere/division. A 10X, 10-megohm voltage probe should be used to reduce circuit loading for voltage measurements. For current waveforms, use a Tektronix P6021 Current Probe with passive termination, or the equivalent.

Purpose: Check operating waveforms.

Recommended type: Refer to the Tektronix Products catalog for applicable oscilloscope system.

5. Variable Autotransformer

Description: Output variable from 0 to 140 volts, 10 amperes minimum rating. Must have three-wire power cord, plug, and receptacle.

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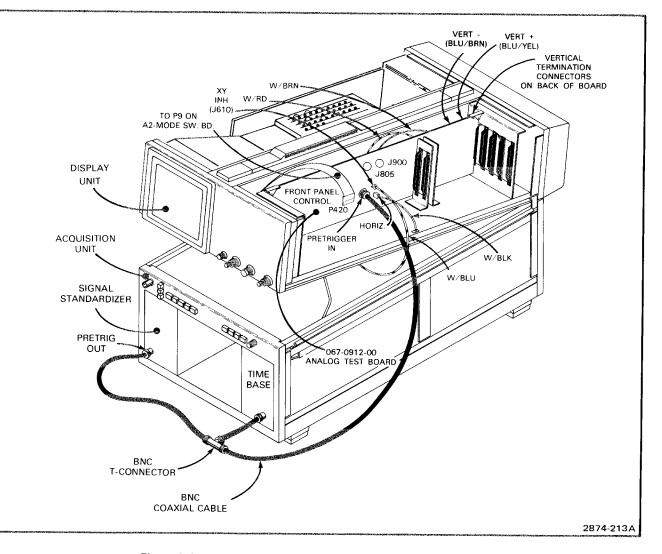


Figure 3-4. Analog Test Board (067-0912-00) interconnections.

Purpose: Vary input line voltage when troubleshooting in the power-supply unit.

Recommended type: General Radio W10MT3W Variac Autotransformer.

6. Isolation Transformer

Description: 1:1 turns ratio, 500 volt-amperes minimum rating, 50-60 cycle. Must have three-wire power cord, plug, and receptacle with ground connection carried through from input to output.

Purpose: To isolate 7854 from line potential when troubleshooting power supply.

Recommended type: Stancor #P6298 (for 115-volt line only) modified to include three-wire power cord, plug, and receptacle.

DIGITAL TROUBLESHOOTING EQUIPMENT

The following equipment is necessary for troubleshooting the Digital Section of the 7854 Oscilloscope. (Refer to Fig. 3-5 for test equipment interconnection information).

1. 7854 Diagnostic Test Interface (067-0911-00)

Description/purpose: The 067-0911-00 serves as the interface between the Microlab 1 mainframe and the digital portion of the 7854 Oscilloscope. It allows memory and I/O devices in the Microlab 1 and in the 067-0911-00 to be added to the 7854 digital bus in order to allow diagnostic monitoring and control of the digital portion of the 7854 Oscilloscope.

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Description/purpose: Provides power for the service

2. Tektronix Microlab I Mainframe (067-0892-00)

package and, in conjunction with an external computer (RS232 compatible) terminal provides control of the Diagnostic Memory Board (067-0961-XX).

3. 7854 Diagnostic Memory Board (067-0961-XX)

Description/purpose: Contains a portion of the service package firmware, as well as specific troubleshooting stimuli and diagnostics particular to the 7854 for which it's designed. (See Service Identification Tag)

4. Data Analyzer

Description/purpose: Capable of analyzing parallel signal timing, status of serial and parallel data transmissions and signatures.

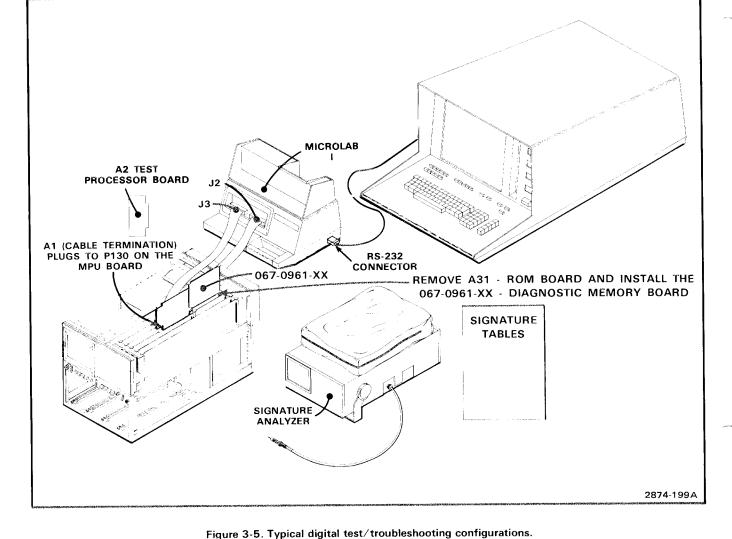
Recommended type: Sony/Tektronix 308 Data Analyzer

5. 7854 Signature Tables (070-2972-00)

Description/purpose: The "7854 Signature Tables" is a complete and cumulative (historical) document of the firmware in the digital portion of the 7854. Each signature table contained in the document is assigned a 2 digit number that is referred to by the Service Identification Tag affixed to the rear panel.

The "7854 Signature Tables" is part numbered 070-2972-00; the suffix 00, will increment sequentially each time another table is added. Individual signature tables will not be available.

A chart, in matrix format, is included to correlate signature versions with instrument and board versions.



6. RS232 Compatible Terminal

Description/purpose: In conjunction with the Microlab I, provides control of the Diagnostic Memory Board (067-0961-XX), the A2-Test Processor Board, and the Diagnostic Test Interface (067-0911-00).

7. Extender board (067-0913-00)

Description/purpose: Used with the A30-GPIB and A31-ROM boards (44 pin).

- 8. Extender board (067-0914-00)
 - **Description/purpose:** Used with the A27-MPU and A28-RAM boards (80 pin).
- 9. Extender board (067-0915-00)

Description/purpose: Used with the A26-Control logic and A29-Display boards (124 pin).

NOTE

The combination of the 067-0914-00 (80 pin) and the 067-0913-00 (44 pin) extender boards may be used in place of the 067-0915-00 (124 pin) extender board when a lower circuit board height is required.

- Step 2: All positions of the VERTICAL and HORIZONTAL MODE switches, all INTENSITY indicators, and all red front panel and Waveform Calculator indicators will now light.
- Step 3: A fault condition found through any of the four tests is indicated with the lights of the VERTICAL and HORIZONTAL MODE switches. Fault condition codes are listed in Table 3-1.

If a fault code occurs, press any button of the VERTICAL or HORIZONTAL MODE switches and the self-testing will continue. Then refer to the Performance Check Procedure in the Calibration section of the 7854 Service Manual to verify the electrical performance of the instrument.

TABLE 3-1 Self-Test Fault Codes

VERTICAL MODE Indicator Status	HORIZONTAL MODE Indicator Status	Circuitry With Fault
All lights on.	B light on.	RAM
All lights on.	CHOP light on.	ROM
All lights on.	CHOP and B lights on.	Real time Clock
All lights on.	ALT light on.	Display

DIGITAL TROUBLESHOOTING TECHNIQUES

SELF TEST

When the 7854 is turned on (without memory backup power applied), the digital processor runs four, selfchecking tests. Although these tests are not all-inclusive, they indicate if major portions of the processor are properly working. The self-test sequence outlined below begins when power is applied to the 7854.

Step 1: When power is applied the following indicators will light: POWER, selected positions of the A and B TRIGGER SOURCE switches, and all selected indicators on the plug-in units. The following indicators will remain off for approximately three seconds after power-up: all positions of the VERTICAL and HORIZONTAL MODE switches, all intensity indicators, and all red, front panel (measurement keyboard) and Waveform Calculator indicators. Troubleshooting procedures for each board in the waveform processing portion (digital backplane) of the 7854 can be found in the 7854 Diagnostic Troubleshooting Manual Package.

Step 4: Successful completion of the self tests is indicated by the issuance of the audible warning tone (if the rear panel AUDIBLE WARNING switch is ON), and the extinguishing of all red indicators, the S and A Intensity indicators, all VERTICAL MODE lights except LEFT, and all HORIZONTAL MODE switch lights except B. In addition, if the READOUT intensity control is set to at least midrange, the message **SELF TEST COMPLETE**, will be displayed on the crt.

PRESET CONDITIONS

After successful completion of the processor self tests, several parameters of the 7854 are set to predetermined conditions. These power-up conditions are:

CRT DISPLAY mode Set to SCOPE Program Mode Set to EXECUTE Program Memory Cleared VERTICAL MODE Set to LEFT HORIZONTAL MODE Set to B Stored Waveform Display Not displayed; set to VECTors
P/W (Points/Waveform) Set to 512
Stack RegistersCleared to 0
OPW (Operational Waveform) Set to 0
All waveform memory pointsSet to the zero value
(center horizontal graticule line)
VZR (Vertical Zero Reference Set to 0 (all
waveform memories)
Vertical Scale FactorSet to 1 (all
waveform memories)
Vertical Scale Factor UnitSet to V (all
waveform memories)
Horizontal Scale Factor Set to 1 (all
waveform memories)
Horizontal Scale Factor Unit Set to S (all
waveform memories)
Constant RegistersSet to 0
TTL OutputSet HIGH
rsv control flagsSet ON

ANALOG TROUBLESHOOTING TECHNIQUES

This troubleshooting procedure is arranged to check the simple trouble possibilities before proceeding with extensive troubleshooting. The first few checks ensure proper connection, operation, and adjustment. If the trouble is not located by these checks, the remaining steps aid in locating the defective component. When the defective component is located, replace it using the replacement procedures given under Corrective Maintenance.

1. CHECK CONTROL SETTINGS

Incorrect control settings can indicate a trouble that does not exist. If there is any question about the correct function or operation of any control on the 7854, refer to the 7854 Operators Manual.

2. CHECK ASSOCIATED EQUIPMENT

Before proceeding with troubleshooting, check that the equipment used with this instrument is operating correctly. Also, check that the input signals are properly connected and that the interconnecting cables are not defective. Check the line-voltage source.

3. VISUAL CHECK

Visually check that portion of the instrument in which the trouble is located. Many troubles can be found by visible indications, such as unsoldered connections, loose cable connections, broken wires, damaged circuit boards, and damaged components.

4. CHECK INSTRUMENT ADJUSTMENT

Check the electrical adjustment of this instrument, or of the affected circuit if the trouble appears in one circuit. The apparent trouble may only be a result of misadjustment. Complete adjustment instructions are given in Section 4, Calibration.

5. ISOLATE TROUBLE TO A CIRCUIT

To isolate trouble to a particular circuit, note the trouble symptom. The symptom often identifies the circuit in which the trouble is located. When trouble symptoms appear in more than one circuit, check the affected circuits by taking voltage and waveform measurements. Also check for the correct output signals at the front- and rear-panel output connectors with a test oscilloscope. If the signal is correct, the circuit is working correctly up to that point.

Incorrect operation of all circuits often indicates trouble in the power supply. However, a defective component elsewhere in the instrument can appear as a powersupply trouble and may also affect the operation of other circuits. If incorrect operation of the power supplies is suspected, first, check for correct voltages of the individual supplies, then, refer to Troubleshooting High-Efficiency Power-Supply Unit given later in this section.

The 7854 Troubleshooting Chart in the Diagrams and Circuit Board Illustrations Section 7, provides a guide for locating defective circuits.

After the defective circuit has been located, proceed with steps 6 and 7 to locate the defective component(s).

6. CHECK VOLTAGES AND WAVEFORMS

Often the defective component can be located by checking for the correct voltages or waveforms in the circuit. Typical voltages and waveforms are given in Section 7, Diagrams and Circuit Board Illustrations.

NOTE

Voltages and waveforms given in Section 7, Diagrams and Circuit Board Illustrations, are not absolute and may vary slightly between 7854 Oscilloscope mainframes. To obtain operating conditions similar to those used to take these readings, see the appropriate schematic.

7. CHECK INDIVIDUAL COMPONENTS



Most transistors and integrated circuits are soldered in and thus difficult to remove without damaging the circuit board and/or component.

The following procedures describe methods of checking individual components in the 7854. Components which are soldered in place are best checked by first disconnecting one end. This isolates the measurement from the effects of surrounding circuitry.



To avoid electric-shock hazard, always disconnect the 7854 from the power source before removing or replacing components.

Fuses

Check for open fuses by checking continuity with an ohmmeter.

Transistors

A good check of transistor operation is actual performance under operating conditions. A transistor can most effectively be checked by substituting a new component for it (or one which has been previously checked). However, be sure that circuit conditions are not such that a replacement transistor might also be damaged. If substitute transistors are not available, use a dynamic tester. Static-type testers are not recommended, since they do not check operation under simulated operating conditions.

Integrated Circuits

Integrated circuits can be checked with a voltmeter, test oscilloscope, or by direct substitution. A good understanding of the circuit operation is essential to troubleshooting circuits using integrated circuits. In addition, operating waveforms, logic levels, and other operating information for the integrated ciruits are given in Section 2, Theory of Operation and Section 7, Diagrams and Circuit Board Illustrations. Use care when checking voltages and waveforms around the integrated circuits so that adjacent leads are not shorted together. A convenient means of clipping a test probe to the in-line, multi-pin integrated circuits is with an integrated-circuit test clip. This device also doubles as an integrated-circuit extraction tool.

Diodes

A diode can be checked for an open or shorted condition by measuring the resistance between terminals with an ohmmeter on a scale having a low internal source current, such as the R X 1k scale. The resistance should be very high in one direction and very low when the meter leads are reversed.



When checking diodes, do not use an ohmmeter scale that has a high internal current, since high currents may damage the diodes under test.

Resistors

Check the resistors with an ohmmeter. Resistor tolerances are given in Section 6, Replaceable Electrical Parts. Normally, resistors do not need to be replaced unless the measured value varies widely from the specified value.

Capacitors

A leaky or shorted capacitor can best be detected by checking resistance with an ohmmeter on the highest scale. Do not exceed the voltage rating of the capacitor. The resistance reading should be high after initial charge of the capacitor. An open capacitor can best be detected with a capacitance meter or by checking if the capacitor passes ac signals.

8. REPAIR AND ADJUST THE CIRCUIT

If any defective parts are located, follow the replacement procedures given under Component Replacement in this section. Check the performance of any circuit that has been repaired or that has had any electrical components replaced. Adjustment of the circuit may be necessary.

TROUBLESHOOTING THE HIGH-EFFICIENCY POWER-SUPPLY UNIT

GENERAL

The following information is provided to facilitate troubleshooting the high-efficiency power-supply unit. Information contained in other sections of this manual should be used in conjunction with this procedure to aid in locating a defective component. An understanding of the circuit operation is valuable in locating troubles. See Section 2, Theory of Operation, for this information. Specifications for the troubleshooting equipment referred to in this procedure are given earlier in this section under Troubleshooting Equipment.



Extreme caution must be used when troubleshooting in the power-supply unit due to the line voltage and the high-voltage/highcurrent potentials present in the unit.

When a fault condition occurs, which is not of sufficient magnitude to open the line fuse, power-supply protection circuitry will cause the inverter to operate in a pulse mode. In this mode the inverter will turn on for a short period of time, and then turn off for a longer period of time. This cycle repeats until the malfunction is corrected. This pulse mode causes either a "ticking" or a "chirping" sound. Whenever either of these sounds is heard, turn off the 7854 and proceed with the Preliminary Procedure given below.

PRELIMINARY PROCEDURE

WARNING

To avoid electric shock, always disconnect the instrument from the power source before removing or replacing components or plug-in units.

1. Remove all plug-in units from the mainframe.

2. Set the CONTROL ILLUMINATION switch on the rear panel to the OFF position, and the GRAT ILLUM switch on the front panel to the fully-clockwise position.

3. Remove the power-supply unit from the mainframe following the procedure given later in this section under Component Removal and Replacement.

4. Connect the power-cord plug of the 7854 to the output of a variable autotransformer which is set for 115 volts. Connect the autotransformer to an isolation transformer and plug the isolation transformer into a 115-volt power source.

5. Push the 7854 POWER button in (to turn the instrument on) and note the trouble symptoms.

6. Turn the 7854 off and proceed to the appropriate step in the Troubleshooting Procedure as indicated by the Trouble Symptoms column in Table 3-2.

TROUBLESHOOTING PROCEDURE

Step A: Check Line Fuse

To check the line fuse, perform the following procedure:

1. Check the line fuse (F10), located on the rear panel of the power-supply unit, for continuity and proper rating as given in Section 6, Replaceable Electrical Parts.

2. If the line fuse is open, replace with a new one of proper rating.

Step B: Isolate Malfunction from the Mainframe Circuitry

To isolate the malfunction perform the following procedure:

Trouble Sympton	Procedure	Proceed to Troubleshooting Step
7854 inoperative; no pulse mode.	1. Check line fuse.	A
7854 inoperative; no pulse mode;	1. Check line input circuit.	D
line fuse open.	2. Check LV rectifier circuit.	Н
	3. Check inverter circuit.	G
7854 inoperative; no pulse mode; line fuse normal.	1. Check inverter circuit.	G
7854 operating in the pulse mode.	1. Isolate malfunction from the mainframe circuitry	В
	2. Check pre-regulated power supplies.	с
	3. Check crt and high-voltage circuits.	E
	4. Check inverter control circuit.	F
	5. Check inverter cirucit.	G

TABLE 3-2 Recommended Power Supply Troubleshooting Sequence

WARNING

Use extreme caution when troubleshooting in the power-supply unit, to avoid electric shock. Stored dc potentials on the A23-Inverter circuit board remain long after the instrument is disconnected from the power source. Verify that the power-cord plug is disconnected and that the line storage capacitors (C16 and C17) are completely discharged before attempting any repairs or ohmic measurements. (A warning-indicator neon bulb, located on the A23-Inverter board, flashes when this stored voltage exceeds about 80 volts. However, simply because the neon bulb is not flashing does not mean that the capacitors are fully discharged.)

1. Remove the 7854 power-cord plug from the power source.

2. Remove the protective cover from the power-supply unit following the procedure under Access to Components in the Power-Supply Unit.

3. Manually discharge the line storage capacitors using the procedure given later in this section, under Access to Components in the Power-Supply Unit.

4. Check the resistance of the power supplies at the test points given in Table 3-3.

NOTE

Place the Common lead of the ohmmeter to ground when measuring power-supply resistance.

TABLE 3-3

Power Supply Test Point	Ohmeter Scale	Typical Resistance Reading
+130 V	20 K	7.12 K
+50 V	20 K	2.65 K
+15 V	20 K	0.04 K
+5 V	2 K	0.004 K
-5 V	2 К	0.068 K
–15 V	2 K	0.05 K
–50 V	2 K	0.57 K

5. If any of the resistance readings are significantly lower than that listed, remove the electrical connections between the mainframe and the power-supply unit. Disconnect P17, P82, P83 on the A25-Low-Voltage Regulator board. This isolates the circuitry in the mainframe from the power-supply unit. Recheck the resistance. If the readings remain low, the malfunction is located within the mainframe circuits. If the readings increase to normal or above, the malfunction is in the power supplies.

6. Replace all electrical connections that were disconnected in part 5.

Step C: Check the Pre-Regulated Power Supplies

To check the pre-regulated power supplies, perform the following procedure:

1. Connect a 10X voltage probe from the test oscilloscope to resistor R84 on the A12-Control Rectifier board. Set the test oscilloscope vertical deflection factor as necessary for an on-screen display; set the horizontal sweep rate for 2 milliseconds/division.

2. Set the variable autotransformer for 115 volts. Connect the 7854 power-cord plug to the variable autotransformer; turn on the 7854.

3. Compare the waveform on the test oscilloscope to those shown in Figure 3-6. If the waveform resembles that of Figure 3-6A, proceed to Step E of this procedure. If it resembles that of Figure 3-6B, proceed with part 4 of this step.

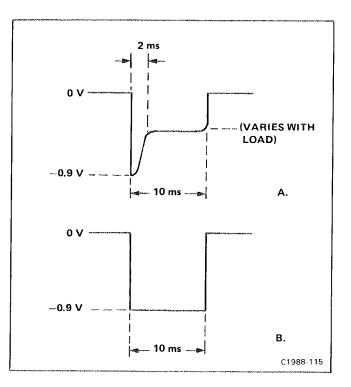


Figure 3-6. Current sensing waveform at R84.

4. Remove the 10X voltage probe from R84. Set the test oscilloscope vertical coupling to dc and the horizontal sweep rate to 10 milliseconds/division.

5. Connect the 10X probe to each power supply at the test points given in Table 3-4. Note the polarity, amplitude, and shape of the waveform present at each test point. (Adjust the vertical deflection factor of the test oscilloscope as necessary to maintain an on-screen display.)

Pre-Regulated Power Supply	Test Point Located on Control Rectifier Board	
+108 V	TP126	
+54 V	Pin 4 of P52	
+17 V	Pin 6 of P52	
-17 V	Pin 2 of P52	
+8 V	Pin 7 of P50	
-54 V	Pin 3 of P52	
+5 V Lights	Pin 10 of P82	

	TABLE	3-4	
Burst	Voltage	Test	Points

NOTE

Look for a power supply where the burst voltage is very low in relation to the specified supply voltage.

6. When a low supply voltage is found, disconnect the 7854 from the power source and discharge the line storage capacitors (Fig. 3-7) following the procedure given under Access to Components in the Power-Supply Unit. Check for shorted components in the suspected power supply; also check the filter capacitors for leakage.

Step D: Check Line Input Circuit

To check the input circuit, perform the following procedure:

1. Disconnect the 7854 from the variable autotransformer and discharge the line storage capacitors (Fig. 3-7) following the procedure given under Access to Components in the Power-Supply Unit.

2. Replace the line fuse.

3. Check diode bridge CR15 on the A23-Inverter board and the associated line input circuit for a shorted component. If the circuit appears normal, connect the power-cord to the variable autotransformer.

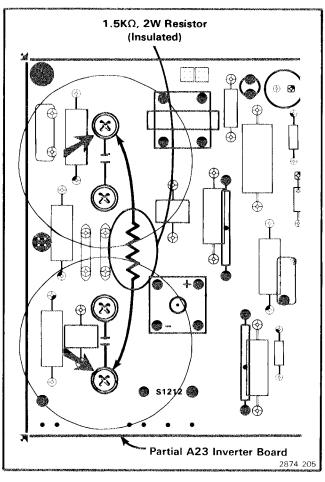


Figure 3-7. Location of screws used for discharging line storage capacitors.

4. Attach the test probe from the digital multimeter to one of the screws used to discharge C16 and C17 (see Fig. 3-7). Connect the other test lead to ground. Set the variable autotransformer for 20 volts and turn the 7854 on.

5. Check for a dc voltage on the digital multimeter of approximately 27 volts. Move the test probe to the other capacitor screw. Check for a dc voltage which is both equal and opposite in polarity, from the previous voltage. (This checks the condition of the line storage capacitors.)

Step E: Check Crt and High-Voltage Circuit

To check the crt circuitry, perform the following procedure:

1. Disconnect the 7854 from the power source and discharge the line storage capacitors following the procedure given under Access to Components in the Power-Supply Unit.

2. Remove multi-lead cable P40 from the A12-Control Rectifier board.

3. Set the variable autotransformer for 115 volts. Connect the 7854 power-cord plug to the variable autotransformer; turn the 7854 on.

4. Check for stable operation (no pulse mode) of the power supplies. If the power supplies operate properly, a crt failure or malfunction in the high-voltage circuitry is indicated.

Step F: Check the Inverter Control Circuit

To check the inverter control circuit, perform the following procedure:

1. Disconnect the 7854 from the power source and discharge the line storage capacitors following the procedure given under Access to Components in the Power-Supply Unit.

2. Remove Q54 from the A12-Control Rectifier board.

3. Connect the 7854 power-cord plug to the variable autotransformer. Turn the 7854 on and apply 115 volts from the variable autotransformer. If the power supplies stabilize, check the inverter control circuit for a malfunction. If the 7854 continues in pulse mode, proceed to part 4 of this step.

4. Repeat part 1 of this step. Then remove Q52 from the A12-Control Rectifier board.

5. Set the variable autotransformer to 0 volts. Connect the 7854 power-cord plug to the variable autotransformer. Turn the 7854 on. While monitoring the +108 V test point on the A25-Low-Voltage Regulator board with a voltmeter, slowly increase the output of the variable autotransformer until the voltmeter just reads +108 volts.

NOTE

If the variable transformer's output is increased past the point where the voltmeter just reaches a reading of +108 volts, the 7854 will switch to pulse mode.

6. If the power supplies stabilize, check U75 and the inverter control circuit for a malfunction. If the 7854 continues in the pulse mode, proceed to Step G of this procedure.

Step G: Check Inverter Circuit

To check the inverter circuit, perform the following procedure:

1. Disconnect the 7854 power-cord plug from the power source and discharge the line storage capacitors following the procedure given under Access to Components in the Power-Supply Unit. 2. Remove Q34, Q40, CR34, and CR41 on the A23-Inverter board and check the characteristics of each with a curve tracer. Install the checked or replaced components in the A23-Inverter board. Replace the line fuse, if it is open.

3. If the faulty component was not found, check Q43, Q45 and VR45 with a curve tracer.

NOTE

A shift in the zener voltage of VR45 can cause erratic operation of the inverter circuit.

4. If the 7854 continues in the pulse mode or, continues to below line fuses, check the current waveform through T30. To do this, first repeat part 1 of this step. Then connect a current probe from the test oscilloscope to the gray lead that passes through toroid transformer T30. Set the test oscilloscope for a vertical deflection factor of about 1 volt/division and a horizontal sweep rate of 2 milliseconds/division. Connect the 7854 power-cord plug to the variable transformer which is set for 0 volt. Turn the 7854 on and slowly increase the variable autotransformer's output to about 60 volts. Check for a burst waveform on the test oscilloscope (similar to that shown in Fig. 3-8).

NOTE

The burst waveform indicates that the inverter circuit is attempting to start. If no burst waveform occurs, proceed to part 6; if a burst waveform is obtained, proceed to part 5.

5. If a burst waveform was obtained in part 4 above, check for stable inverter operation when the line input voltage is increased to about 85 volts. Figure 3-9 shows the current waveform at T30 for normal inverter operation at a line source of 115 volts. (NOTE: The test oscilloscope horizontal sweep rate has been changed to about 50 microseconds/division for Fig. 3-9.)

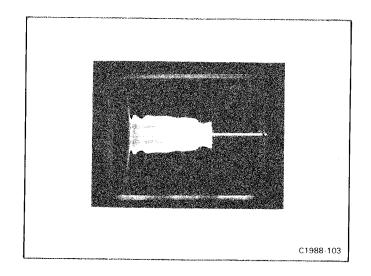


Figure 3-8. Current waveform of T30 showing burst operation at line voltage of about 60 volts.

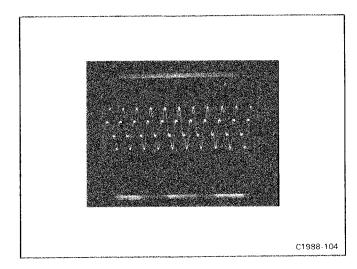


Figure 3-9. Current waveform at T30 for normal inverter operation at line voltage of 115 volts.

6. If no burst waveform occurred in part 4, repeat part 1 of this step. Then remove the current probe from the 7854 and the test oscilloscope. Connect a 10X voltage probe from the test oscilloscope to TP1234 on the A23-Inverter board. Set the variable autotransformer for 20 volts and check for a filtered line waveform which is centered about 0 volt. (see Fig. 3-10). If the waveform is not centered check Q46, CR32, CR40, CR49, and CR45 for shorts or leakage.

Step H: Check LV Rectifier Circuit

1. Disconnect the 7854 power-cord plug from the power source and discharge the line storage capacitors in the power-supply unit, following the procedure given under Access to Components in the Power-Supply Unit. Inspect the A12-Control Rectifier board and connecting cables for shorts and damaged components. 2. Remove dual diode CR51 from the A12-Control Rectifier board and check with a curve tracer. Re-install tested or replaced parts, making certain that the case is not shorted to the heat sink.

3. Lift one leg each of CR40, CR41, CR42, and CR43 and check with a curve tracer. Reconnect tested or replaced parts.

4. Lift one leg each of CR30, CR31, CR32, CR33, CR50, and CR53 and check with a curve tracer. Reconnect tested or replaced parts.

5. Check the electrolytic capacitors which filter the supplies, including C54 (under the board) for shorts.

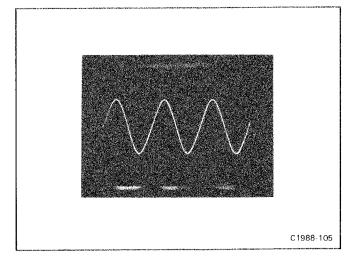


Figure 3-10. Waveform at TP34 on the A23-Inverter board with the line voltage at about 20 volts.

CORRECTIVE MAINTENANCE

Corrective maintenance consists of component replacement and instrument repair. Special techniques required to replace components in the 7854 Oscilloscope Mainframe are given here.

OBTAINING REPLACEMENT PARTS

Most electrical and mechanical part replacements for the 7854 can be obtained through your Tektronix Field Office or representative. However, many of the standard electronic components can be obtained locally.

Before purchasing a part from a source other than Tektronix, Inc., check the parts list for value, tolerance, rating, and description. Some parts are manufactured or selected by Tektronix, Inc. to satisfy particular requirements, or are manufactured for Tektronix, Inc. to our specifications.

NOTE

When selecting replacement parts, remember that the physical size and shape of a component may affect its performance in the instrument. All replacement parts should be direct replacements unless you know that a different component will not adversely affect instrument performance.

When ordering replacement parts from Tektronix, Inc., include the following information:

1. Instrument type.

2. Instrument serial number.

3. A description of the part (if electrical, include circuit number, if crt, also include all data on crt tag).

4. Tektronix part number.

When soldering on circuit boards or small wiring, use only a 15-watt, pencil-type soldering iron. A higher wattage soldering iron can cause the etched circuit wiring to separate from the board base material and melt the insulation from small wiring. Always keep the soldering-iron tip properly tinned to ensure the best heat transfer to the solder joint. Apply only enough heat to make a good solder joint. To protect heat-sensitive components, hold the component lead with a pair of long-nose pliers between the component body and the solder joint.

The following technique should be used to replace a component on any of the circuit boards:

1. Touch the vacuum desoldering tool to the lead at the solder connection. Never place the iron directly on the board, as this may damage the board.

SOLDERING TECHNIQUES



To avoid electric-shock hazard, disconnect the instrument from the power source before soldering.

The reliability and accuracy of this instrument can be maintained only if proper soldering techniques are used when repairing or replacing parts.

The desoldering and removal of parts is especially critical and should be done only with a vacuum solder extractor, further, one approved by a Tektronix Inc., Service Center.

Use wire solder with rosin core, 63% tin, 37% lead. Contact your local Tektronix Inc. representative or field office for approved solders.

Several of the circuit boards in this instrument have as many as eight (8) layers. Conductive paths between the top and bottom board layers may connect with one or any number of inner layers. Once this inner conductive path is broken (Due mainly to poor soldering practices) between the top and bottom layer, the board is unuseable and must be replaced. Damage can void warranty.



Only an experienced maintenance person, proficient in the use of vacuum type desoldering equipment, should attempt repair of any board in this instrument. The following multi-layer board assemblies are partic ilarly susceptable to heat damage: A8, A11, A12, A13, A14, A26, A27, A28, A29. Damage can void warranty.

@

NOTE

Some components are difficult to remove from the circuit boards due to a bend placed in each lead during machine insertion of the component. The purpose of the bent leads is to hold the component in position during a flow-solder manufacturing process which solders all components at once. To make removal of machine inserted components easier, straighten the component leads on the back of the circuit board, using a small screwdriver or pliers.

When removing multi-pin components; i.e., IC's do not heat adjacent conductors consecutively (see Fig. 3-11). Allow a moment for the circuit board to cool before proceeding to the next pin.

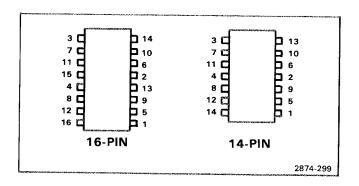


Figure 3-11. Recommended desoldering sequence for multipin devices.



Excessive heat can cause the etched circuit wiring to separate from the board base material.

Never allow the solder extractor to remain on the board for more than three (3) seconds. Solder wick, spring-actuated or squeeze-bulb solder suckers, and heat blocks (for multi-pin components) must not be used. Damage can void warranty.

Do not allow solder or solder flux to flow under printed circuit board switches. The printed circuit board is an integral part of the switch and intermittent operation can occur if contaminated.

Soldering in the area of Hypcon connectors requires special precautions. See the discussion of Hypcon connectors under Semiconductors in this section.

2. Bend the leads of the replacement components to fit the holes in the circuit board. If the component is replaced while the board is mounted in the instrument, cut the leads so they will just protrude through the board. Insert the leads into the holes in the board so that the component is firmly seated against the board, or as originally positioned.

3. Touch the iron to the connection and apply enough solder to make a firm solder joint.

4. Cut off any excess lead protruding through the board (if not clipped in step 2).

5. Clean the area around the solder connection with a flux removing solvent. Be careful not to remove information printed on the circuit board.

The exploded-view drawings associated with the Replaceable Mechanical Parts list (located at the rear of this manual) may be helpful in the removal or disassembly of individual components or sub-assemblies.

DISPLAY UNIT KICKSTAND

The Display unit of the 7854 Oscilloscope mainframe is equipped with a kickstand to ease access to interior components of the instrument (see Fig. 3-12). To use the kickstand feature, disconnect the power-cord plug from the power source. Then remove the side and top panels as described under Cabinet Panel Removal. Remove the two frame coupling screws on each side of the 7854 This will allow the upper portion of the frame coupling to be pivoted outward. The two units can now be separated at the front of the instrument (the kickstand will hold the units apart). To assemble the units, disengage the kickstand and reverse the disassembly procedure.

POWER-SUPPLY UNIT REMOVAL

The power-supply unit can be slid out the rear of the 7854 to gain better access to the A14-Logic board, A13-Trigger Amplifier board, A22-Low-Voltage Regulator board, or for power-supply maintenance and troubleshooting. To remove the power-supply unit from the mainframe, first remove the four screws which hold the power-supply unit to the rear frame of the instrument (see Fig. 3-13). Slide the power-supply unit out of the mainframe until it can be set down on the work surface (be sure to guide the interconnecting cables so they do not catch on other parts of the instrument). The powersupply unit remains electrically connected to the rest of the instrument in this position, allowing for troubleshooting.

COMPONENT REMOVAL AND REPLACEMENT

WARNING

To avoid electric-shock hazard, always disconnect the instrument from the power source before removing or replacing components or plug-in units.

POWER SUPPLY UNIT INSTALLATION

NOTE

Proper interconnecting cable positioning is important when installing the Power Supply Unit in the mainframe. The 2 ribbon cables (from P82 and P83 on the A22-Low Voltage Regulator board) must be dressed away from the 2 coaxial cables (from P40 on the A12-Control Rectifier board).

Position the mainframe on its right side and remove the bottom panel to gain access to the interconnecting cables.

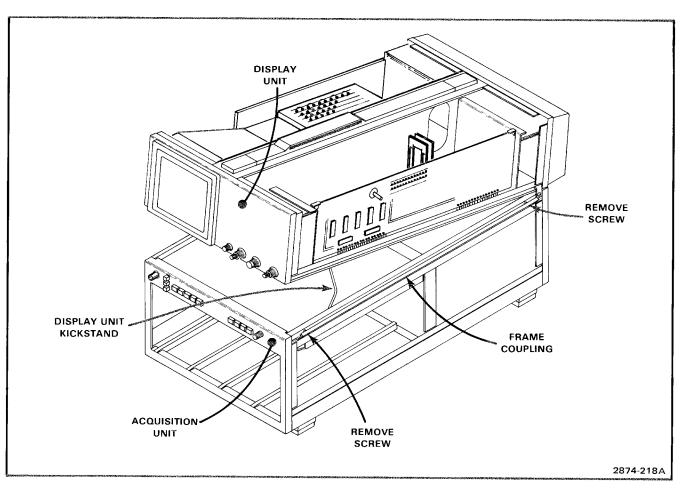


Figure 3-12. Use of the Display Unit kickstand.

NOTE

Assure all harmonica connectors on the Power Supply Unit and A11-Main Interface board are properly seated.

Guide the Power Supply Unit into the mainframe while dressing the 2 ribbon cables (from P82 and P83 on the A22-Low Voltage Regulator board) toward the lower corner of the Display Unit, and the gray power cord with green gound wire, up against the A19-Vertical Channel Switch board support. Be careful not to pinch the interconnecting cables when replacing the unit. Be sure that all the securing screws are tight enough to hold the power-supply unit properly in place.

Access to Components in the Power-Supply Unit

To reach the components located inside the powersupply unit for maintenance or repair, use the following procedure:



Disconnect the instrument from the power source and allow the line storage capacitors to discharge, before removing the powersupply unit cover. The line storage capacitors remain charged with high voltage dc for several minutes after the line power is disconnected unless they are manually discharged. A warning-indicator (neon bulb) located on the A23-Inverter board, flashes when this stored voltage exceeds about 80 volts. Do not remove the power-unit cover while this light is flashing.

1. Slide out the power unit as previously described.

2. Remove the four small screws that secure the cover to the rear heatsink.

3. Remove the 9 screws that attach the sides of the cover to the power unit chassis.

(a)

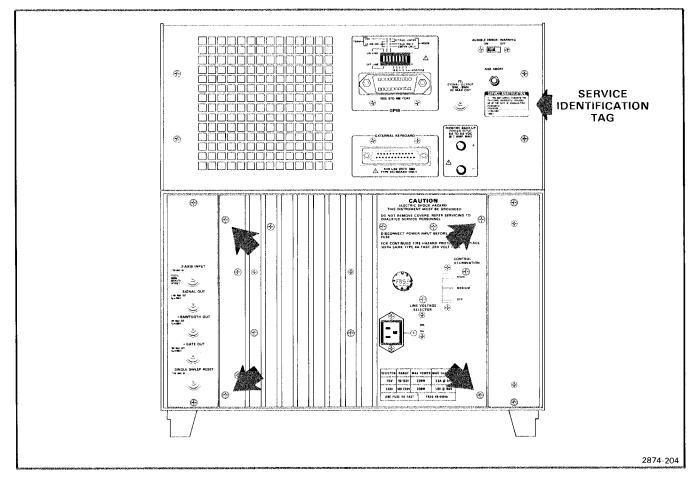


Figure 3-13. Power Supply Unit securing screws and service identification tag location.

4. Disconnect the two coaxial connectors from P40 on A12-Control Rectifier board.

5. Remove the cover from the power-supply unit.

6. The power-supply unit is now open for maintenance or repair. If the 7854 is to be operated with the cover removed, first reconnect the coaxial cables to the A12-Control Rectifier board.

7. Reverse the order of removal to replace the power-unit cover.

Before performing maintenance or taking ohmic measurements in the power-supply unit, manually discharge the line storage capacitors (C16 and C17) as follows:

1. Remove the protective cover from the power-supply unit following the preceding procedure.

2. Apply a 1.5-kilo-ohm, 2-watt, insulated resistor across the capacitor screws as indicated in Figure 3-7.

CATHODE-RAY TUBE REMOVAL

Remove the cathode-ray tube (crt) as follows:

Refer to Section 8, Replaceable Mechanical Parts for an exploded view drawing to aid in identification of parts mentioned in the following procedure.



The crt may retain a dangerous electrical charge. Before removing the crt, the anode must be fully discharged by shorting the anode lead from the crt to the chassis. Wait approximately ten minutes and again firmly short this lead to the chassis. Then remove the crt.

3-20

Use care when handling a crt. Breakage of the crt causes a high-velocity scattering of glass fragments (implosion). Protective clothing and safety glasses should be worn. Avoid striking the crt on any object which might cause it to crack or implode. When storing a crt, place it in a protective carton or set it face down in a protected location on a smooth surface with a soft mat under the faceplate.

1. Remove the left side panel.

2. Remove the crt base-pin socket from the rear of the crt.

3. Loosen the two screws located above and below the crt base pins until the tension of the springs on these screws is released. Then, press in upon the screws to be certain that the crt clamp inside the crt shield is loose.

4. Disconnect the 4 vertical deflection-plate connectors from the left side of the crt.

5. Disconnect the 2 horizontal deflection-plate connectors from the top of the crt.

6. Disconnect the crt anode lead and ground it to the chassis to dissipate any stored charge remaining in the crt.

7. Remove the frame mask with, crt scale mask and light filter.

8. Remove the 4 screws securing the crt bezel to the front panel. Remove the bezel while disconnecting the 3-pin connector from the left rear of the bezel.

9. Remove the plastic implosion shield and the graticule light assembly. (The graticule light assembly need not be unsoldered from its leads.)

10. Hold one hand on the crt faceplate and gently push forward on the crt base with the other. Slowly pull the crt out from the front of the instrument while guiding the crt anode lead through the hole in the crt shield.

CATHODE-RAY TUBE REPLACEMENT

Replace the cathode-ray tube (crt) as follows:

1. Insert the crt into the shield, guiding the crt anode plug through the hole in the crt shield. Set the crt firmly against the front-panel casting. (Check that crt front supports are positioned correctly).

2. Clean the crt faceplate, implosion shield and the light filter with denatured alcohol.

3. Reconnect the multi-pin connector to the crt bezel (align the arrow on the connector with the arrow on the bezel).

4. Hold the implosion shield in position and replace the crt bezel. Firmly tighten the 4 screws, making sure that the implosion shield is properly aligned. Replace the graticule light assembly, crt scale mask frame, and light filter. Tighten the 4 screws, making sure that the light filter is properly aligned.

5. Replace the plastic frame mask.

6. Gently push forward on the crt base to determine that the crt is as far forward as possible. Then tighten the 2 screws beside the crt base until the springs on the screws are fully compressed.

7. Place the crt base-pin socket on the crt base pins.

8. Reconnect the crt anode plug.

9. Carefully reconnect all cables and crt neck-pin connectors. (The Vertical Output board may be tilted outward to make the vertical deflection plate pins more accessable).

10. Replace the side panel.

NOTE

The replacement of the crt will require that the instrument be re-adjusted. Refer to Section 4, Calibration.

CIRCUIT BOARDS

If a circuit board is damaged beyond repair, replace the entire board assembly. Part numbers are given in Section 6, Replaceable Electrical Parts, for completely wired boards.

The pin connectors, except for coaxial-type connectors, used for interconnection between circuit boards are color-coded to aid in identification and circuit tracing. The color of the connector body matches the resistor color-code for the last digit of the connector circuit number; e.g., P62 is red, P63 is orange, etc.

Most of the circuit boards in this instrument are mounted on the chassis; pin connectors are used for electrical interconnection with chassis mounted components and other circuit boards. Several boards plug onto the rear of the A11-Main Interface board; feed-thru connectors connect the plug-on boards to the A11-Main Interface board.

Chassis-Mounted Boards

Remove and replace all chassis-mounted circuit boards as follows:

1. Disconnect the power source from the 7854 mainframe.

 $\ensuremath{\mathbf{2}}.$ Remove the appropriate side panel to gain access to the boards.

3. Disconnect all pin connectors attached to the board, or which connect the board to other parts of the instrument.

4. Remove the securing screws.

5. Remove the chassis-mounted board.

6. Replace chassis-mounted boards in the reverse order of removal. Match the index arrow on the multi-pin connectors to the corresponding arrow on the board.

Chassis-Mounted Plug-on Boards

Remove and replace the chassis-mounted plug-on boards as follows:

1. Disconnect the power source from the 7854 Mainframe.

 $\ensuremath{\text{2. Remove the appropriate side panel to gain access to the boards}$

3. Remove the digital circuit board support.

4. Disconnect all pin connectors attached to the board, or which connect the board to other parts of the instrument. If a pin connector is not accessible with the board installed, proceed to steps 5 and 6 then remove the connectors.

5. With the thumb and forefinger, pry up simultaneously on the board ejectors (located on each end of the board) until the board clears the mating receptables.

6. Remove the board from the instrument.

7. To replace the board, first plug in all pin connectors that are not accessible when the board is installed.

NOTE

The board ejectors must be in the horizontal position for the edge pins to seat.

8. Position the board over the board guides. Slide the board down until the board edge pins mate with the receptacles, then press firmly and evenly until the board edge pins bottom in the receptacles.

9. Connect all remaining plugs.

Board-Mounted Plug-On Boards

Remove and replace the plug-on boards as follows:

1. Disconnect the power source from the 7854 Mainframe.

2. Remove the power-supply unit (see Power-Supply Unit Removal) as necessary to gain access to the boards mounted on the rear of the A11-Main Interface board.

3. Disconnect any end-lead coaxial connectors located on the front of the board, or those which pass across a portion of the board.

4. Loosen all of the board's securing screws.

5. Keeping the board parallel to the A11-Main Interface board, gently pull out on the edges of the board until the feed-thru terminals are cleared.

6. To replace a plug-on circuit board, position the board parallel to the A11-Main Interface board so that all feed-thru pins are properly aligned with their sockets.

7. Gently press the circuit board against the mounting surface. Be sure that all feed-thru pins and sockets mate properly.

8. Uniformly tighten the securing screws (recommended torque: four to six inch-pounds).

A2-Mode Switch Circuit Board

Remove or replace the A2-Mode Switch circuit board as follows:



Do not allow solder or solder flux to flow under printed circuit board switches. The printed circuit board is part of the switch contacts, and intermittent switch operation can occur if contaminated. 1. Separate the Display Unit from the Acquisition Unit as previously described under Display Unit Kickstand. (Fig. 3-12)

2. Remove the VERT TRACE SEPARATION (B) knob.

3. Disconnect the pin connectors and remove the 5 screws holding the board to the chassis.

NOTE

When removing wires from a circuit board, always tag the wire and the corresponding connection point on the circuit board.

4. Slide the board toward the rear of the instrument until the front-panel pushbuttons clear the chassis.

5. Lift the board from the instrument.

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6. Replace the board by reversing the order of removal. Match the index arrow on the pin connectors to the corresponding arrow on the board.

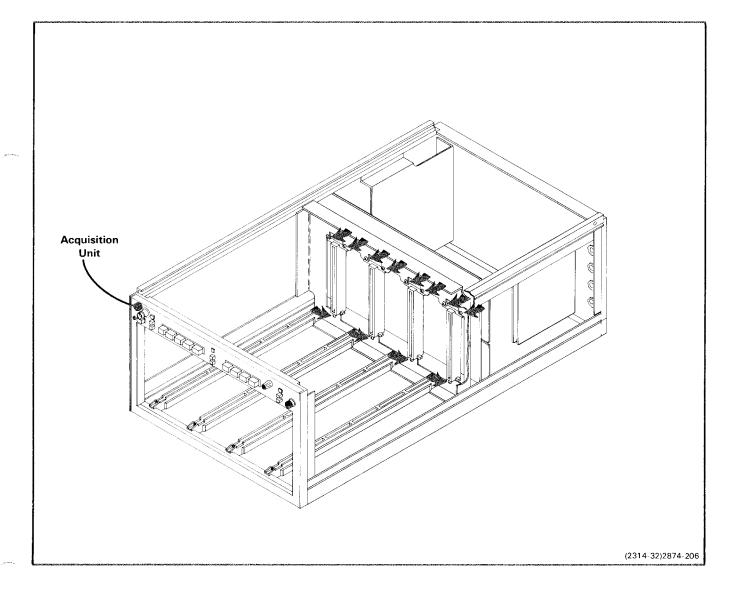
A11-Main Interface Circuit Board

Remove and replace the A11-Main Interface circuit board as follows:

1. Remove the plug-in units and the power-supply unit (see Power-Supply Unit Removal).

2. Disconnect all connectors from the A11-Main Interface board. Note the location of the connectors so they can be correctly replaced.

3. Remove the screws from inside each plug-in compartment which hold the plug-in interface connectors to the chassis (see Fig. 3-14). Also remove the screws which hold the ground straps to the chassis.





4. Slide the Main Interface board assembly to the rear of the instrument and remove it.

5. Replace the A11-Main Interface circuit board in the reverse order of removal. Match the index arrow on the pin connectors to the corresponding arrow on the board.

A12-Control Rectifier Circuit Board

An exploded-view drawing of the power-supply unit is given in Section 8, Replaceable Mechanical Parts, at the rear of this manual. To remove the A12-Control Rectifier board, use the following procedure:

1. Slide the power-supply unit out of the instrument (see Power-Supply Unit Removal).

2. Remove the A25-Low-Voltage Regulator board with attached chassis as described under A25-Low-Voltage Regulator Board.

3. Remove the 4 screws securing the power transformer to the bracket.

4. Remove the protective cover from the power-supply unit (see Access to Components in the Power-Supply Unit).

5. Disconnect the multi-pin connectors, from the A12-Control Rectifier board. Note the location of the pin connectors so they can be correctly replaced.

6. Remove the 2 plastic screws which hold the circuitboard shield to the A23-Inverter board.

7. Unsolder the 3 power-transformer leads from the A23-Inverter board. Remove the excess solder from the board pads with a vacuum-type desoldering tool.

8. Remove the 5 securing screws from the A12-Control Rectifier board.

9. Lift the circuit board and attached power transformer from the instrument.

10. To replace the A12-Control Rectifier board, reverse the order of removal. Match the index arrow on the pin connectors to the corresponding arrow on the board.

A16-Fan Motor Circuit Board

The exhaust fan and A16-Fan Motor circuit board are removed as a unit. Remove and replace the Fan assembly as follows:

1. Disconnect the pin connecter (P80) from the board.

2. Remove the screw that secures the board to the spacer post.

3. Remove the 2 screws from the motor retaining strap, then remove the fan motor and board assembly.

4. To replace the Fan assembly, reverse the removal procedure.

A23-Inverter Circuit Board

An exploded-view drawing of the power-supply unit is given in Section 8, Replaceable Mechanical Parts, at the rear of this manual. Remove and replace the power-supply A23-Inverter board as follows:



The power-supply unit has been tested at the factory to ensure safe operation. Improper repair of this unit can result in hazardous potentials on the instrument chassis. Do not remove the plate insulator, block insulator, or transistor shield from the heatsink. (See the exploded-view drawing of the power-supply unit for the location of the components.)

1. Slide the power-supply unit out of the instrument (see Power-Supply Unit Removal).

2. Remove the protective cover from the power-supply unit (see Access to Components in Power-Supply Unit).

3. Remove A12-Control Rectifier board using the previous procedure.

4. Remove the 3 securing screws from A23-Inverter board.

5. Unsolder the line-input leads from the circuit board. Remove the excess solder from these circuit board pads with a vacuum-type desoldering tool.

6. Remove the two metal-cased power transistors by removing the securing nuts and pulling the transistors from their sockets.

7. Move the A23-Inverter board away from the heatsink shield until the transistor mounting studs clear the heatsink shield. Remove the board from the power-supply unit.

8. To replace the A23-Inverter board, reverse the order of removal. Match the index arrow on the pin connectors to the corresponding arrow on the board.

A22-Low-Voltage Regulator Circuit Board

Remove and replace the A22-Low-Voltage Regulator circuit board as follows:

1. Slide the power-supply unit out of the instrument (see Power-Supply Unit Removal).

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2. Disconnect the multi-pin connectors from the board (two of the multi-pin connectors are self-locking; see the discussion on Multi-Pin Connectors in this section). Note the location of the pin connectors so they may be correctly replaced.

NOTE

If the A25-Low-Voltage Regulator board is to be removed to allow access to other parts of the power-supply unit, proceed with steps 3 and 4 only. If the board is to be removed from the instrument, proceed with the remaining steps of the procedure.

3. Remove the 2 screws located in the access holes under the A25-Low-Voltage Regulator board. These screws secure the chassis.

4. Remove the 3 screws securing the Low-Voltage Regulator chassis to the rear heatsink. Remove the board with attached chassis.

5. Remove the mounting hardware securing the plasticcased power transistors to the rear heatsink (see Fig. 3-15). Note the position of the lockwashers so they can be correctly replaced. 6. Remove the 5 securing screws and lift the board with attached power transistors from the chassis.

7. To replace the A22-Low Voltage Regulator board, first apply a thin coat of silicone grease to the back (mounting surface) of each power transistor.

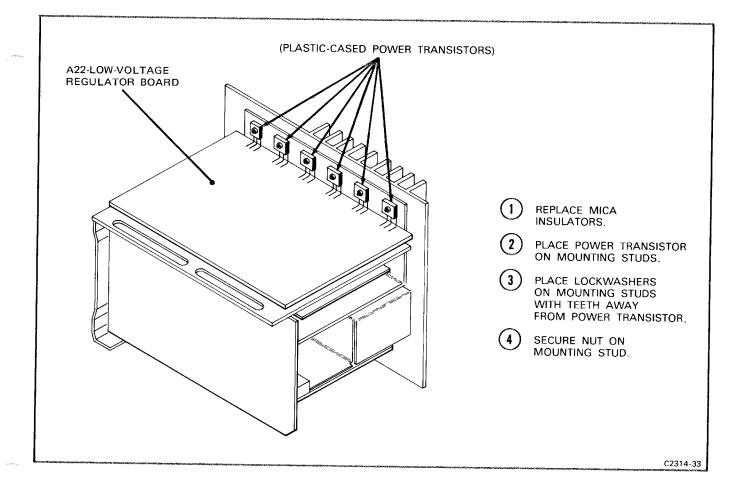


Handle silicone grease with care. Avoid getting silicone grease in your eyes. Wash hands thoroughly after use.

8. Place the A22-Low Voltage Regulator board on the chasis. Replace, but do not tighten, the securing screws.

9. Check that the power transistors are aligned with their mounting screws and that the insulating washers are in place between the transistor cases and the rear heatsink.

10. Secure the transistors with the mounting hardware. Do not over-tighten the nuts; recommended torque is four to six inch-pounds.





11. Tighten the screws holding the A22-Low Voltage Regulator board to the chasis.

12. Install the chassis on the power-supply unit.

13. Connect the multi-pin connectors to the board. Match the index arrow on the pin connectors to the corresponding arrow on the board.

14. Install the power-supply unit in the instrument.

A34, A35-Follower Circuit Boards

Follower circuit boards with six interface contacts are used in the plug-in interface connectors to provide optimum signal connections between the Vertical Mode plug-in units and the 7854 Interface board. Each Follower board is held in place by a spring so that the board can move back and forth within the interface connector to compensate for length differences between plug-in units. If a contact on a Follower board is damaged, the entire board with contacts and interconnecting cables is replaced as a unit.

Remove a Follower circuit board as follows:

1. Disconnect the instrument from the power source and remove any plug-in units.

2. Remove the power supply unit (see Power Supply Unit Removal).

3. Remove the appropriate metal shield in front of the A11-Main Interface board.

4. Disconnect the coaxial leads of the Follower board from the A19-Vertical Channel Switch board and the A13-Trigger Amplifier board. Note the location of the connectors so they may be correctly replaced.

5. Using long-nose pliers, disengage the spring from the Follower board (spring is in front of the A11-Main Interface board).

6. Remove the Follower board with interconnecting cables from the rear of the interface connector, through the hole in the A11-Main Interface board.

To replace a Follower circuit board, a folded length of very thin shim stock as wide as the Follower board is required to compress the contacts while the board is inserted into the interface connector. Proceed as follows:

1. Hold the Follower board between the ends of the shim stock with the fold directly in front of the contacts. With the shim stock held against the sides of the board, the contacts on the sides of the board should be pressed together. 2. Insert the folded end of the shim stock (with the Follower board) into the rear of the interface connector through the hole in the A11-Main Interface board. When the Follower board contacts are almost fully inserted into the connector, hold the board in place and remove the shim stock through the front of the interface connector while fully inserting the Follower board.

3. Secure the Follower board with the spring.

4. Reconnect the Follower board coaxial leads to the A19-Vertical Channel Switch and the A13-Trigger Amplifier board.

5. Replace the power supply unit.

6. Replace the metal shields.

A36—Calculator Keyboard Electronics Board Removal

1. Remove the right side cover of the calculator (2 screws).

2. Locate and disconnect the ground connection to the Calculator Button board.

3. Slide the front panel approximately 1/4 inch to the right then pull up.

4. Disconnect the pin connector, P208 from the Calculator Button board.

5. Remove two screws and pull up on the Calculator Keyboard Electronics board until the interboard connectors, P200, P300, P305 disengage.

6. To replace the board, reverse the removal procedure.

A37—Calculator Button Board Removal

1. Follow the procedure for the Keyboard Electronics Board removal then proceed with the following instructions.

2. Locate and remove 9 nuts and 2 spacer posts.

3. Separate the board and the front panel.

Calculator Button Board Replacement

1. Follow the procedure for the Keyboard Electronics Board removal then proceed with the following instructions.

2. Align the pushbuttons and the 2 indicator lamps with the appropriate holes in the front-panel.

3. Install 9 nuts and 2 spacer posts.

4. Align the Keyboard Electronics Board with the interboard connectors, P200, P300, P305, and press down until they are fully engaged.

- 5. Install and tighten 2 screws.
- 6. Plug in the pin connector P208.

7. Place the front-panel with boards attached into the appropriate grooves in the frame section.

8. Slide the front-panel to the left until fully engaged into the left side cover.

9. Reconnect the ground wire (Calculator Button Board ground).

10. Install the right side cover and secure with 2 screws.

PLUG-IN INTERFACE CONNECTORS

The individual contacts of the plug-in interface connectors can be replaced. However, we recommend replacing the entire A11-Main Interface board if a large number of the contacts are damaged. An alternative solution is to refer the maintenance of the damaged A11-Main Interface board to your local Tektronix Field Office. Use the following procedure to remove and replace an individual contact of the plug-in interface connectors:

NOTE

The plug-in interface contacts which are mounted on the Follower circuit boards cannot be replaced. A Follower board with contacts and interconnecting cables is replaced as a unit. See A34, A35-Display Follower board removal procedure.

1. Remove the A11-Main Interface circuit board from the instrument as previously described.

2. Snap the white plastic connector cover off the side of the damaged plug-in interface connector.

3. Unsolder and remove the damaged contact.

4. Install the replacement contact. Carefully position it to fit against the connector body.

5. Snap the white plastic connector cover back onto the plug-in interface connector. Check that the replaced contact is aligned with the other contacts.

6. Replace the A11-Main Interface board.

SEMICONDUCTORS

Semiconductors should not be replaced unless actually defective. If removed from their sockets during routine maintenance, return them to their original sockets. Unnecessary replacement of semiconductors may affect the adjustment of the instrument. When semiconductors are replaced, check the operation of circuits which may be affected.



To avoid electric shock hazard, always disconnect the 7854 from the power source before removing or replacing components.

Replacement semiconductors should be of the original type or a direct replacement. Lead configurations of the semiconductors used in this instrument are shown in Figure 3-2. Some plastic case transistors have lead configurations which do not agree with those shown. If a replacement transistor is made by a different manufacturer than the original, check the manufacturer's basing diagram for correct basing. All transistor sockets in this instrument are wired for standard basing as used for metal-cased transistors. Transistors which have heat radiators or are mounted on the chassis use silicone grease to increase heat transfer. Replace the silicone grease on both sides of the insulating washer when replacing these transistors.



Handle silicone grease with care. Avoid getting the silicone grease in your eyes. Wash hands thoroughly after use.

To replace one of the power transistors mounted on the heatsink at the rear of the power-supply unit, first remove the mounting hardware. Then, unsolder and remove the defective transistor. When replacing the transistor, be sure to install the insulating washer between the transistor and the heatsink (use silicone grease as previously described). Tighten the mounting nut just tight enough to hold the transistor in place. Then solder the replacement transistor to the A25-Low-Voltage Regulator board.

An extracting tool should be used to remove the in-line integrated circuits to prevent damaging the pins. This tool is available from Tektronix, Inc.; order Tektronix Part 003-0619-00. If an extracting tool is not available, use care to avoid damaging the pins. Pull slowly and evenly on both ends of the integrated circuit. Try to avoid one end disengaging from the socket before the other end.

Vertical Amplifier Replacement

Replace Vertical U50 as follows:

	1. Remove the Left side cover to expose the A18-Vertical Amplifier board.	ропения и инсличения и инсличения U50	n tauf ayu kabun kataran kataran ya kataran y
	2. Pivot the plastic retaining bar away.		
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Hypcon Connectors

The hypcon (hybrid-printed connector) connector is a precision-made connector designed to provide low loss electrical and/or thermally efficient connection between the printed circuit board and hybrid integrated circuit. An exploded view of the Hypcon connector is shown in Figure 3-17. Care must be taken when replacing the hybrid IC's not to touch the elastomer gold-plated contacts with the fingers or to use a cleaner which will degrade contact reliability. The Hypcon connector and hybrid IC should be removed if it becomes necessary to use a cleaning solvent near the connector when replacing adjacent (within 1/2") circuit board components. IMPORTANT: Remove all traces of solder flux or foreign material contamination from the circuit board contact area before replacing the connector. Contamination usually takes place during the soldering and cleaning process. Even when the soldering is done carefully, flux, oil, or other contaminants can be carried under the connector during the cleaning operation. When the solvent evaporates, nonconductive contaminants may remain on or near the contact interfaces.

The cleaning process (either hand cleaning with a solvent or machine cleaning in an automatic detergent wash) is not recommended for boards containing Hypcon connectors.

If a component adjacent to a Hypcon connector must be replaced, the following steps are recommended:

1. Remove the hybrid IC and Hypcon connector (see Disassembly and Removal instructions) before any soldering or cleaning and store in a dirt-free covered container. When several hybrids and Hypcon connectors are to be removed, keeps part together and replace as sets; do not interchange parts.

2. Hand soldering:

a. Use small diameter solder (0.030"-0.040").

b. Use low wattage soldering irons (15-20 watts).

c. Use care with solder amount and placement.

3. Remove solder flux and contact contamination with isopropyl alcohol, denatured ethyl alcohol, or a Freon TF cleaner.

4. Flush the hybrid and Hypcon connector mounting area with isopropyl alcohol. Do not scrub with a cotton-tipped applicator, as cotton fibers will adhere to edges and surfaces of contact areas and cause open or intermittent connections. The elastomer should be examined under light for dust, hair, etc., before it is re-installed. If the etched circuit board surfaces require more cleaning, scrub with a soft rubber eraser and blow or vacuum clean while dusting surface with a small clean brush.

5. If the hybrid IC and elastomer contact holder are contaminated, clean the contact holder and hybrid by flushing or spraying with alcohol and oven dry at 50° C. Do not scrub with a cotton-tipped applicator or similar device. If the contact holder is excessively contaminated, replace it with a new one.

Two inch-pounds of torque should be applied to the mounting screws to secure the Hypcon to the circuit board.

Make sure that the elastomer is properly seated in the contact holder before remounting the assembly to the circuit board. Exercise care when mounting the frame, elastomer-contact-holder, hybrid IC assembly to the circuit board to prevent misalignment between the connector and board.



Because of close tolerances involved, special care must be taken to assure correct index alignment of each Hypcon part during reassembly. Failure to do so can result in a cracked hybrid substrate. See Figure 3-17 for index locations.

If your instrument contains both the flush and stepped type of Hypcon connectors, be careful not to mix the elastomer contact holders during reassembly. The flush Hypcon connectors have green elastomer contact holders and the plastic frame is marked FLUSH. The stepped Hypcons have neutral-colored elastomer contact holders with a slight ridge or step on the contact surface; the large frames are marked STEPPED. The registration pins on the stepped plastic frame are slightly longer than those on the flush frame. The elastomer contact holder in the small stepped connectors is indexed differently than the large connectors. Look for a small gold arrow in one corner of the holder instead of a flat corner. Match this corner arrow with the pointed corner of the plastic frame. Give close attention to this indexing, as it is easy to insert the elastomer contact holder incorrectly.

Differences also exist between the large flush and large stepped Hypcon circuit board receptacles. Figure 3-17 shows the cross-sectional differences which must be observed when working with an instrument that contains both types of Hypcon connectors.



Damage to the elastomer contact holder can result if the connectors are not mated properly with the board receptacle.

When replacing the hybrid, insert it into the board opening and then position the Hypcon connector in the board registration holes for perfect alignment. The outer portion of the hypcon frame should be flush with the circuit board before the four mounting screws are tightened. Avoid touching the hybrid and elastomer contact holder with your fingers; finger oils can degrade reliability.

A procedure for removal and replacement is included in Figure 3-17.

(a)

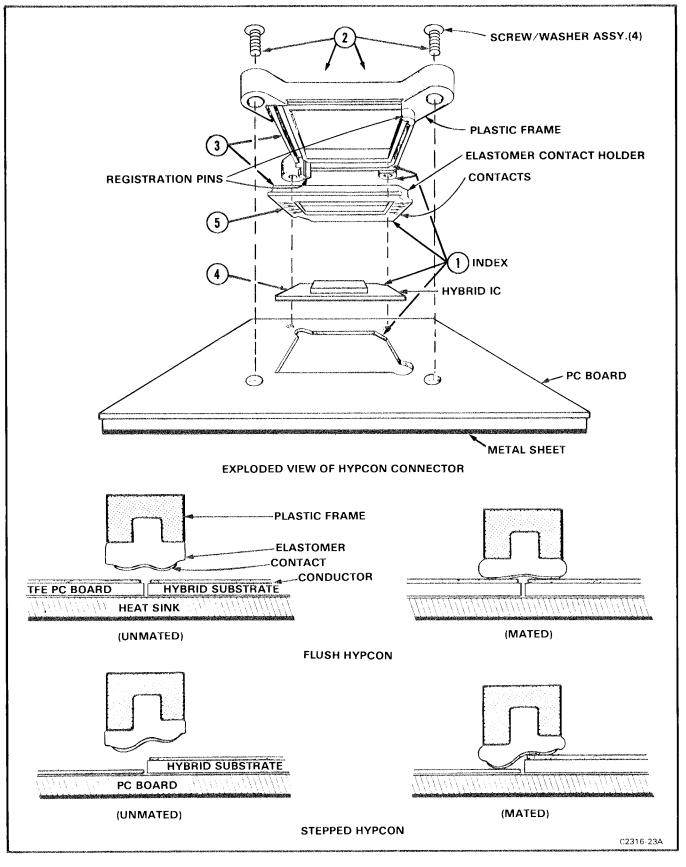


Figure 3-17. Hypcon assembly removal and replacement.

DISASSEMBLY AND REMOVAL

(1) Note index on circuit board (arrow) and Hypcon plastic frame (pointed mounting ear).

2) Unscrew and remove the 4 screw/washer assemblies.

- 3) Lift Hypcon connector from board.
- 4) Note index location of hybrid and remove from board with tweezers.
- 5) Note index location of elastomer contact holder and remove by grasping a corner of the contact holder with tweezers and lifting up. Do not touch the gold-plated contacts with your fingers.

REASSEMBLY AND REPLACEMENT

Grasp corner of elastomer contact holder with tweezers and place in plastic frame slot being careful to match the flat contact holder with the flat frame corner. Place a clean plastic envelope over finger and press with finger to seat contact holder into the frame. The contact holder must be evenly seated on all four sides.

Flush Hypcon: Match hybrid flat corner with board receptacle flat corner and place hybrid in receptacle. Match pointed mounting ear of Hypcon connector with flat corner of receptacle and guide registration pins into the board holes.

Stepped Hypcon: Using tweezers, match the hybrid corner index with the elastomer contact holder index and insert between the registration pins. Turn the assembly over, grasp the hybrid "hat" with the tweezers, and guide the registration pins into the board holes. Match the plastic frame pointed mounting ear with the circuit board arrow.

Insert mounting hardware and apply 2 inch-pounds of torque to secure the connector assembly.

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Figure 3-17. Hypcon assembly removal and replacement (Cont.).

Hybrid substrate contact numbers 1 and 20 are printed on the substrate at the index corner. See Figure 3-2 Semiconductor lead configurations.

INTERCONNECTING PINS

Two methods of interconnection are used in this instrument to electrically connect the circuit boards with other boards and components. When the interconnection is made with a coaxial cable, a special end-lead connector plugs into a socket on the board. Other interconnections are made with a pin soldered into the board. Two types of mating connectors are used for these interconnecting pins. If the mating connector is mounted on a plug-on circuit board, a special socket is soldered into the board. If the mating connector is on the end of a lead, an end-lead pin connector is used which mates with the interconnecting pin. The following information provides the removal and replacement procedure for the various types of interconnecting methods.

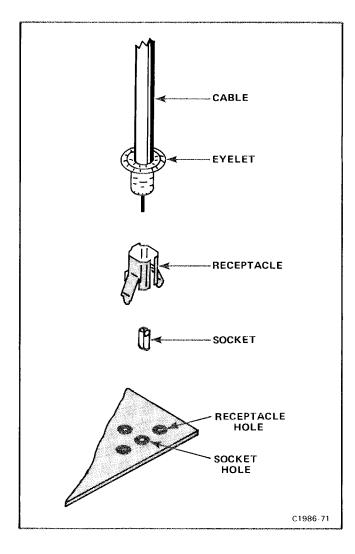


Figure 3-18. Coaxial end-lead connector assembly.

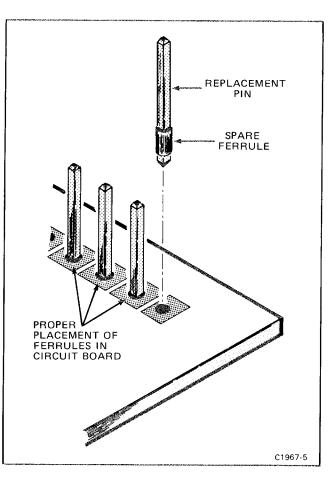


Figure 3-19. Exploded view of circuit board pin and ferrule.

Coaxial-Type End-Lead Connectors

Replacement of the coaxial-type end-lead connectors requires special tools and techniques; only experienced maintenance personnel should attempt to remove or replace these connectors. We recommend that the damaged cable or wiring harness be replaced as a unit. For cable or wiring harness part numbers, see Section 8, Replaceable Mechanical Parts. An alternative solution is to refer the replacement of the defective connector to your local Tektronix Field Office or representative. Figure 3-18 gives an exploded view of a coaxial end-lead connector assembly.

Circuit-Board Pins

A circuit-board pin replacement kit (including necessary tools, instructions, and replacement pins with attached ferrules) is available from Tektronix, Inc. Order Tektronix Part 040-0542-00. Replacing circuit-board pins on multilayer boards is not recommended. (The multi-layer boards in this instrument are listed under Soldering Techniques in this section.)

To replace a damaged pin, first disconnect any pin connectors. Then remove the solder from the connection using a vacuum desoldering tool. See Soldering Techniques. Remove the damaged pin from the board with a pair of pliers, leaving the ferrule (see Fig. 3-19) in the circuit board if possible. If the ferrule remains in the circuit board, remove the spare ferrule from the replacement pin and press the new pin into the hole in the circuit board. If the ferrule is removed with the damaged pin, then press the replacement pin, with attached spare ferrule, into the circuit board. Position the replacement pin in the same manner as the original. Solder the pin to the circuit board on each side of the board. If the original pin was bent at an angle to mate with a connector, carefully bend the new pin to the same angle. Replace the pin connector.

Circuit-Board Pin Sockets

The pin sockets on the circuit boards are soldered to the back of the board. To remove or replace one of these sockets, first unsolder the pin (use a vacuum-type desoldering tool to remove excess solder). Then straighten the tabs on the socket and remove the socket from the board. Place the new socket in the circuit board hole and press the tabs down against the board. Solder the tabs of the socket to the circuit board; be careful not to get solder inside the socket.

NOTE

The spring tension of the pin sockets ensures a good connection between the circuit board and the pin. This spring tension can be destroyed by using the pin sockets as a connecting point for spring-loaded probe tips, alligator clips, etc.

Multi-Pin Connectors

The pin connectors used to connect the wires to the interconnecting pins are clamped to the ends of the associated leads. To remove or replace damaged multipin connectors, remove the old pin connector from the end of the lead and clamp the replacement connector to the lead.

NOTE

Some multi-pin connectors are equipped with a special locking mechanism. These connectors cannot be removed by pulling on the wire(s). To remove the connectors from the pin(s) grasp the plastic holder and pull.

To remove an individual wire from the holder insert a scribe in the hole on the side of the holder and slide the extended portion under the holder. This will allow the wire to be removed from the holder.

Some of the pin connectors are grouped together and mounted in a plastic holder; the overall result is that these connectors are removed and installed as a multipin connector (see Troubleshooting Aids). If the individual end-lead pin connectors are removed from the plastic holder, note the order of the individual wires for correct replacement in the holder.

PUSHBUTTON SWITCHES

The pushbutton switches used on the 7854 Oscilloscope mainframe are circuit board mounted. First remove the associated circuit board following the procedure given under Circuit Boards in this section. Figure 3-20 gives removal and replacement instructions for the pushbutton switches. (A Trigger Source, B Trigger Source and Calibrator).

GRATICULE LIGHT BULBS

To remove or replace the graticule light bulbs, first remove the crt frame mask, light filter, and scale mask. Pull on the white tabs to remove the graticule lamp assembly. Next, slide the retaining strip off to the side of the damaged bulb base. Pull the bulb out of the circuit board. Reverse the order of removal for replacement.

POWER TRANSFORMER

Replace the power transformer only with a direct replacement Tektronix transformer. Remove and replace the power transformer as follows:

1. Remove the A12-Control Rectifier board as described under Circuit Boards in this section.

2. Remove the bracket which holds the transformer to the rear heatsink.

3. Unsolder the transformer leads from the circuit boards. Remove the excess solder from the circuit-board pads (see Soldering Techniques). Note the position of the transformer leads so they may be correctly replaced.

4. Place the new transformer in position but do not yet solder the leads to the circuit-board pads.

5. Secure the bracket to the A12-Control Rectifier board and attach the transformer to the bracket with the 4 securing screws.

6. Reposition the A12-Control Rectifier board and secure with 3 screws. Attach the bracket securely to the rear heatsink.

7. Solder the transformer leads to the circuit-board pads.

8. Continue replacing the A12-Control Rectifier board.

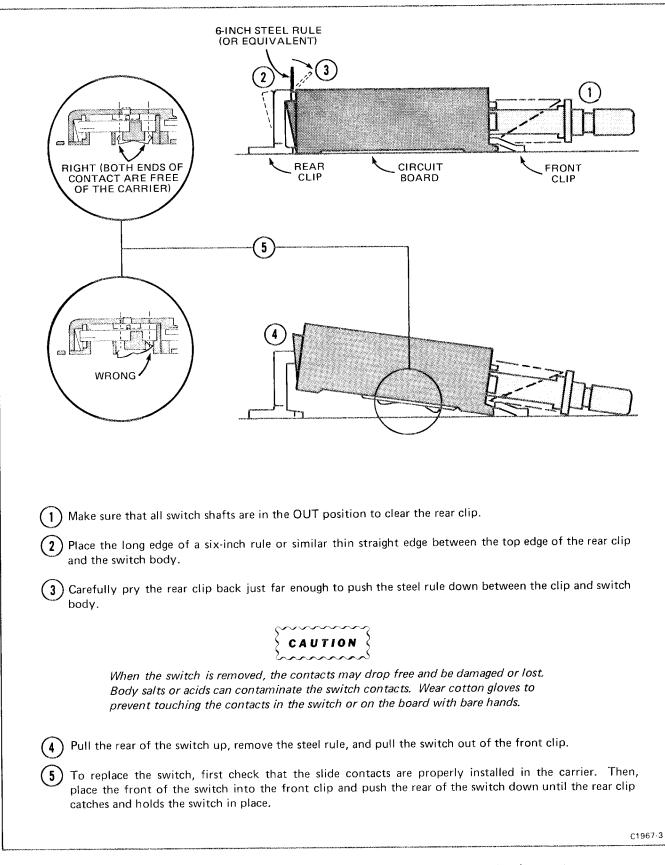
The line fuse used in this instrument is located on the rear panel of the power-supply unit. Replace the line fuse (F10) only with one of proper type and rating.

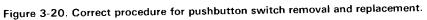
NOTE

The line voltage fuse F10 is used for both 110 volt and 220 volt operation. No change in the fuse is necessary when switching the LINE VOLTAGE SELECTOR switch between 110 volts and 220 volts.

ADJUSTMENT AFTER REPAIR

After any electrical component has been replaced, the adjustment of that particular circuit should be checked, as well as the adjustment of any closely related circuits. Since the low-voltage supplies affect all circuits, adjustment of the entire instrument should be checked if component replacements have been made in these supplies or if the power transformer has been replaced. See section 4 for a complete adjustment procedure.





CALIBRATION

This section provides procedures for calibrating the 7854 Oscilloscope. These procedures are designed to compare the performance of this instrument with measurement instruments of known accuracy to detect, correlate, or eliminate by adjustment, any variation from the electrical specifications. These procedures also verify that the controls function properly.

This section is divided into two parts: Part I—Performance Check is provided for those who wish to verify that this instrument meets the applicable electrical specifications in Table 4-2, Performance Check Summary, without making internal adjustments. Part II—Adjustment and Performance Check provides a complete calibration procedure that includes adjustments and performance checks in addition to verifying that the controls function properly. The procedures in Part I and Part II are written so that the entire instrument, or any major circuit or part of a circuit, can be checked or adjusted.

Table 4-1, Calibration Procedure Electives, lists the choices available and instructions for performing complete or partial calibration procedures. Also refer to page 4-2, Using These Procedures, for more detailed information.

Electives	Procedures
Functional Check	1. A functional check only is provided in the checkout procedure in the Operators Manual.
	2. Also, a functional check is accomplished by performing Part II—Adjustment and Performance Check.
Performance Check Only	Perform Part IPerformance Check.
Complete Calibration	Perform Part II—Adjustment and Performance Check.
Partial Procedures	Proceed to the desired step(s) (e.g., A2, A3, B2, B3, etc.; as listed in the index to Part I—Performance Check or Index to Part II—Adjustment and Performance Check).
	NOTE
	When adjustments are made, we recommend that the entire, major functional circuit procedure be performed.

TABLE 4-1 Calibration Procedure Electives

USING THESE PROCEDURES

NOTE

In these procedures, capital letters are used within the body of the text to identify frontpanel controls, indicators, and connectors on the 7854 (e.g., A INTENSITY). Initial capitalization is used to identify all the associated test equipment and their controls, indicators, and connectors (e.g., Amplitude) used in the procedures. Initial capitalization is also used to identify internal adjustments (e.g., Hor Pos).

These procedures are divided into subsections by major functional circuits (e.g., A. Power Supply, B. Z-Axis and Display, etc.). The order in which the subsections and procedures appear is the recommended sequence for a complete performance check or calibration of the instrument.

The first step in each subsection (A1, B1, C1, etc.) contains reference information and control settings that must be performed before proceeding with any of the other steps of that subsection.

Setup conditions provide equipment connection information and control settings for both the 7854 Oscilloscope and any associated test equipment. The Setup Conditions are written so that, if desired, each subsection (A, B, C, etc.) or step (A2, A3, B2, B3, etc.) can be performed independently.

The terms CHECK, EXAMINE, ADJUST, or INTERACTION when used as the first word of an instruction or heading are defined as follows:

1. CHECK----indicates the instruction accomplishes an electrical specification check. Each electrical

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specification checked is listed in Table 4-2, Performance Check Summary (see Performance Check Summary discussion for more information).

2. **EXAMINE**—usually precedes an ADJUST instruction and indicates that the instruction determines whether adjustment is necessary. If no ADJUST instruction appears in the same step, the EXAMINE instruction concerns measurement limits that do not have a related adjustment. Measurement limits following the word EXAMINE are not be be interpreted as electrical specifications. They are provided as indicators of a properly functioning instrument and to aid in the adjustment process.

3. **ADJUST**—describes which adjustment to make and the desired result. We recommend that adjustments not be made if a previous CHECK or EXAMINE instruction indicates that no adjustment is necessary.

4. **INTERACTION**—indicates that the adjustment described in the preceding instruction interacts with other circuits. The nature of the interaction is described and reference is made to the step(s) affected.

PERFORMANCE CHECK SUMMARY

Table 4-2, Performance Check Summary, lists the electrical specifications that are checked in Part I and Part II of this section. Table 4-2 is intended to provide a convenient means for locating the procedures in Part I and Part II that check and/or adjust the instrument to meet the applicable electrical specifications. For example: if the Trigger Amplifier had been repaired, use Table 4-2 to locate the electrical specifications affected by the repair. Then, note the title of the procedure in Part I or Part II in which those specifications are checked and/or adjusted. Use the index provided at the front of Part I and Part II to determine the page number of the desired procedures.

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Characteristic	Performance Requirement	Part I Performance Check Procedure Title	Part II Adjustment and Performance Check Procedure Title
	REAL-TIME	VERTICAL SYSTEM	
Deflection Factor as Checked with 067-0587-02 Cali- bration Fixture, referenced to 6 Div Difference be- tween Vertical Channels	Compatible with all 7000-series plug-in units. 1%, or less.	Implicity checked in step E2. Check Differ- ence between Vertical Channels.	Implicity checked in step F5. Check/Adjust Vertical Gain.

TABLE 4-2 Performance Check Summary

TABLE 4-2 (CONT) Performance Check Summary

Characteristic	Performance Requirement	Part I Performance Check Procedure Title	Part II Adjustment and Performance Check Procedure Title
	REAL-TIME VER	TICAL SYSTEM (CON	IT)
Deflection Factor (Continued)			
Low Frequency Linearity	0.1 div, or less, com- pression or expansion of a center-screen 2 div signal repositioned vertically anywhere within the graticule area.	E3. Check Vertical Low- Frequency Linearity	F6. Check Vertical Low- Frequency Linearity
System Bandwidth	Varies with plug-in unit selected. See 7000- Series Oscilloscope Systems Specification in the Operators Manual.	Does not normally require customer verification. Satisfactory operation substantiated at the factory.	
Step Response	маллоналана на на ток ток на на на колони с на прои с на на ток на		
System Rise Time	Varies with plug-in unit selected. See 7000- Series Oscilloscope Systems Specification in the Operators Manual.		
Channel Isolation		E4. Check Vertical Channel Isolation.	F9. Check Vertical Channel Isolation.
All Vertical Modes (Except ADD)	At least 100:1 from dc to 250 MHz; and at least 40:1 from 250 MHz to 475 MHz.		
Delay Line	Permits viewing the leading edge of triggering signal.	Checked throughout proced displayed on crt.	lure where single pulse is
Displayed Differ- ence in Signal Delay between Vertical Channels		Does not normally require of Satisfactory operation subs	
Externally Triggered	60 ps, or less.		
Internally Triggered	200 ps, or less.		

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TABLE 4-2 (CONT) Performance Check Summary

Characteristic	Performance Requirement	Part I Performance Check Procedure Title	Part II Adjustment and Performance Check Procedure Title
	REAL-TIME F	ORIZONTAL SYSTEM	l
Deflection Factor as Checked with 067-0587-02 Cali- bration Fixture.	Compatible with all 7000-Series plug-in units.	Does not normally require customer verification. Satisfactory operation substantiated at the factory.	
Difference be- tween Horizon- tal Channels	1%, or less.	D2. Check Difference Between Horizontal Channels.	E2. Check/Adjust Hori- zontal Amplifier Gain and Readout Jitter.
Linearity at 1 ms/Div	0.05 div, or less, error at each graticule line after adjusting for no error at the second and tenth graticule lines.	D3. Check 1 ms Linearity and Frequency Timing.	E3. Check/Adjust 1 ms Linearity and High- Frequency Timing.
Fastest Calibrated Sweep Rate	500 ps∕div.	D3. Check 1 ms Lin- earity and High-Freq- uency Timing.	E3. Check/Adjust 1 ms Linearity and High- Frequency Timing.
Horizontal Band- width Referenced at 10 Div	Dc to at least 1 MHz (-3 dB).	Does not normally require customer verification. Satisfactory operation substantiated at the factory.	
Phase Shift between Vertical and Horizontal Systems	2°, or less, from dc to at least 35 kHz.	D4. Check X-Y Phasing.	E4. Check X-Y Phasing.
With Option 02 (B HORIZ Compartment only).	2°, or less, from dc to 1 MHz.	D5. Check X-Y Compensation.	E5. Check/Adjust X-Y Compensation.
		DIGITIZER	
Vertical			
Acquisition Window	From +5 div above, to -5 div below the center horizontal graticule line.	Does not normally require customer verification. Satisfactory operation substantiated at the factory.	
Resolution: Stored and Numeric Data Paths	Nominally 0.0098 div.		
Noise: Numeric Data Paths	0.008 div or less, mean value of 100 rms measurements, main- frame only.	F6. Check Vertical Digitizer Numeric Noise.	H13. Check Vertical Digitizer Numeric Noise.

TABLE 4-2 (CONT) Performance Check Summary

Characterstic	Performance Requirement	Part I Performance Check Procedure Title	Part II Adjustment and Performance Check Procedure Title
	DIGI	TIZER (CONT)	
DC Gain Accuracy as Checked with 067-0587-02 Cali- bration Fixture, referenced to 6 Div		F4. Check Digitizer Vertical Gain	H8. Check/Adjust Digitizer Vertical Gain.
Stored and Numeric Data Paths	Within 1% at Temper- ature of calibration.		
Change with Temperature	0.8%, or less, per 10°C.	Does not normally require Satisfactory operation sub	
DC Offset Stored Data Path	Within 0.1 div of grati- cule center, at temp- perature of calibration.	F2. Check Vertical Sampler Offset.	H4. Check∕Adjust Vertical Sampler Offse
Numeric Data Path	Within 0.1 equivalent graticule div of zero, at temperature of cali- bration.		
Change with Temperature	0.1 div, or less, per 10°C.	Does not normally require Satisfactory operation sub	e customer verification. Istantiated at the factory.
System Bandwidth; Stored and Numeric Data Paths	Varies with plug-in unit selected. See 7000- Series Oscilloscope Systems Specification in the Operators Manual; step response should be same specification limits as given for realtime operation.		
Matching to Real Time	Real time and acqui- sition system sine- wave amplitude response should match each other to within 1+2.5 (f/100 MHz)%, where 0 \leq f \leq 400 MHz, (f in MHz).		

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TABLE 4-2 (CONT) Performance Check Summary

Performance Check Summary				ak sheq.
Characteristic	Performance Requirement	Part I Performance Check Procedure Title	Part II Adjustment and Performance Check Procedure Title	
	DIGIT	IZER (CONT)		
System Step Response: Stored and Numeric Data Paths	Varies with plug-in unit selected. See 7000- Series Oscilloscope Systems Specification in the Operators Manual; shall be same specification limits as given for real-time operation.	Does not normally require Satisfactory operation subs	customer verification. stantiated at the factory.	
Horizontal				
Acquisition Window	From -5 div left, to +5 div right of the center vertical graticule line.			
Resolution: Stored and Numeric Data Paths	Nominally: 0.0098 div at 1024 P/W; 0.0196 div at 512 P/W; 0.0392 div at 256 P/W; 0.0784 div at 128 P/W.			.cc.8846.
Noise: Numeric Data Path	0.01 div or less, mean value of 100 rms mea- surements, mainframe only.	F7. Check Horizontal Digitizer Numeric Noise.	H14. Check Horizontal Digitizer Numeric Noise.	
DC Gain Accuracy, as Checked with 067-0587-02 Cali- pration Fixture, eferenced to 5 Div		F5. Check Digitizer Horizontal Gain	H11. Check/Adjust Digitizer Horizontal Gain.	
Stored and Numeric Data Path	Within 1% at temper- ature of Calibration.			
Change with Temperature	0.4%, or less per 10°C.	Does not normally require customer verification. Satisfactory operation substantiated at the factory.		
DC Offset Stored Data Path	Within 0.1 div of grati- cule center, at temper- ature of calibration.	F3. Check Horizontal Sampler Offset.	H5. Check/Adjust Hori- zontal Sampler Offset.	
Numeric Data Path	Within 0.1 equivalent graticule div of zero, at temperature of calibration.			
Change with Temperature	0.1 div, or less, per 10°C.	Does not normally require customer verification. Satisfactory operation substantiated at the factory.		

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Characteristic	Performance Requirement	Part I Performance Check Procedure Title	Part II Adjustment and Performance Check Procedure Title
	DIGITI	ZER (CONT)	
DC Offset (Continued)		Does not normally require	customer verification.
Equivalent Time Sampling	For proper acquisition, input signals must be repetitive single valued waveforms of the hori- zontal variable. Processor does not check that these conditions are met.	Satisfactory operation substantiated at the factory.	
Maximum Sweep Speeds for Single- Shot Acquisi- tion with 7B87 Time Base with Pretrigger Acquire clock	Maximum Sweep Speed P/W (μs/div) 128 50 256 100 512 200 1024 500		
	CR	T SYSTEM	
Graticule Type	Internal; illuminated with variable edge lighting.	Does not normally require Substantiated at the factor	customer verification. y.
Display Area	8 div vertically by 10 div horizontally.		
Div Unit	1 div = 1 cm.	-	
Phosphor			
Standard	P31.		
Option 78	P11.		
Photographic Writing speed With Polaroid 3000 ASA Film, without Film Fogging P-11 Phosphor)		Does not normally require a Satisfactory operation subs	customer verification. tantiated at the factory.
TEKTRONIX C51R Camera, fl.2 Lens and 1:05 Object-to- Image Ratio	At least 2.4 cm/ns. In typical applications, P31 phosphor has approximately one-half the writing speed of P11 phosphor.		

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Characteristic	Performance Requirement	Part I Performance Check Procedure Title	Part II Adjustment and Performance Check Procedure Title	
566 696 COLORE FOR LONG TO THE STOCK OF A LONG OF THE STOCK OF A ST	EXTERN	AL CONNECTORS		r generat
Camera Power	Front-panel 3-contact connector (on crt bezel) compatible with Tek- tronix C-50 series cameras.	B7. Check Single Sweep Reset and Camera Connector.	C7. Check Single Sweep Reset and Camera Connector.	
Bottom Pin Center Pin Top Pin	Ground. Single-sweep reset. +15 V.			
Calibrator Output	Front-panel bnc connector.	B4. Check Calibrator Amplitude.	C4. Check Calibrator Amplitude.	
Wave Shape	Square wave.			
Polarity	Postive-going with baseline at OV.	-		
Output Resis- tance.	450 Ω.	Does not normally require Satisfactory operation sub		and de loga
Output Voltage	(Selected by front- panel CALIBRATOR switch.)	B2. Check Calibrator Output Voltage.	C2. Check/Adjust Cali- brator Output Voltage.	νατορομοι ιναθιατοιχώ
Load ≥ 100 kΩ	40 mV, 0.4 V, 4 V.			
Load = 50 Ω	4 mV, 40 mV, 0.4 V.			
Accuracy	Within 1%.			
Output Current	40 mA available through CALIBRATORoutput with a bnc-to-current loop adapter. CALI- BRATOR switch must be set to 4 V for calibrated output.	Does not normally require customer verification. Implicitly checked in steps B2, and C2.		
Repetition Rate	1.0 kHz, within 0.25%.	B3. Check Calibrator 1-kHz Repetition Rate.	C3. Check/Adjust Cali- brator 1-kHz Repetition Rate.	
Duty Cycle	49.8% to 50.2%.	Does not normally require Satisfactory operation sub	customer verification. stantiated at the factory.	90'490-
Rise Time and Fall Time 100 pF maximum Ioad)	250 μ s or less.			
Ground Post	Provides user a conve- nient ground reference point on front panel.	Does not normally require Substantiated at the factor	customer verification. ry.	

Characteristic	Performance Requirement	Part I Performance Check Procedure Title	Part II Adjustment and Performance Check Procedure Title
	EXTERNAL CO	ONNECTORS (CONT)	
EXTERNAL KEYBOARD	25-pin female rear- panel connector for connecting an external keyboard.	Does not normally require cus Substantiated at the factory.	stomer verification.
GPIB IEEE-488-1978	24-pin female rear- panel connector for connecting instrument to GPIB. Meets IEEE-488-1978 (Not available on Option OD.)		
MEMORY BACK- UP POWER	Two rear-panel female banana jacks. Provides for external power to maintain power on RAM, thereby providing non-volatile memory.	Satisfactory operation substan procedure where plug-ins are POWER OFF.	tiated throughout removed and installed with
Voltage Requirement	6.0 to 6.5 V dc.		
TTL SIGNAL OUTPUT SWL/SWH	Rear-panel bnc connector provides TTL-compatible signal.	B8. Check TTL Signal Output.	C8. Check TTL Signal Output.
Output Level	Set by user commands available on the Wave- form Calculator.		
SWL Command	Selects low level output between 0 V and +0.8 V. Maximum current sink is 16 mA.		
SWH Command	Selects high level output between +2.4 V and +5.0 V. Maximum current source is 2.6 mA.		
+SAWTOOTH OUT	Rear-panel bnc connector.	B5. Check +Sawtooth Output.	C5. Check +Sawtooth Output.
Polarity	Positive-going with baseline at 0 V, within 1 V, into 1 MΩ load.		
Output Voltage	10 V maximum.	Does not normally require cust Satisfactory operation substant	comer verification.

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Characteristic	Performance Requirement	Part I Performance Check Procedure Title	Part II Adjustment and Performance Check Procedure Title	
	EXTERNAL C	ONNECTORS (CONT)		99,000,000 1999,000 1999,000 1999,000
+SAWTOOTH OUT (Continued)				
Rise Time into 50 Ω	50 mV/unit-of-time, selected by the time- base unit time/div switch, within 15%; 100 ns/div maximum.	Does not normally require of Satisfactory operation subst		
Rise Time into 1 MΩ	1 V/unit-of-time, within 10%, selected by the time-base unit time/div switch; 1 μ s/ div maximum.			
Output Resistance	Approximately 950 Ω.			
+GATE OUT	Rear-panel bnc connector.	B6. Check +Gate Output	C6. Check +Gate Output.	
A Gate	Derived from A HORIZ time-base unit main gate.			
B Gate	Derived from B HORIZ time-base unit main gate.			
Dly'd Gate	Derived from A HORIZ time-base unit delayed gate.			
Polarity				
A or B gate	Positive-going with baseline at 0 V, within 1.0 V, into 1 M Ω load.			
A Dly'd Gate	Positive level when A time-base delayed sweep or B sweep is enabled; 0 V, within 1.0 V, into 1 M Ω load, when sweeps are disabled.			
	Output is positive when no plug-in is used or when plug-in does not provide delay gate.			

Characteristic	Performance Requirement	Part I Performance Check Procedure Title	Part II Adjustment and Performance Check Procedure Title
	EXTERNAL	CONNECTORS (CON	Г)
+GATE OUT (Continued)			
Output Voltage	10 V maximum.	Does not normally require customer verification. Satisfactory operation substantiated at the factory.	
Into 50 Ω Load	0.5 V, within 10%.		
Into 1 $M\Omega$ Load	10 V, within 10%, (up to 1 μs/div).	~	
Rise Time into 50 Ω Output Resistance	20 ns or less. Approximately 950 Ω.		
SIGNAL OUT	Rear-panel bnc- connector selected by A TRIGGER SOURCE switch.	C3. Check Signal Out Selection.	D5. Check Trigger Selector Operation.
Source	Same as A TRIGGER SOURCE.		
Output Voltage	±15 V maximum.	Normally does not require Satisfactory operation subs	
Into 50 Ω Load.	25 mV/div of vertical deflection, with 25%.		
Into 1 MΩ Load.	0.5 V/div of vertical deflection, within 25%.		
Bandwidth into 50 Ω Load (−3 dB)	Varies with vertical plug-in selected. See 7000-Series Oscillo- scope Systems Speci- fications in the Operators Manual.	Does not normally require Satisfactory operation subs	
DC Centering	0 V, within 1 V, into 1 MΩ load.	C2. Check Vertical Signal Out DC Centering.	D4. Check/Adjust Vertical Signal Out DC Centering.
Aberrations	15% p-p, or less, within 50 ns of step.	Does not normally require Satisfactory operation subs	customer verification. stantiated at the factory.
Output Resistance	Approximately 950 Ω.		

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	Performance Check Summary		
Characteristic	Performance Requirement	Part I Performance Check Procedure Title	Part II Adjustment and Performance Check Procedure Title
	EXTERNAL CO	ONNECTORS (CON	NT)
Z-AXIS INPUT	Rear-panel bnc connector.	A2. Check External Z-Axis Operation.	B11. Check External Z-Axis Operation.
Polarity and Sensitivity	+2 V provides complete blanking from maximum intensity condition; -2 V provides complete unblanking from minimum intensity condition.		
Low-Frequency Limit	Dc.		ire customer verification. ubstantiated at the factory.
Input Resistance	Approximately 470 Ω.		
Input Capaci- tance	Less than 50 pF.		
Open Circuit Voltage	Approximately 0 V.		
Maximum Input Voltage	15 V (dc plus peak ac).		
Maximum Repe- tition Rate	1 MHz.		
SINGLE SWEEP RESET	Rear-panel bnc connector.	B7. Check Single Sweep Reset and Camera Connector.	C7. Check Single Sweep Reset and Camera Connector.
Input	Input to reset single- sweep function of time-base units installed in A and B HORIZ compartments.		
Signal Required	Closure to ground (or switching from the high level to the low level in less than 1 ms) resets the sweep.		
High Level	+50 V to +10 V, sinκ less than 40 μA.	Does not normally requ Satisfactory operation s	ire customer verification. Substantiated at the factory.
Low Level	+0.5 V to -5 V, sink less than 10 mA.		
Minimum Pulse Width	10 μ s at 50% ampli- tude points.		

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Characteristic	Performance Requirement	Part I Performance Check Procedure Title	Part II Adjustment and Performance Check Procedure Title
	EXTERNAL	CONNECTORS (CON	Τ)
SINGLE SWEEP RESET (Continued)		Does not normally require customer verification. Satisfactory operation substantiated at the factory.	
Maximum Input Voltage	+50 V to −5 V (dc plus peak ac).		
AC Power Input	3-pin male connector.	Does not normally require Substantiated at the factor	
	GPI	BINTERFACE	
	GPI	B INTERFACE	
Functions Imple- mented (as per IEE 488-1978)	Description:	Does not normally require Satisfactory operation sub	e customer verification. Ostantiated at the factory.
SH1	Complete Source Handshake.		
AH1	Complete Acceptor Handshake.		
Τ5	Talk Function.		
L3	Listen Function.		
SR1	Complete Service Request Capability.		
RL1	Complete Remote/ Local Capability.		
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No Parallel Poll Capability.

Capability.

Complete Device Clear

Complete Device Trigger Capability.

No Controller Capability.

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Characteristic	Performance Requirement	Part I Performance Check Procedure Title	Part II Adjustment and Performance Check Procedure Title	
	COMM	AND ACCURACY		
		NOTE		
0	II keyboard commands not listed f the >VCRD command. Refer to anguage, for additional informat	Section 9 of the Operators Ma		
Waveform Func- tions		Does not normally require Satisfactory operation sul	e customer verification. bstantiated at the factory.	
Arithmetic Functions				
SQRT LN EXP SGN +,-,/,*	Accurate to 4 signi- ficant digits ±(6*10 ⁻⁴) ,VSCL).			
Cursors Func- tions				
HCRD	Accurate to 4 signi- ficant digits ±(6*10 ⁻⁵)*(HSCL).			
VCRD	Accurate to 4 signi- ficant digits ±(6*10 ⁻⁵)*(VSCL).			
Data Storage Functions				
PNT	Accurate to 4 signi- ficant digits ±(6*10 ⁻⁵)*(VSCL).			
>PNT	Accurate to 4 signi- ficant digits ±(6*10 ⁻⁴)*(VSCL).			
Waveform Func- tions				
ORD SMOOTH DIFF INTRP INTG	Accurate to 4 signi- ficant digits ±(6*10 ⁻⁵)*(VSCL).			
>ORD	Accurate to 4 signi- ficant digits ±(6*10 ⁻⁴)*(VSCL).			
	If autoscaling occurs, all waveform points are rescaled to: $\pm(6*10^{-4})*(VSCL)$.			

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Characteristic	Performance Requirement	Part I Performance Check Procedure Title	Part II Adjustment and Performance Check Procedure Title
	COMMAN	D ACCURACY (CONT)	
Waveform Para- meters		Does not normally require of Satisfactory operation subst	
MAX MIN P-P MID MEAN RMS	Accurate to 4 signi- ficant digits ±(6*10 ⁻⁵)*(VSCL).		
ENERGY	Accurate to 4 signi- ficant digits ±(6*10 ⁻⁵)*(VSCL ²) *(HSCL).		
AREA	Accurate to 4 signi- ficant digits ±(6*10 ⁻⁵)*(VSCL) *(HSCL).		
FREQ	Accurate to 4 signi- ficant digits ±(6*10 ⁻⁴)*(HSCL).		
DELAY WIDTH RISE FALL PER	Accurate to 4 signi- ficant digits ±(6*10 ⁻⁴)*(HSCL).		
Waveform Scaling Functions			
VZR VSCL >VSCL	Accurate to 4 signi- ficant digits ±(6*10 ⁻⁵)*(VSCL).		
HSCL >HSCL	Accurate to 4 signi- ficant digits ±(6*10 ⁻⁵)*(HSCL).		
>VZR VXPD	Accurate to 4 signi- ficant digits ±(6*10 ⁻⁴)*(VSCL).		
Constant Func- tions			
Arithmetic Functions			
SQRT LN EXP +,-,/,*	Accurate to 4 signi- ficant digits.		

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Characteristic	Performance Requirement	Part I Performance Check Procedure Title	Part II Adjustment and Performance Check Procedure Title	
	POV	VER SOURCE		* -
Voltage Range (AC, RMS)	Selected by rear-panel LINE VOLTAGE SELECTOR switch.	Does not normally require Satisfactory operation sub		~
115 V Range	From 90 to 132 V.			
230 V Range	From 180 to 250 V.			
Line Frequency	From 48 to 440 Hz.			
Maximum Power Consumption	230 W, nominal.			
Maximum Current	3.5 A at 60 Hz, 90 V line. 1.8 A at 60 Hz, 180 V line.			
Fuse	4 A fast-blowing type.			
	WAVEFO	ORM CALCULATOR		~
Keyboard		Does not normally require Satisfactory operation su	e customer verification. bstantiated at the factory.	••
Controls	An array of key switches which allows the user to execute commands; pressing a key issues a command to the processor			
	(except in the GPIB Remote mode).			-
External Connector	25-pin male connector on 56 inch (±3 inches) cable for connecting the keyboard to the mainframe.	Does not normally requir Substantiated at the factor		

ADJUSTMENT INTERVAL

To maintain instrument accuracy, check performance every 1000 hours of operation, or every 6 months if used infrequently. Before complete adjustment, thoroughly clean and inspect this instrument as outlined in the Maintenance section.

TEKTRONIX FIELD SERVICE

Tektronix Field Service Centers and the Factory Service Center provide instrument repair and adjustment services. Contact your Tektronix Field Office or representative for further information.

TEST EQUIPMENT REQUIRED

The test equipment listed in Table 4-3 is required for a complete Adjustment and Performance check of the 7854 Oscilloscope. If only a Performance Check is to be performed, the items required for Adjustment only are not used and are indicated by footnote 1. The remaining test equipment is common to both procedures.

The specifications for test equipment, given in Table 4-3 are the minimum required to meet the performance requirements. Detailed operating instructions for test equipment are omitted in these procedures. Refer to the test equipment instruction manual if more information is needed.

SPECIAL FIXTURES

Special fixtures are used only where they facilitate instrument adjustment. These fixtures are available from Tektronix, Inc. Order by part number from Tektronix Field Offices or representatives.

TEST EQUIPMENT ALTERNATIVES

All of the listed test equipment is required to completely calibrate this instrument. However, complete checking or adjusting may not always be necessary or desirable. You may be satisfied with checking only selected characteristics, thereby reducing the amount of test equipment actually required.

The calibration procedures in Part II are based on the first item of equipment given as an example. When other equipment is substituted, control settings or setups, may need to be altered. If the exact item of equipment given as an example in Table 4-3 is not available, first check the Minimum Specifications column carefully to see if any other equipment might suffice. Then check the Purpose column to see what this item is used for. If used for a performance check or adjustment that is of little or no importance for your measurement requirements, the item and corresponding step(s) can be deleted.

Description	Minimum Specifications	Purpose	Examples of Applicable Test Equipment
1. Test Oscilloscope	Bandwidth, dc to 200 megahertz, minimum deflection factor 10 millivolts/division; accuracy, within 3%. Dual-channel and both added and alternate vertical modes.	Used throughout cali- bration procedure.	a. TEKTRONIX 7704A Oscilloscope System with 7A18 and 7A29 Amplifier; 7B80 or 7B10 Time Base, and P6053B Probe. b. TEKTRONIX 475 Oscilloscope with P6053B Probe. c. Refer to the Tek- tronix Products catalog for compatible oscillo-
			scope system.
2. Amplifier Unit (Two Required, one may be 3	Tektronix 7A-series plug-in unit.	Used throughout pro- cedure to provide vertical input to the	a. TEKTRONIX 7A26 Amplifier.
pelow)		instrument under adjustment.	b. TEKTRONIX 7A16A Amplifier.

TABLE 4-3 Test Equipment

TABLE 4-3 (CONT) Test Equipment

Description	Minimum Specifications	Purpose	Examples of Applicable Test Equipment
3. Amplifier Unit (Dual Trace)	Any 7A-series dual display amplifier unit.	Used to check position and operation of read- out display.	a. Any 7A-series dual amplifier unit (may be shared with a 7000- series test oscillo- scope).
4. Time-Base Unit (Two,	Sweep rate 5 nano- seconds/division.	Used throughout procedure to provide	a. TEKTRONIX 7B92A Time Base.
One Delaying)	ne Delaying)	sweep.	b. TEKTRONIX 7B15 Time Base.
			c. TEKTRONIX 7B10 Time Base.
lizer (Two	Produces gain-check and pulse-response waveforms.	Used throughout pro- cedure to standardize instrument so plug-in	a. Tektronix Calibration Fixture 067-0587-02.
nequired,	(quired) waveforms.	units can be inter- changed without complete readjustment. Also used to adjust crt geometry.	b. 7000-series plug- in units with suitable signal sources may be substituted if lower performance is accep- table.
6. Plug-In Extender (Rigid Calibration Fixture)	Provides access to plug-in connectors.	Power Supply Voltage, Trigger system and Digitizer System checks and adjust- ments.	a. Tektronix Part 067-0589-00.
7. 7854 Analog ¹ Test Card	Allows operation of the analog system with digital boards removed.	Used to adjust the Vertical Amplifier thermal compen- sations.	a. Tektronix Part 067-0912-00.
8. Precision DC Voltmeter (DVM)	Range, -75 to +200 volts; accuracy, within 0.1%.	Check and adjustment of calibrator output accuracy, power	a. TEKTRONIX DM501 Digital Multimeter with power module.
		supply voltages and Z-axis display voltages.	b. Fluke Model 825A Differential DC Volt- meter.
9. Timè-Mark Generator	Marker outputs, 1 nanosecond to 0.1 second; marker	Check and adjustment of horizontal timing, digitizer timing, and	a. TEKTRONIX TG 501 Time-Mark Generator with power module.
	accuracy; within 0.1%, trigger output, 1 milli- second.	calibrator frequency.	b. TEKTRONIX Type 184 Time-Mark Generator.

¹ Used for calibration only; not used for performance check.

TABLE 4-3 (CONT) Test Equipment

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Description	Minimum Specifications	Purpose	Examples of Applicable Test Equipment
10. Low-Fre- quency Sine- Wave Generator	Frequency, 250 kilo- hertz to 250 mega- hertz; output amplitude, variable from 50 milli- volts to 3 volts into 50 ohms.	Check and adjust hori- zontal bandwidth, digitizer bandwidth, and external Z-Axis inputs.	a. TEKTRONIX SG 503 Leveled Sine-Wave Generator with power module.
			b. General Radio 1310-B Oscillator.
11. High-Fre- quency Sine- Wave Generator	Frequency 250 mega- hertz to 475 MHz, reference frequency, 10 megahertz or lower; output amplitude, variable from 0.5 to 4 volts into 50 ohms; amplitude accuracy, constant within 1% of reference as output frequency changes.	Check and adjustment of vertical bandwidth, digitizer bandwidth, and vertical channel isolation.	a. TEKTRONIX SG 504 Leveled Sine-Wave Generator with power module.
12. Function Generator	Waveform outputs; sinewave, squarewave and triangular from 6 Hz to 3 MHz.	Used throughout pro- cedure for signal source.	a. TEKTRONIX FG503, with Power Module.
13. 10X Passive	Compatible with test oscilloscope to be used.	Used to check signals out, digitizer signal levels, calibrator and Z-axis adjustment.	a. TEKTRONIX P6053B.
Prove With Short Grounding Strap ¹			b. TEKTRONIX P6054A.
14. Coaxial Cable Two each 42 nch, one each 18 inch)	Impedance, 50 ohms; type, RG-58/U; length, 18 and 42 inches; connectors, bnc.	Signal interconnection.	a. Tektronix Part 012-0076-00 (18 inches) and Tektronix Part 012-0057-01 (42 inches).
15. 50 Ohm Ferminators (Two Each)	Impedance, 50 ohms; accuracy, within 2%; connectors, bnc.	Output termination for signal generators, if amplifier unit is not 50-ohm input impe- dance, and termination of trigger inputs.	a. Tektronix Part 011-0049-01.
16. 2X Atten- uator	Accuracy within 2%; connectors, bnc.	Check Vertical band- width.	a. Tektronix Part 011-0069-02.
17. Bnc-T Connector	Bnc-to-bnc.	Used to check external Z-axis operation, X-Y Compensation and vertical channel switch.	a. Tektronix Part 103-0030-00.
8. Screwdriver ¹	2 inch shaft, slot type.	Used to adjust Y-axis alignment.	a. Tektronix Part 003-0511-00.
			b. Xcelite R182.

¹ Used for calibration only; NOT used for performance check.

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TABLE 4-3 (CONT) Test Equipment

Description	Minimum Specifications	Purpose	Examples of Applicable Test Equipment
19. Nylon Tuning Tool ¹	1 inch shaft.	Adjustment of Vertical high-frequency compensations.	a. Tektronix Part 003-0675-00.
20. Low-Capa- citance Screw- driver ¹	1 inch shaft.	Used throughout adjustment procedure to adjust variable components.	a. Tektronix Part 003-0000-00.
21. Screwdriver ¹ (Phillips head)	3 inch shaft, 3∕32-inch bit.	Used for power supply and rear panel removal.	a. Tektronix Part 003-0341-00.
22. 18″ Jumper Wire	18 inch with alligator or similar clips.	Used to center vertical Amplifier and set Digitizer codes.	a. Allied Part 920-605.
23. Bnc to Clip Lead Adapter	Bnc to 2 lead.	Used to check TTL SIGNAL OUTPUT.	a. Tektronix Part 013-0076-00.
24. Battery	6 V to 6.5 V at 0.7	Used throughout	a. Gates #0800-0011.
	amps with appropriate connectors.	procedure as Memory Backup power.	b. Gates #0810-0011.
25. Resistor	887 ohm.	Used to check TTL SIGNAL OUTPUT.	a. Tektronix Part 321-0188-00.
26. Resistor	909 ohm.	Used to check TTL SIGNAL OUTPUT.	a. Tektronix Part 321-0189-00.

¹ Used for calibration only; NOT used for performance check.

PART 1—PERFORMANCE CHECK

The following procedure (Part 1—Performance Check) verifies electrical specifications without removing instrument covers or making internal adjustments. All tolerances given are as specified in the Performance Check Summary Table 4-2.

Part II---Adjustment and Performance Check provides the information necessary to: (1) verify that the instrument meets the electrical specifications, (2) verify that controls function properly, and (3) perform all internal adjustments.

A separate Real-Time Functions Checkout Procedure is provided in the 7854 Operators Manual. Also, each waveformprocessor function is demonstrated in the Measurement Keyboard and Waveform Calculator sections of the Operators Manual. (Refer to Table of Contents or Command Index for specific functions.)

INDEX TO PERFORMANCE CHECK PROCEDURE

 A. Z-AXIS AND DISPLAY
B. CALIBRATOR AND OUTPUT SIGNALS 4-23 1. Preliminary Setup Conditions 4-23 2. Check Calibrator Output Voltage 4-23 3. Check Calibrator 1 kHz Repetition Rate 4-24 4. Check Calibrator Amplitude 4-25 5. Check ± Sawtooth Output 4-26 6. Check + Gate Output 4-26 7. Check Single Sweep Reset and Camera Connector 4-27 8. Check TTL Signal Output 4-28
C. TRIGGER SYSTEM
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 E. VERTICAL SYSTEM
F. VERTICAL AND HORIZONTAL PICKOFF SYSTEM

2. Check Vertical Sampler Offset 4-37
3. Check Horizontal Sampler Offset 4-38
4. Check Digitizer Vertical Gain 4-39
5. Check Digitizer Horizontal Gain 4-40
6. Check Vertical Digitizer Numeric
Noise 4-40
7. Check Horizontal Digitizer Numeric
Noise 4-41

PERFORMANCE CHECK POWER-UP SEQUENCE

NOTE

The performance of this instrument can be checked at any ambient temperature from 0° to +50° C unless otherwise stated.

1. Check that the instrument has been set for the proper power source and also that a suitable power cord and plug has been attached. Refer to Power Source Information in Section 1 for specific details.

2. Connect the instrument to the power source.

3. Connect the memory backup battery to the MEMORY BACKUP POWER INPUT.

4. Press the POWER button and allow 20 minutes warmup before proceeding.



To prevent instrument damage, turn off 7854 POWER before installing or removing plug-in units.

NOTE

To maintain the front-panel mode settings when switching plug-ins with POWER OFF, external power must be applied to the rearpanel MEMORY BACKUP POWER INPUT.

A. Z-AXIS AND DISPLAY

Equipment Required: (Numbers correspond to those listed in Table 4-3, Test Equipment.)

2. Amplifier unit

17. Bnc-T connector

4. Time base

24. Battery (memory backup)

10. Low-frequency sine-wave generator

14. Coaxial Cable (two 42-inch required)

Shaded lines identify Performance Requirement CHECK.

A1. Z-AXIS AND DISPLAY PRELIMINARY SETUP

a. Perform the Performance Check Power-Up Sequence.

b. Refer to Section 5, Instrument Options, and the Change Information at the rear of this manual for any modifications which may affect this procedure.

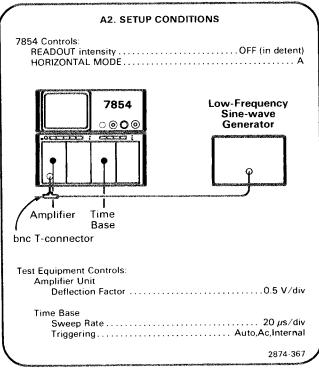
c. Set the 7854 controls as follows:

POWER On (pushbutton in) VERTICAL MODE LEFT VERT TRACE SEPARATION (B) Midrange
A TRIGGER SOURCE
HORIZONTAL MODE A
B INTENSITY Fully counterclockwise B TRIGGER SOURCE VERT MODE
FOCUS
READOUT OFF (in detent)
GRAT ILLUMMidrange CONTROL ILLUMMEDIUM (rear panel) STORED INTENSITY Fully counterclockwise

A2. CHECK EXTERNAL Z-AXIS OPERATION

NOTE

First perform step A1, then proceed.



a. Set the low-frequency sine-wave generator for a 4division display at 50 kilohertz (one volt above and below ground).

b. Set the A INTENSITY control for a dim display.

c. Connect the signal from the output of the bnc Tconnector at the Amplifier input to the Z-AXIS INPUT connector on the rear panel with bnc cable.

d. **CHECK**—Positive portion of the displayed waveform is blanked out.

	Equipment Required: (Numbers correspond to those	listed in Table 4-3, Test Equipment.)
and constant	1. Test oscilloscope	17. Bnc-T connector
	4. Time base	22. Jumper wire
	8. Precision dc voltmeter (DVM)	23. Bnc-to-clip lead adaptor
	9. Time-mark generator or frequency counter	24 Rattery (memory backup)
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Calibration Part I-7854 Performance Check

d. Disconnect the DVM.

e. Connect a 50-ohm terminator to the CALIBRATOR output.

f. Connect the DVM to the terminated CALIBRATOR output.

g. CHECK—Meter reading for 0.0397 to 0.0404 volt.

h. Disconnect the DVM and terminator.

NOTE

An alternate method for step B3 is to use a frequency counter, with at least 0.1% accuracy, and check the CALIBRATOR rep rate to be exactly 1 kHz.

a. The 1-millisecond time-markers are connected to the test oscilloscope external trigger input and to the noninverting vertical channel of the test oscilloscope (use a bnc-T connector). The 7854 CALIBRATOR output is connected to the inverting input of the test oscilloscope.

b. Set the test oscilloscope triggering level for a stable time-mark display.

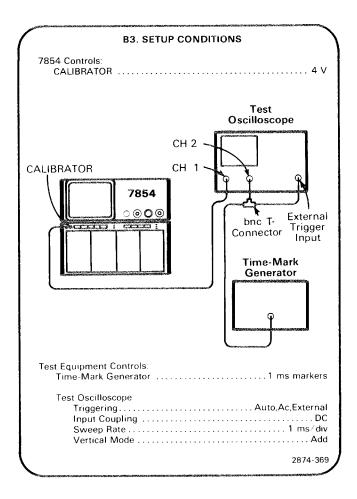
c. Set the test oscilloscope vertical deflection factors to display 2 divisions of CALIBRATOR signal and 1 division of time-marker signal.

d. Set the test oscilloscope sweep rate for 0.2 second/ division.

B3. CHECK CALIBRATOR 1-kHz REPETITION RATE

NOTE

If the preceding step was not performed, first perform step B1, then proceed.



e. **CHECK**—The time required for the 1-millisecond time marks to drift from the positive level of the CALIBRATOR signal to the negative level, and back to the positive level must be more than 0.4 second (2 divisions). This time can be measured directly from the display by observing the number of divisions that the markers move across the display area before it returns to the positive level.

f. Disconnect the bnc cable.

B4. CHECK CALIBRATOR AMPLITUDE

NOTE

If the preceding step was not performed, first perform step B1, then proceed.

B4. SETUP CONDITIONS 7854 Controls CALIBRATOR 4 V Test CALIBRATOR Oscilloscope 7854 ୖୖୄଠ CH 1 bnc cable **Test Equipment Controls:** Test Oscilloscope Sweep Rate Triggering Auto, Ac, Internal Deflection Factor 1 V/div Input CouplingGnd 2874-370

a. Set the ground reference level on the test oscilloscope to 2 divisions below graticule center.

b. Set the test oscilloscope input coupling to dc.

c. **CHECK**—Test oscilloscope for a 4-division display within 0.04-division.

d. Set the CALIBRATOR select switch to 0.4 V.

e. Set the test oscilloscope deflection factor to 0.1 V/ division.

f. **CHECK**—Test oscilloscope for a 4-division display within 0.04-division.

g. Set the CALIBRATOR select switch to 40 mV.

h. Set the test oscilloscope deflection factor to 10 mV/ division.

i. **CHECK**—Test oscilloscope for a 4-division display within 0.04-division.

j. Install a 50 Ω terminator between the CALIBRATOR output and the bnc cable.

k. Set the test oscilloscope deflection factor to 5 mV/ division.

I. **CHECK**—Test oscilloscope for a 0.8-division display within 0.01 division.

m. Set the CALIBRATOR select switch to 0.4 V.

n. Set the test oscilloscope deflection factor to 10 mV/division.

o. **CHECK**—Test oscilloscope for a 4-division display within 0.04-division.

p. Set the CALIBRATOR select switch to 4 V.

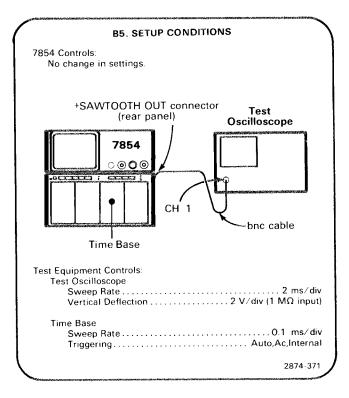
q. Set the test oscilloscope deflection factor to 0.1 V/ division.

r. **CHECK**—Test oscilloscope for a 4-division display within 0.04-division.

B5. CHECK +SAWTOOTH OUTPUT

NOTE

If the preceding step was not performed, first perform step B1, then proceed.



a. **CHECK**—That the slope of the test oscilloscope display is positive-going and that the sawtooth baseline is within 1 volt of ground.

b. If a signal is not present at the +SAWTOOTH OUT connector, move the time-base unit to the B HORIZ compartment of the 7854.

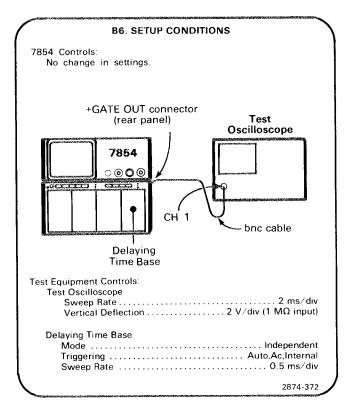
c. **CHECK**—That the test oscilloscope display is positivegoing and that the sawtooth baseline is within 1 volt of ground.

d. Disconnect the bnc cable.

B6. CHECK +GATE OUTPUT

NOTE

If the preceding step was not performed, first perform step B1, then proceed.



a. **CHECK**—Test oscilloscope display for a positive-going gate waveform with a baseline at 0 volt, within 1 volt.

b. If a signal is not present at the +GATE OUT connector move the time-base unit to the A HORIZ compartment.

c. **CHECK**—Test oscilloscope display for a positive-going gate waveform with a baseline at 0 volt, within 1 volt.

e. If a signal is not present at the +GATE OUT connector, set the time base B Delay Mode switch to B Starts After DIy.

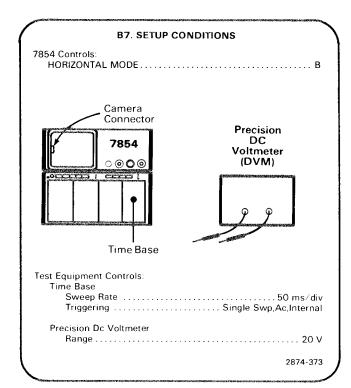
e. **CHECK**—Test oscilloscope display for a positive-going gate waveform with a baseline at 0 volt, within 1 volt.

f. Disconnect the bnc cable.

B7. CHECK SINGLE SWEEP RESET AND CAMERA CONNECTOR

NOTE

If the preceding step was not performed, first perform step B1, then proceed.



a. Connect the precision dc voltmeter between the top pin of the camera connector on the crt bezel and chassis ground.

b. **CHECK**—Voltmeter reading to be +15 volts within 0.15 volt.

c. Connect the precision dc voltmeter between the bottom pin of the camera connector on the crt bezel and chassis ground.

d. **CHECK**—Voltmeter reading to be 0 volt.

e. Momentarily short the center pin of the camera connector on the crt bezel to the bottom pin of the camera connector using the jumper wire.

f. CHECK---Time bases Single Sweep Reset Ready indicator should be illuminated.

g. Momentarily short the center pin of the camera connector on the crt bezel to the bottom pin of the camera connector using the jumper wire.

h. CHECK—Time bases Trig'd indicator should illuminate and a sweep should occur.

i. Momentarily short the center pin of the rear-panel SINGLE SWEEP RESET bnc connector to ground using the jumper wire.

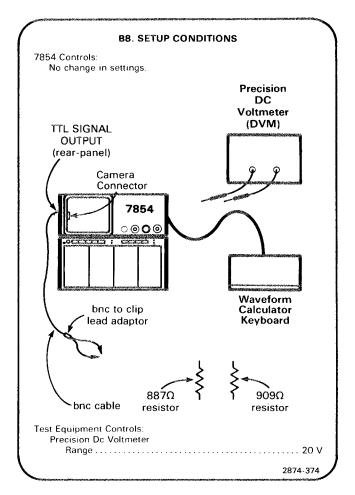
j. **CHECK**—Time base Single Sweep Reset Ready indicator should be illuminated.

k. Momentarily short the center pin of the rear-panel SINGLE SWEEP RESET bnc connector to ground using the jumper wire.

I. **CHECK**—Time bases Trig'd indicator should illuminate and a sweep should occur.

B8. CHECK TTL SIGNAL OUTPUT NOTE

If the preceding step was not performed, first perform step B1, then proceed.



a. Connect a 909 Ω resistor (Tek Part No. 321-0189-00) to the red clip lead.

b. Connect the precision dc voltmeter (DVM) across the clip adaptor, observing clip adaptor polarity.

c. Press the SWH pushbutton on the WAVEFORM CALCULA-TOR keyboard.

d. Momentarily short the unattached end of the resistor to the upper pin of the camera connector (on crt bezel).

e. **CHECK**—Voltmeter reading to be between 0 volt and +0.8 volt.

f. Remove the 909 Ω resistor and replace it with an 887 Ω resistor (Tek Part No. 321-0188-00).

g. Sequentially press the *f* and SWL pushbuttons on the WAVEFORM CALCULATOR keyboard.

h. Momentarily short the unattached end of the resistor to the lower pin of the camera connector (on crt bezel).

i. **CHECK**—Voltmeter reading to be between +2.4 volts and +5.0 volts.

j. Disconnect bnc cable, clip adaptor and voltmeter.

NOTE

The output at the SIGNAL OUT connector is checked in the Trigger System procedure.

C. TRIGGER SYSTEM

Equipment Required: (Numbers correspond to those listed in Table 4-3, Test Equipment.)

1. Test oscilloscope

- 2. Amplifier unit
- 4. Timebase (two required)
- 5. Signal Standardizer

12. Function Generator

14. Coaxial Cable (one 18-inch, two 42-inch required)

24. Battery (memory backup)

Shaded lines identify Performance Requirement CHECK.

C1. TRIGGER SYSTEM PRELIMINARY SETUP

a. Perform the Performance Check Power-up Sequence.

b. Refer to Section 5, Instrument Options, and the Change Information at the rear of this manual for any modifications which may affect this procedure.

c. Set the 7854 controls as follows:

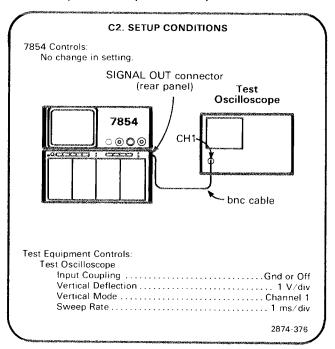
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POWER switch
VERTICAL MODE
VERT TRACE SEPARATION (B) Midrange
A TRIGGER SOURCE VERT MODE
A INTENSITY Fully counterclockwise
HORIZONTAL MODE A
B INTENSITY Fully counterclockwise
B TRIGGER SOURCE VERT MODE
FOCUS Midrange
READOUT intensity OFF (in detent)
GRAT ILLUM Midrange

C2. CHECK VERTICAL SIGNAL OUT DC CENTERING

NOTE

First perform step C1, then proceed.



a. Establish a ground reference for the test oscilloscope by positioning the trace to the graticule center line. Do not change the test oscilloscope position control after setting this ground reference.

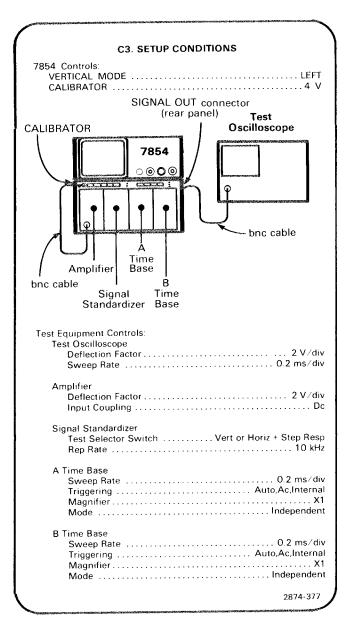
b. Set the test oscilloscope input coupling switch to dc.

c. **CHECK**—Test oscilloscope display for a dc level within 1 division of the ground reference established in part (a).

C3. CHECK SIGNAL OUT SELECTION

NOTE

If the preceding step was not performed, first perform step C1, then proceed.



a. Set the A INTENSITY control for a visible display. Set the amplifier for a 2-division display in the lower half of the gratricule area. Set the A time-base unit triggering controls for a stable display.

b. Set the VERTICAL MODE switch to RIGHT.

c. Set the Signal Standardizer Amplitude and Position controls for a 2-division display in the upper half of the graticule area.

d. Set the VERTICAL MODE switch to ALT.

e. **CHECK**—For 1-kHz and 10-kHz triggered waveforms on the test oscilloscope crt (adjust the time-base unit trigger level controls as necessary).

f. Set the A TRIGGER SOURCE switch to LEFT VERT.

g. **CHECK**—Sequentially select all positions of the VERTICAL MODE switch and check for a stable display of only the 1-kHz waveform on the test oscilloscope.

h. Set the A TRIGGER SOURCE switch to RIGHT VERT.

i. **CHECK**—Sequentially select all positions of the VERTICAL MODE switch and check for a stable display of only the 10-kHz waveform on the test oscilloscope.

D. HORIZONTAL SYSTEM

Equipment Required: (Numbers correspond to those listed in Table 4-3, Test Equipment)2 Amplifier unit (two required)10. Low-frequency sine-wave generator4 Time base12. Function Generator5. Signal Standardizer unit14. Coaxial Cable (one 18-inch, two 42-inch required)9. Time-mark generator24. Battery (memory backup)

Shaded lines identify Performance Requirement CHECK.

D1. HORIZONTAL SYSTEM PRELIMINARY SETUP

a. Perform the Performance Check Power-Up Sequence.

b. Refer to Section 5, Instrument Options, and the Change Information at the rear of this manual for any modifications which may affect this procedure.

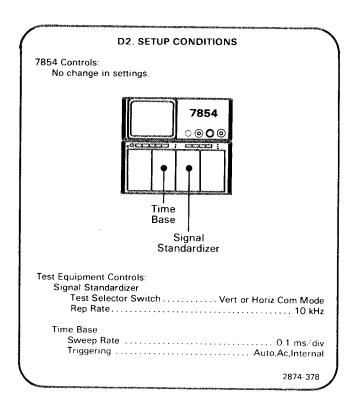
c. Set the 7854 controls as follows:

POWER switch On (pushbutton in)
VERTICAL MODE
VERT TRACE SEPARATION (B) Midrange
A TRIGGER SOURCE VERT MODE
A INTENSITY Midrange
HORIZONTAL MODE
B INTENSITY Midrange
B IRIGGER SOURCE
FOCUS Midrange
READOUT intensity OFF (in detent)
GRAT ILLUMAs desired
CRT DISPLAY SCOPE



NOTE

First perform step D1, then proceed.



a. Set the A INTENSITY and FOCUS controls for a well defined trace.

b. Set the Signal Standardizer Test selector switch to Vert or Horiz Gain. align the bright vertical trace with the center vertical graticule line using the Signal Standardizer Position control.

c. **EXAMINE**—For 8 divisions of deflection between the center nine traces within 0.08 division. Note the exact deflection for comparison in part f.

Calibration Part I—7854 Performance Check

d. Move the Signal Standardizer to the B HORIZ compartment.

e. Set the HORIZONTAL MODE switch to B.

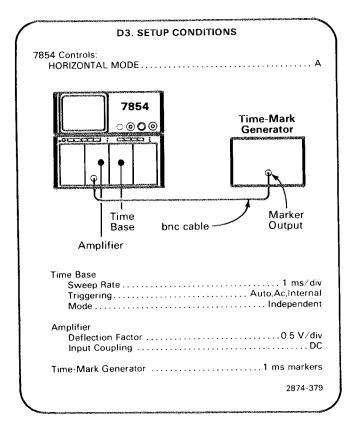
f. **CHECK**—For 8 divisions of deflection between the center nine traces within 0.08 division of the deflection noted in part c.

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D3. CHECK 1 MS LINEARITY AND HIGH-FREQUENCY TIMING

NOTE

If the preceding step was not performed, first perform step D1, then proceed.



a. Set the Amplifier unit deflection factor for about 2 divisions of time marker display.

b. Set the time-base unit triggering controls for a stable display.

c. Position the first marker to the extreme left line on the graticule.

d. Set the time-base unit sweep calibration pre-set for 1 marker at each major graticule division between the second and tenth graticule lines (center 8 divisions).

e. **CHECK**—That each time-mark aligns with a vertical graticule line along the center horizontal graticule line within 0.05 division (1/4 of a minor division). This verifies 1 ms/div linearity.

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f. Apply 1 nanosecond time markers and set the Amplifier unit vertical deflection for about 2 divisions of display.

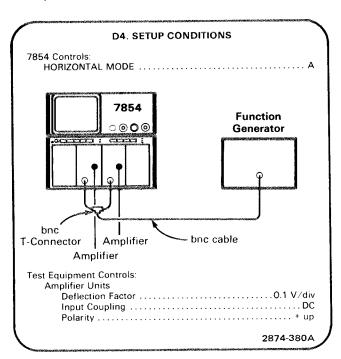
g. Set the time base unit for 500 ps/division sweep rate.

h. **CHECK**—For 1 time-mark every 2 divisions over the center 8 divisions of the display within 0.2 division.

D4. CHECK X-Y PHASING

NOTE

If the preceding step was not performed, first perform step D1, then proceed.



a. Set the function generator for eight divisions of vertical and horizontal deflection of a 35 kHz sinewave.

b. **CHECK**—Crt Lissajous display (see Figure 4-1) for a separation of 0.28 division or less (indicates 2 degrees or less phase shift).

c. Remove the Amplifier unit from the RIGHT VERT compartment and install it in the LEFT VERT compartment.

d. Set the VERTICAL MODE switch to LEFT.

e. **CHECK**.—Crt Lissajous display for a separation of 0.28 division or less (indicates 2 degrees or less of phase shift).

NOTE

If the instrument under calibration contains Option 02, omit the remainder of this step.

f. Remove the Amplifier Unit from the A HORIZ compartment and install it in the B HORIZ compartment.

g. Set the HORIZONTAL MODE switch to B.

h. **CHECK**—Crt Lissajous display for a separation of 0.28 division or less (indicates 2 degrees or less of phase shift).

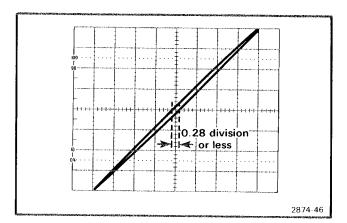


Figure 4-1. Typical display when checking X-Y Phase relationships.

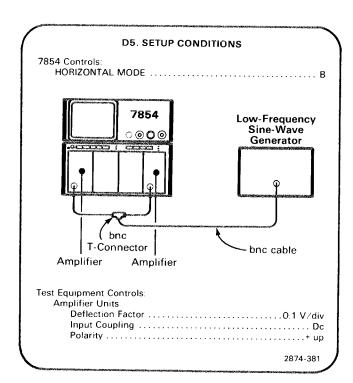
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D5. CHECK X-Y COMPENSATION (OPTION 02 ONLY)

NOTE

If the instrument under calibration does not contain Option 02, omit this step.

If the preceding step was not performed, first perform step D1, then proceed.



a. Set the low-frequency sine-wave generator for eight divisions of vertical and horizontal deflection at 1 MHz.

b. **CHECK**—Crt Lissajous display for a separation of 0.28 division or less (indicates 2 degrees or less phase shift).

c. Remove the Amplifier unit from the LEFT VERT compartment and install it in the RIGHT VERT compartment.

d. Set the VERTICAL MODE switch to RIGHT

c. **CHECK**—Crt Lissajous display for a separation of 0.28 division or less (indicates 2 degrees or less of phase shift).

E. VERTICAL SYSTEM

Equipment Required: (Numbers correspond to those listed in Table 4-3, Test Equipment).		
2. Amplifier	11. High-Frequency sine-wave generator	
4. Time base	14. Coaxial cable (one 42-inch required)	
5. Signal Standardizer	15. 50-ohm terminators (two required)	
6. Plug-in Extender	24. Battery (memory backup)	
10. Low-Frequency sine-wave generator		

Shaded lines identify Performance Requirement CHECK.

E1. VERTICAL SYSTEM PRELIMINARY SETUP

a. Perform the Performance Check Power-Up Sequence.

b. Refer to Section 5, Instrument Options, and the Change Information at the rear of this manual for any modifications which may affect this procedure.

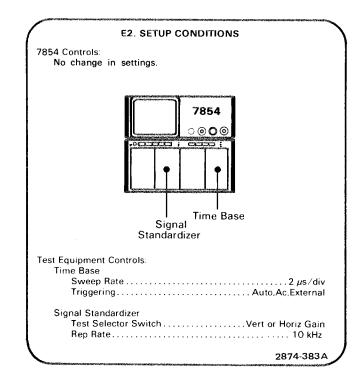
c. Set 7854 Oscilloscope controls as follows:

POWER switch ON VERTICAL MODE	RIGHT
VERT TRACE SEPARTION (B)	Midrange
A TRIGGER SOURCE	VERT MODE
A INTENSITY	Midrange
HORIZONTAL MODE	В
B INTENSITY	Midrange
B TRIGGER SOURCE	
FOCUS	Midrange
READOUT intensity	OFF (in detent)
GRAT ILLUM	As desired
CRT DISPLAY	SCOPE

E2. CHECK DIFFERENCE BETWEEN VERTICAL CHANNELS

NOTE

First perform step E1, then proceed.



a. Position the Signal-Standardizer display to align the bright trace with the graticule center line.

b. **EXAMINE**—For one trace per graticule division within 0.06 division over the center 6 graticule divisions. Note the exact magnitude for comparison in part e.

c. Remove the Signal Standardizer from the RIGHT VERT compartment and install it in the LEFT VERT compartment.

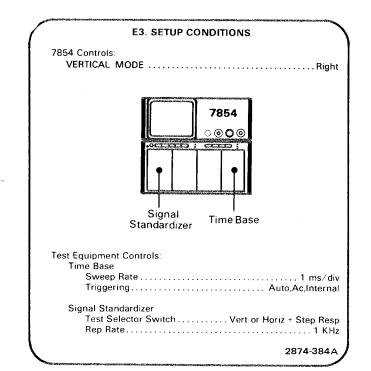
d. Set the VERTICAL MODE switch to LEFT.

e. **CHECK**—For one trace per graticule division within 0.06 division of the magnitude noted in part b over the center 6 graticule divisions (verifies gain difference between vertical channels to be 1% or less).

E3. CHECK VERTICAL LOW-FREQUENCY LINEARITY

NOTE

If the preceding step was not performed, first perform step E1, then proceed.



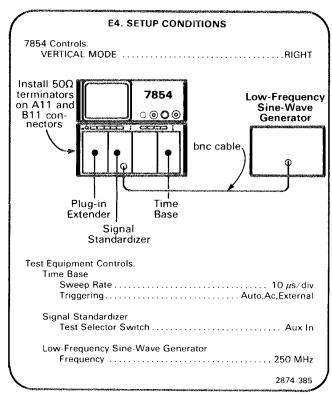
a. Set the Signal Standardizer Amplitude and Position controls to display exactly 2 divisions of signal in the center of the graticule area.

b. **CHECK**—Position the two-division display vertically and check for not more than 0.1 division of compression or expansion anywhere within the graticule area (verifies low-frequency linearity specification).

E4. CHECK VERTICAL CHANNEL ISOLATION

NOTE

If the preceding step was not performed, first perform step E1, then proceed.



a. Set the ouput of the low-frequency sine-wave generator and the Signal Standardizer Amplitude control for 8 divisions of deflection at 250 MHz.

b. Set the VERTICAL MODE switch to LEFT.

c. **CHECK**—The displayed signal for an amplitude of 0.08 division or less while adjusting the low-frequency sine-wave generator from 250 MHz to 50 MHz (verifies 250-MHz isolation of at least 100:1).

d. Move the Signal Standardizer to the LEFT VERT compartment and the Plug-in Extender (with 50-ohm terminators on A11 and B11 connectors) to the RIGHT VERT compartment.

e. Set the output of the low-frequency sine-wave generator and the Signal Standardizer amplitude control for 8 divisions of display at 250 MHz.

f. Set the VERTICAL MODE switch to RIGHT.

Calibration Part I-7854 Performance Check

g. **CHECK**—Displayed signal for an amplitude of 0.08 division or less while adjusting the low-frequency sinewave generator from 250 MHz to 50 MHz (verifies 250-MHz isolation of at least 100:1).

h. Disconnect the low-frequency sine-wave generator from the Signal Standardizer and connect the highfrequency sine-wave generator to the Signal Standardizer Aux In input.

i. Set the VERTICAL MODE switch to LEFT.

j. Set the output of the high-frequency sine-wave generator and the Signal Standardizer Amplitude control for 8 divisions of display at 475 MHz.

k. Set the VERTICAL MODE switch to RIGHT.

I. **CHECK**—Displayed signal for an amplitude of 0.2 division or less while adjusting the high-frequency sinewave generator from 475 MHz to 250 MHz (verifies 475-MHz isolation of at least 40:1).

m. Move the Signal Standardizer to the RIGHT VERT compartment and the Plug-in Extender to the LEFT VERT compartment.

n. Set the output of the high-frequency sine-wave generator and Signal Standardizer Amplitude control for 8 divisions of display at 475 MHz.

o. Set the VERTICAL MODE switch to LEFT.

p. **CHECK**—Displayed signal for an amplitude of 0.2 division or less while adjusting the high-frequency sine-wave generator from 475 MHz to 250 MHz (verifies 475-MHz isolation of at least 40:1).

F. VERTICAL AND HORIZONTAL PICKOFF SYSTEM

Equipment Required: (Numbers correspond to those listed in Table 4-3, Test Equipment).

- 4. Time base
- 5. Signal Standardizer
- 6. Plug-in Extender
- 9. Time-mark generator
- 13. X10 Probe

14. Coaxial cable (one 18-inch, one 42-inch required)

- 16. 2X Attenuator
- 24. Battery (memory backup)

Shaded lines identify Performance Requirement CHECK.

F1. PICKOFF SYSTEM PRELIMINARY SETUP

a. Perform the Performance Check Power-Up Sequence.

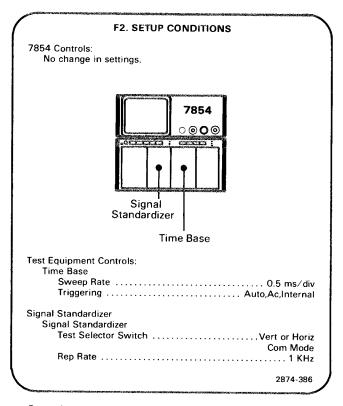
b. Refer to Section 5, Instrument Options, and the Change Information at the rear of this manual for any modifications which may affect this procedure.

c. Set the 7854 controls as follows:

POWER switch On (pushbutton in)
VERTICAL MODE RIGHT
VERT TRACE SEPARATION (B) Midrange
A TRIGGER SOURCE VERT MODE
A INTENSITY Midrange
HORIZONTAL MODE A
B INTENSITY Midrange
B TRIGGER SOURCE VERT MODE
FOCUSMidrange
READOUT intensity OFF (in detent)
GRAT ILLUM As desired

F2. CHECK VERTICAL SAMPLER OFFSET NOTE

First perform step F1, then proceed.



a. Set the time-base unit triggering controls for an untriggered; stable display.

b. Press the *f*, BOTH and AQR pushbuttons on the frontpanel keyboard in sequence to obtain a display of the realtime and digitized traces. Observe the two traces at graticule center. It may be necessary to set the A INTENSI-TY and STORED INTEnsity controls for an easily visible display.

Calibration Part I-7854 Performance Check

c. CHECK—The crt display for vertical overlaying of the traces within 0.1 division.

d. Move the Signal Standardizer to the LEFT VERT compartment.

e. Sequentially press the LEFT (VERTICAL MODE switch), f, BOTH and 10 Avg pushbuttons to obtain a display of the realtime and digitized waveforms.

f. **CHECK**—The crt display for vertical overlaying of the waveforms within 0.1 division.

g. Sequentially press the f and CRS1 pushbuttons to obtain a cursor display.

h. Set the READOUT intensity control for a visible character display.

i. Position the cursor to mid-screen by pressing the CRS1> pushbutton on the front panel keyboard.

j. **CHECK**—The character readout should indicate a vertical displacement from graticule center less than or equal to VCRD= $(\pm)100$ m $(\pm 0.1$ div).

k. Move the Signal Standardizer to the RIGHT VERT compartment.

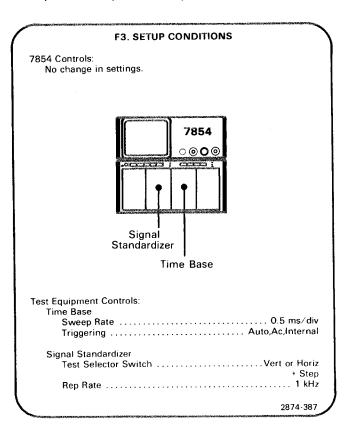
I. Press the RIGHT (VERTICAL MODE switch), *f*, BOTH and 10 Avg pushbuttons in sequence to obtain a display of the realtime and digitized waveforms.

m. Repeat part (j) for the RIGHT VERT compartment.

F3. CHECK HORIZONTAL SAMPLER OFFSET

NOTE

If the preceding step was not performed, first perform step F1, then proceed.



a. Set the time-base units triggering controls for a stable display.

b. Press SCOPE pushbutton on the front-panel keyboard to obtain a display of the real-time waveform.

c. Use the Signal Standardizer Position and Amplitude controls to display a 6-division square wave, centered on the crt graticule. Use the time-base position control to horizontally center the display with a transition at graticule center.

d. Press the f, BOTH and AQR pushbuttons on the frontpanel keyboard to obtain a display of the real-time and digitized waveforms.

e. **CHECK**—The crt display for horizontal overlaying of the waveforms within 0.1 division at graticule center. It may be necessary to set the A INTENSITY and STORED INTensity controls for an easily visible display.

f. Move the time base to the B HORIZ compartment.

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g. Sequentially press the B (HORIZONTAL MODE switch), f, BOTH and AQR pushbuttons to obtain a display of the realtime and digitized waveforms.

h. **CHECK**—The crt display for horizontal overlaying of the waveforms within 0.1 division at graticule center. (It may be necessary to use the time base Position control to move a transition to graticule center.)

i. Sequentially press the *f* and CRS1 pushbuttons to obtain a cursor display.

j. Set the READOUT intensity control for a visible character display.

k. Position the cursor to the transition at graticule center by pressing the CRS1> pushbutton on the front-panel keyboard.

I. **CHECK**—The character readout should indicate a horizontal displacement from the left side of the graticule of HCRD = 2.5 ms (±0.05 ms).

m. Move the time-base unit to the A HORIZ compartment.

n. Press the A (HORIZONTAL MODE), *f*, BOTH and AQR pushbuttons in sequence to obtain a display of the realtime and digitized waveforms. (It may be necessary to use the time base Position control to move a transition to graticule center.)

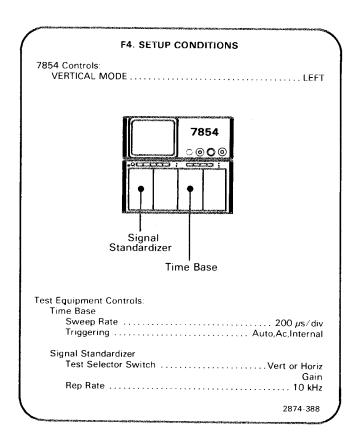
o. Repeat parts (i) through (I) for the A HORIZ compartment.

(a)

F4. CHECK DIGITIZER VERTICAL GAIN

NOTE

If the preceding step was not performed, first perform step F1, then proceed.



a. Press the SCOPE pushbutton on the front-panel keyboard to obtain a realtime display. It may be necessary to set the A INTENSITY control for an easily visible display.

b. Set the time base Triggering and Holdoff controls for a stable staircase display.

c. Set the Signal Standardizer Position control to center the waveform on the crt.

d. Sequentially press the STORED and AVERAGE 10 pushbuttons on the front-panel keyboard to obtain a digitized staircase display. It may be necessary to vary the STORED INTensity control to obtain a visible display.

e. Press the CRS2-1 pushbutton on the front-panel keyboard to obtain a cursor display.

f. Press the CRS1> and <CRS2 pushbuttons on the frontpanel keyboard to position the cursors to the midpoints of the steps 3 divisions above and 3 divisions below graticule center (6 divisions apart vertically). g. Turn the READOUT intensity control on and set it for a viewable character display.

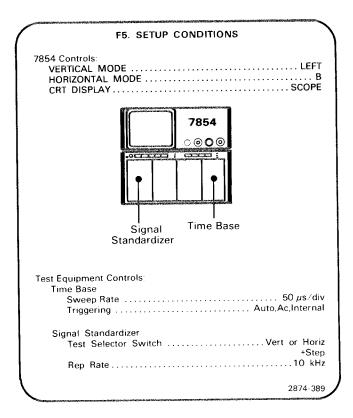
Press a new second sec

i. CHECK.—Vertical difference between cursors to be 6 divisions ± 0.06 division in relation to the crt graticule.

F5. CHECK DIGITIZER HORIZONTAL GAIN

NOTE

If the preceding step was not performed, first perform step F1, then proceed.



a. Set the Signal Standardizer Amplitude and Position controls for a 6-division square wave centered on the crt graticule.

b. Set the time base Triggering and Holdoff controls for a stable display.

c. Use a screwdriver to set the time-base unit front-panel Swp Cal adjustment for exactly one cycle per 2 horizontal divisions. d. Sequentially press the STORED and AQR pushbuttons on the front panel keyboard to obtain a digitized display.

e. **CHECK**—The display for one cycle per 2 horizontal divisions over the center 8 horizontal divisions within 0.08 division.

f. Press the CRS2-1 pushbutton on the front-panel keyboard to obtain a cursor display.

g. Position the cursors to the transitions at the second and tenth vertical graticule lines.

h. Set the READOUT intensity control for a visible display of the cursor position information.

i. CHECK—The character readout display to be between \triangle HCRD = 396 μ s and \triangle HCRD = 404 μ s.

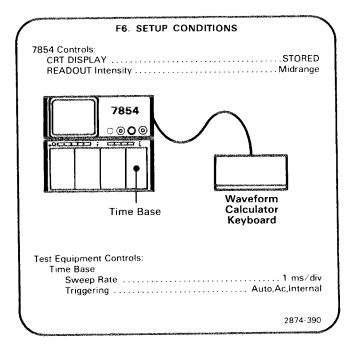
NOTE

The time base units Swp Cal adjustment should be reset according to the procedure given in the Service Manual for the time base in use.

F6. CHECK VERTICAL DIGITIZER NUMERIC NOISE

NOTE

If the preceding step was not performed, first perform step F1, then proceed.



a. With the 7854 in STORED mode and the READOUT intensity set for an easily visible display, press the PROGRAM ENTRY key on the Waveform Calculator keyboard to obtain a program display with a line pointer at the left side of the crt.

b. Sequentially press the following keys to enter the program required to check numeric noise. Keystrokes that will not appear in the program listing shown on the 7854 crt are enclosed in parentheses (). Line numbers are automatically added.

(f), CLS, 2, (f), >CNS, 3, (f), >CNS, (NEXT),

GND, AQR, RMS, (NEXT),

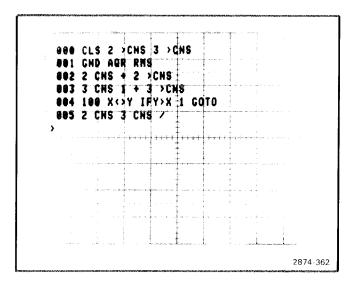
2, CNS, +, 2, (f), >CNS, (NEXT),

3, CNS, 1, +, 3, (f), >CNS, (NEXT),

1, 0, 0, x<>y, IF y>x, 1, GOTO, (NEXT),

2, CNS, 3, CNS, /, (NEXT).

A listing of the program as it will appear on the 7854 crt follows, including the line numbers automatically added. This may be used to check the accuracy of the program as entered.



c. After the program has been entered into the 7854 memory, sequentially press the EXECUTE, f and START pushbuttons to run the program.

NOTE

As the program is running, audible warnings will be issued if the rear-panel AUDIBLE ERROR/WARNING switch is in the ON position. This is normal. d. **CHECK**—The character display at the lower edge of the crt to indicate 100 (100 RMS measurements) and less than or equal to 8.000m (the average of these measurements). The remainder of the display line should be ignored.

a a canada a sa na pana na kana Na kanada na sa na pana na kana na kana

NOTE

If the instrument under test does not have the Waveform Calculator keyboard (Option OD), numeric noise may be checked by manually recording the RMS values obtained by sequentally pressing the GND, AQR and RMS keys on the front-panel Measurement keyboard when set up as indicated above (minus the Waveform Calculator keyboard). These measurements are totaled and divided by the number of measurements taken (averaged). Average noise is specified at 100 measurements.

F7. CHECK HORIZONTAL DIGITIZER NUMERIC NOISE

NOTE

The Horizontal Digitizer Numeric Noise cannot be checked without removing instrument covers. Only qualified service personnel should remove instrument covers and perform verification when required. Step H14 of the Performance Check and Adjustment Procedure verifies this specification.

PART II—ADJUSTMENT AND PERFORMANCE CHECK

The following procedure (Part II-Adjustment and Performance Check) provides the information necessary to: (1) verify that the instrument meets the electrical specifications, (2) verify that controls function properly, and (3) perform all internal adjustments. All tolerances given are as specified in the Performance Check Summary Table 4-1.

Part I-Performance Check verifies electrical specifications without removing instrument covers or making internal adjustments.

A separate Real-Time Functions Checkout Procedure is provided in the 7854 Operators Manual. Also, each waveformprocessor function is demonstrated in the Measurement Keyboard and Waveform Calculator sections of the Operators Manual (refer to Table of Contents or Command Index for specific functions).

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ADJUSTMENT AND PERFORMANCE CHECK POWER-UP SEQUENCE

NOTE

The performance of this instrument can be checked at any ambient temperature from 0° to +50° C unless otherwise stated. Adjustments must be performed at an ambient temperature between +20° and +30° C for specified accuracies.

1. Check that the instrument has been set for the proper power source and also that a suitable power cord and plug has been attached. Refer to Power Source Information in Section 1 for specific details.

2. Remove cabinet panels to gain access to internal adjustments and test points.

3. Connect the instrument to the power source.

4. Connect the memory backup battery to the MEMORY BACKUP POWER INPUT. MEMORY BACKUP POWER must not be connected when doing Display procedure steps GA4, GB3 and GB5.

5. Press the POWER button and allow 20 minutes warmup before proceeding.



To prevent instrument damage, turn off 7854 POWER before installing or removing plug-in units.

ΝΟΤΕ

To maintain the front-panel mode settings when switching plug-ins with POWER OFF, external power must be applied to the rearpanel MEMORY BACKUP POWER INPUT.

A. POWER SUPPLY

Equipment Required: (Numbers correspond to those listed in Table 4-3, Test Equipment).

6. Plug-in extender (optional for this procedure)

20. Low-capacitance screwdriver

8. Precision DC Voltmeter (DVM)

21. Phillips screwdriver

Shaded lines identify Performance Requirement CHECK.

A1. POWER SUPPLY PRELIMINARY SETUP

a. Perform the Adjustment and Performance Check Power-Up Sequence.

b. Refer to Section 5, Instrument Options, and the Change Information at the rear of this manual for any modifications which may affect this procedure.

c. See the **TEST POINT AND ADJUSTMENT LOCATIONS A** foldout page in Section 7, Diagrams and Circuit Board Illustrations.

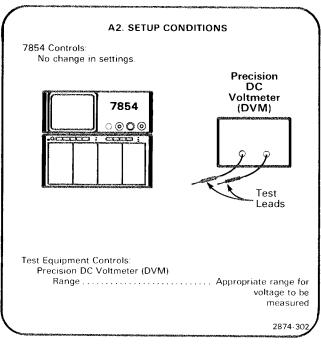
d. Set the 7854 controls as follows:

POWER On (pushbutton in) VERTICAL MODE LEFT
VERT TRACE SEPARATION (B) Midrange
A TRIGGER SOURCE VERT MODE
A INTENSITY Fully counterclockwise
HORIZONTAL MODE A
B INTENSITY Fully counterclockwise
B TRIGGER SOURCE VERT MODE
FOCUS Midrange
READOUT intensity OFF (in detent)
GRAT ILLUM Fully counterclockwise
CONTROL ILLUM MEDIUM (rear panel)

A2. ADJUST PREREGULATOR (A12R23)

NOTE

First perform step A1, then proceed.



a. Connect the precision dc voltmeter (DVM) between TP126 (located on Control Rectifier Board A12) and chassis ground. (Access to TP126 is through Pre Reg Adj hole in the bottom of the power unit.)

b. **EXAMINE**—Meter reading for +108 volts within the limits of +107.5 to +108.5 volts. If the meter reading is within the given tolerance, proceed to step A3.

c. **ADJUST**—Pre Reg Adj R93 (located on Control Rectifier Board A12) for a meter reading of +108 volts.

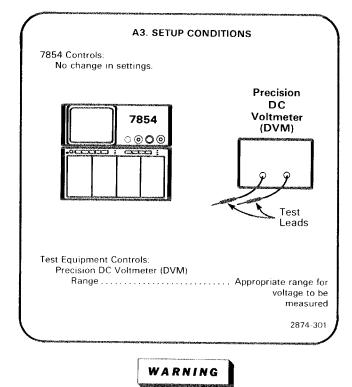
d. **INTERACTION**—Any change in the setting of R93 may affect the adjustment of R15 given in step A3.

Calibration Part II-7854 Adjustment and Performance Check

A3. ADJUST +50 VOLT POWER SUPPLY (A22R15)

NOTE

If the preceding step was not performed, first perform step A1, then proceed.



Extreme caution must be used when operating the 7854 with the power unit removed due to the line voltage, high voltage, and high currents present.

NOTE

The Power Supply voltages can be checked without removing the power unit by using the 7000-series plug-in extender (rigid), Tektronix part 067-0589-00.

a. Set POWER switch to OFF and disconnect the line cord from the power source. Remove any plug-in units from the plug-in compartments. Expose the 7854 power supply adjustments and test points by removing the power unit from the rear of the 7854 (interconnecting cables remain connected). See the Maintenance section in this manual for power unit removal instructions.

b. Connect the line cord to the power source and press the POWER button.

c. Connect the precision dc voltmeter (DVM) between TP -50 V Sense and TP Gnd Sense on the Low-Voltage Regulator circuit board A22.

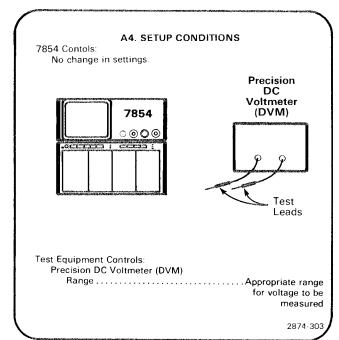
d. **EXAMINE**—The meter reading for -50 volts, within the limits of -49.8 to -50.2 volts.

e. **ADJUST**—The +50 V adjustment R15 (located on the Low Voltage Regulator Board A22) for a meter reading of -50 volts.

f. **INTERACTION**—Any change in the setting of R15 may affect the operation of all circuits in the instrument.

A4. EXAMINE POWER SUPPLY VOLTAGES NOTE

If the preceding step was not performed, first perform step A1, then proceed.



a. **EXAMINE**—Table 4-4 lists the low-voltage power supplies in this instrument. Check each supply with the DVM (precision dc voltmeter) for output voltage within the given tolerance. Connect meter common lead to TP Gnd Sense. Test points are located on the Low-Voltage Regulator Board A22.

b. **INTERACTION**—If the power supplies are not within the tolerances given in Table 4-4, repeat steps A1 and A2.

Calibration Part II-7854 Adjustment and Performance Check

c. Disconnect the precision dc voltmeter.

NOTE

Regulation of the individual power supplies can be checked using the procedure given under Troubleshooting Techniques in the Maintenance section.

- d. Disconnect the line cord from the power source.
- e. Reinstall the power unit and reconnect the line cord.

TABLE 4-4Power Supply Tolerance

Power Supply	Output Voltage Limits	
TP -50 V Sense (-50S)	-49.8 to -50.2 volts	
TP -15 V Sense (-15S)	-14.85 to -15.15 volts	
TP +5 V Sense (+5S)	+4.9 to +5.1 volts	
TP +15 V Sense (+15S)	+14.85 to +15.15 volts	
TP +50 V Sense (+50S)	+49.5 to +50.5 volts	

B. Z-AXIS AND DISPLAY

Equipment Required: (Numbers correspond to those listed in Table 4-3, Test Equipment.)

- 1. Test oscilloscope
- 2. Amplifier unit
- 4. Time base (two required)
- 8. Precision dc voltmeter (DVM)
- 10. Low-frequency sine-wave generator
- 13. 10X probe with short grounding strap
- 14. Coaxial cable (two 42-inch required)

- 17. Bnc-T connector
- 18. Screwdriver
- 19. Nylon tuning tool
- 20. Low-capacitance screwdriver
- 21. Phillips head screwdriver
- 24. Battery (memory backup)

Shaded lines identify Performance Requirement CHECK.

B1. Z-AXIS AND DISPLAY PRELIMINARY SETUP

a. Perform the Adjustment and Performance Check Power-Up Sequence.

b. Refer to Section 5, Instrument Options, and the Change Information at the rear of this manual for any modifications which may affect this procedure.

c. See the **TEST POINT AND ADJUSTMENT LOCATIONS B** foldout page in Section 7, Diagrams and Circuit Board Illustrations.

d. Set the POWER switch to OFF; remove the blue rearpanel cabinet cover (secured by 4 screws) and disconnect the 4 attached cables, noting their location and orientation for re-installation.

e. Set the 7854 controls as follows:

@

POWER in)
VERTICAL MODE LEFT
VERT TRACE SEPARATION (B) Midrange
A TRIGGER SOURCE VERT MODE
A INTENSITY Fully counterclockwise
HORIZONTAL MODE A
B INTENSITY Fully counterclockwise
B TRIGGER SOURCE VERT MODE
FOCUS Midrange
READOUTOFF (in detent)
GRAT ILLUM Midrange
CONTROL ILLUM MEDIUM (rear panel)
STORED INTENSITY Fully counterclockwise

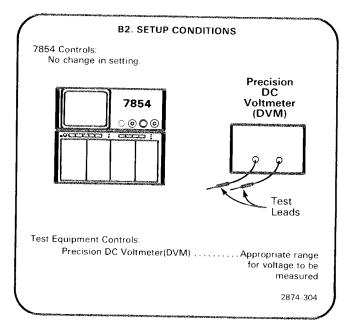
WARNING

Extreme caution must be used when making the following adjustments due to the dangerous potentials present.

B2. ADJUST HV SUPPLY (A20R115)

NOTE

First perform step B1, then proceed.



a. Temporarily set the POWER switch to OFF and remove the High Voltage Board shield (secured by 3 screws). Connect the precision dc voltmeter (DVM), set to measure at least +130 volts, between TP127 (located High Voltage Board A20) and chassis ground.

Calibration Part II--7854 Adjustment and Performance Check

b. Press the POWER button to on.

c. EXAMINE-Voltmeter reading for 96 to 104 volts.

d. **ADJUST**—HV Adj, R115 (located on High Voltage Board A20) for 100 volts on the voltmeter.

e. Press POWER button to OFF.

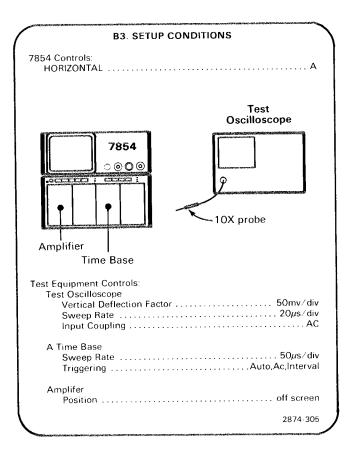
f. Remove the DVM test leads and re-install the High Voltage Board shield.

g. Press POWER button to on.

B3. ADJUST Z-AXIS DC LEVELS (A14R165, (A21R135, A21R125)

NOTE

If the preceding step was not performed, first perform step B1, then proceed.



a. Connect the 10X probe from the test oscilloscope to TP122 (located on the Z-Axis board A21) and the probe ground to chassis ground. Obtain a stable test oscilloscope display.

b. **EXAMINE**—Test oscilloscope display for an 80 millivolt peak-to-peak signal, within 10 millivolts.

c. ADJUST----Z-Axis Level, R165 (located on Logic Board (A14) for an 80 millivolt peak-to-peak display.

d. Move the time-base unit to the B HORIZ compartment.

e. Set the HORIZONTAL MODE switch to B.

f. **EXAMINE**—Test oscilloscope display for an 80 millivolt peak-to-peak signal, within 10 millivolts.

g. **ADJUST**—If necessary, compromise the setting of the Z-Axis Level adjustment, R165, for an 80-millivolt signal, within 10 millivolts for both the A HORIZ and B HORIZ compartments. Re-install the time-base unit in the B HORIZ compartment and set the HORIZONTAL MODE switch to B.

h. Set the test oscilloscope's deflection factor to 1 volt/div (10 volt/div at probe tip) and its input coupling to ground. Move this ground reference trace to the bottom graticule of the test oscilloscope display. Return the test oscilloscope input coupling to dc.

i. Connect the test oscilloscope 10X probe to TP183 (located on the Z-Axis Board) with the probe ground connected to chassis ground.

j. Set the 7854 B INTENSITY control fully clockwise.

k. **EXAMINE**—Test oscilloscope display for a waveform baseline between 8 and 12 volts above ground reference.

I. **ADJUST**—The Output Level adjustment, R135 (located on the Z-Axis Board A21), for a waveform base line at 10 volts above ground reference.

m. **EXAMINE**—The test oscilloscope display for a 68 to 72 volt peak-to-peak waveform. (Do not move the test oscilloscope vertical Position control.)

n. **ADJUST**—The Z-Axis Ampl Gain adjustment, R125 (located on the Z-Axis Board A21) for a 70 volt peak-to-peak waveform displayed on the test oscilloscope.

o. **INTERACTION**—Repeat parts (k) through (n) until the waveform is within the limits specified in parts (k) and (m).

p. Disconnect the probe.

NOTE

If further adjustment of the Z-Axis system is required, omit the remainder of this step.

a. Press POWER switch to OFF.

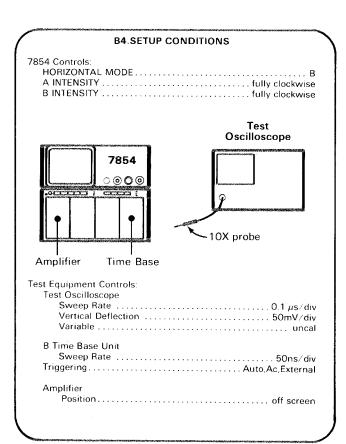
r. Reinstall the rear panel cover and its cables, making sure the fan is free to turn.

s. Press POWER switch to on.

B4. ADJUST Z-AXIS TRANSIENT RESPONSE (A21C180, A21C150, A21C155, A21R150, A21R155)

NOTE

If the preceding step was not performed, first perform step B1, then proceed.



a. Connect the test oscilloscope 10X probe tip to TP186 (located on Z-Axis Board A21) and the probe ground to chassis ground.

b. With the test oscilloscope triggered on the positive edge of the signal, use the test oscilloscope's variable Gain and Position controls to obtain an 8-division display centered on the graticule.

c. Set the 7854 B INTENSITY control for a 6-division display on the test oscilloscope. Position the display to view the leading edge of the waveform at the center graticule lines.

d. **EXAMINE**—The test oscilloscope display for optimum square corner and flat top on the displayed pulse. Aberrations should be less than 3% peak-to-peak (0.18 division).

e. **ADJUST**—Comp 5 (C180) for flat top; and Comp 1 (C150), Comp 2 (R150), Comp 3 (R155), and Comp 4 C155 (located on the Z-Axis Board A21) for optimum square corner of the displayed pulse (use low-capacitance screwdriver to adjust variable capacitors).

f. Set the B INTENSITY control for 1.5 divisions of display on the test oscilloscope.

g. $\ensuremath{\text{EXAMINE}}\xspace{--}$ Test oscilloscope display for less than 3% aberration.

h. **ADJUST**—R150 and C150 (located on the Z-Axis Board A21) for optimum square corner at 1.5 divisions of displayed pulse.

i. Set the B INTENSITY control for a 6-division display on the test oscilloscope.

j. Set the test oscilloscope sweep rate to 10 ns/division.

k. **EXAMINE**—The pulse risetime for 9 to 15 nanoseconds (measured between the 10% and 90% point of the pulse).

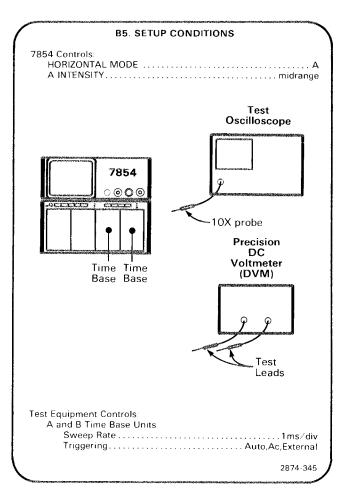
I. **INTERACTION**—The adjustments in parts e and h affect the pulse risetime. If risetime is not within the stated limits, repeat parts (e) through (k).

m. Disconnect the probe.

B5. AJUST GOOD SAMPLE FLIP FLOP (A21R102)

NOTE

If the preceding step was not performed, first perform step B1, then proceed.



a. Obtain a free running display on the 7854; then set the A and B INTENSITY controls fully counterclockwise.

b. Remove the time base from the A HORIZ compartment.

c. Set the precision dc voltmeter to read at least 2 volts dc.

d. Connect the precision dc voltmeter to TP122 (on the Z-Axis Board A21) and chassis ground.

e. Note the dc voltage level at TP122 for comparison in part $\ensuremath{\mathsf{g}}$.

f. Move the precision dc voltmeter probe to TP103 (on the Z-Axis Board A21).

g. **EXAMINE**—The GSF level at TP103 for a reading of 40 mV less than that noted in part e, within 10 millivolts.

h. **ADJUST**—GSF Level, R102 (locaated on Z-Axis Board A21) for a reading of 40 mV less than that noted in part e.

i. Re-install the time base in the A HORIZ compartment.

j. Set the HORIZONTAL MODE switch to B.

k. Remove the precision dc voltmeter leads.

I. Set the test oscilloscope for a calibrated sweep rate of 2ms/div and a 0 2V/div deflection factor (2v at probe tip).

m. Connect the 10X probe to TP106 (located on Z-Axis Board A21) and chassis ground.

n. **EXAMINE**—Test oscilloscope display for a TTL level square wave (HI > 2.4 volts, LO < 0.4 volt).

o. **EXAMINE**—Rotate the B INTENSITY control through its range and observe test oscilloscope for a stable display.

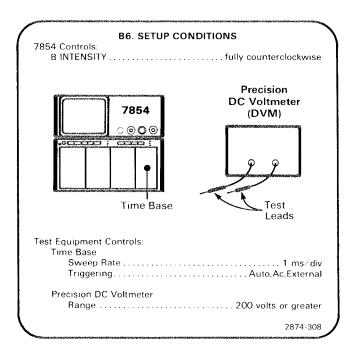
p. **INTERACTION**—If the requirements in parts n and o are not met, compromise the adjustment of the GSF Level, R102, for a stable TTL square wave for both A HORIZ and B HORIZ compartments while rotating the A INTENSITY and B INTENSITY controls throughout their range.

q. Disconnect the probe.

B6. ADJUST FOCUS LEVEL (A21R70)

NOTE

If the preceding step was not performed, first perform step B1, then proceed.



4-50

a. Connect the precision dc voltmeter (DVM), set to measure 200 volts, between TP83 (located on Z-Axis Board A21) and chassis ground.

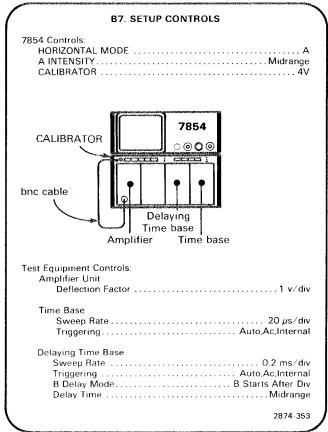
b. EXAMINE-Voltmeter reading for 120 to 126 volts.

c. **ADJUST**—Focus Output Level, R70 (located on Z-Axis Board A21), for a voltmeter reading of 123 volts.

d. Remove the DVM test leads. B7. ADJUST CONTRAST (A6R80)

NOTE

If the preceding step was not performed, first perform step B1, then proceed.



a. Center the square-wave display on the crt graticule using the amplifier Position control and set the A INTENSITY control for a normal viewing level.

b. Set the delaying time-base unit Triggering controls for a stable display.

c. Set the delaying time-base unit Delay Time control to mid-range.

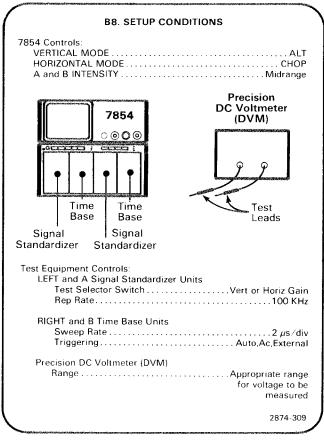
d. **EXAMINE**—The crt display while rotating the CONTRAST adjustment, R80 (front-panel screwdriver adjustment), through its entire range. Notice the change in the intensity of the "intensified" portion of the waveform.

e. **ADJUST**—The CONTRAST adjustment, R80, for a well defined intensified zone on the displayed trace.

B8. ADJUST TRACE ALIGNMENT, GEOMETRY AND FOCUS (A20R155, A20R55, A6R160, A20R143,A16R148, A6R142)

NOTE

If the preceding step was not performed, first perform step B1, then proceed.



a. Set both Signal Standardizer Position controls to superimpose the crosshatch display over the vertical and horizontal graticule center lines.

b. Set FOCUS control to midrange.

c. Temporarily set the POWER switch to OFF and remove the High Voltage Board shield (secured by 3 screws). Connect the precision dc voltmeter (DVM), set to measure at least +36 volts, between TP156 (on the High Voltage Board A20) and chassis ground.

d. Press the POWER button to on.

e. Set the VERTICAL MODE switch to ALT and the HORIZONTAL MODE switch to CHOP.

f. EXAMINE-Voltmeter reading for +34 to +36 volts.

Calibration Part II—7854 Adjustment and Performance Check

g. **ADJUST**—Shield Volts, R155 (on the High Voltage Board A20), for +34.5 volts on the DVM.

h. **ADJUST**—The Focus Preset, R55 (on the High-Voltage Board A20), and the front-panel ASTIG adjustment, R160 (on the Pot Adjust Board A6), for the best overall resolution of the traces.

i. **INTERACTION**—Poor focus at one edge of the display may be improved by compromising the Shield Volts and Focus Preset adjustments, parts (g) and (h).

j. Disconnect the precision dc voltmeter (DVM).

k. Set the front-panel FOCUS and INTENSITY controls for a well-defined display.

I. **EXAMINE**—That the vertical and horizontal traces which cross at graticule center are aligned with the graticule, vertical and horizontal center, lines within 0.1 division.

m. **ADJUST**—The Y-Axis Align, adjustment, R148 (on the Pot Adjust Board A6) and the front-panel TRACE ROTATION adjustment, R142 (on the Pot Adjust Board A6) to align the vertical and horizontal traces with the graticule horizontal and vertical center lines. (The Y-Axis Align adjustment, R148, is accessible, using a thin bladed screwdriver, through the top of the instrument near the front of the instrument's carrying handle.)

n. **EXAMINE**—The horizontal trace at the top and bottom of the graticule for 0.1 division or less of bowing or tilt.

o. **ADJUST**—Geom, R143 (on the High Voltage Board A20), for minimum bowing of the traces at the top and bottom of the graticule.

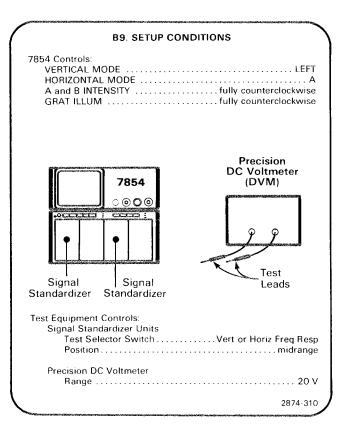
p. Press the POWER button to OFF and re-install the High Voltage Board shield.

q. Press the POWER button to on.

B9. ADJUST CRT GRID BIAS (A20R65)

NOTE

If the preceding step was not performed, first perform step B1, then proceed.



a. Connect the precision dc voltmeter (DVM) between test point TP183 (located on Z-Axis Board A21) and chassis ground and note the voltage reading.

b. **EXAMINE**----Crt display while advancing the A INTENSITY control setting. A spot on the crt should become barely visible at 3.6V to 4.4V above the voltage noted in step a.

c. Set the A INTENSITY control so that the dc voltage at TP183 is 4 volts above the voltage noted in part a.

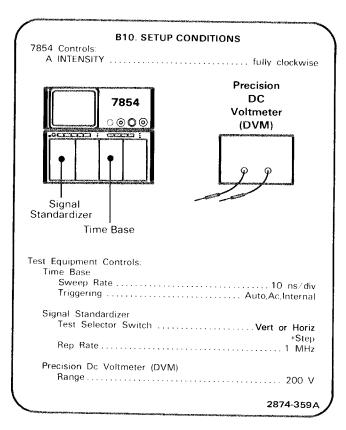
d. **ADJUST**—The Grid Bias Adjustment R65 (located on High Voltage Board A20) to barely extinguish the spot on the crt.

e. Disconnect the DVM.

B10. ADJUST AUTO-FOCUS AMPLIFIER GAIN (A21R63)

NOTE

If the preceding step was not performed, first perform step B1, then proceed.



a. Connect the precision dc voltmeter (DVM) between TP83 (on the Z-Axis Board A21) and ground.

b. Set the Signal Standardizer Amplitude and Position controls for a 3-division square wave, centered on the crt.

c. Set the time base Triggering controls for a stable display triggered on the rising edge.

d. **EXAMINE**—The crt display for objectionable defocusing of the crt display.

e. **ADJUST**—Focus Gain adjustment, R63 (on the Z-Axis Board A21), for optimum focusing of the high-intensity trace.

f. **EXAMINE**—Voltmeter reading should be greater than (more positive) -12 volts.

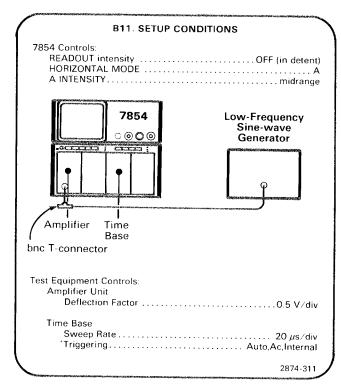
g. **ADJUST**—If optimum focus of trace occurs below (more negative) -12 volts, compromise the setting of R63 until voltmeter reading is -12 volts.

h. Disconnect the DVM.

B11. CHECK EXTERNAL Z-AXIS OPERATION

NOTE

If the preceding step was not performed, first perform step B1, then proceed.



a. Set the low-frequency sine-wave generator for a 4division display at 50 kilohertz (one volt above and below ground).

b. Set the A INTENSITY control for a dim display.

c. Connect the signal from the output of the bnc Tconnector at the Amplifier input to the Z-AXIS INPUT connector on the rear panel with bnc cable.

d. **CHECK**—Positive portion of the displayed waveform is blanked out.

C. CALIBRATOR AND OUTPUT SIGNALS

Equipment Required: (Numbers correspond to those listed in Table 4-3, Test Equipment.)

1. Test oscilloscope

- 4 Delaying time base
- 8. Precision dc voltmeter (DVM)

9. Time-mark generator or frequency counter (optional)

14. Coaxial cable (one 18-inch, two 42-inch required)

15. 50 ohm-terminator

17. Bnc-T connector

Shaded lines identify Performance Requirement CHECK.

C1. CALIBRATOR AND OUTPUT SIGNALS PRELIMINARY SETUP

a. Perform the Adjustment and Performance Check Power-Up Sequence.

b. Refer to Section 5, Instrument Options, and the Change Information at the rear of this manual for any modifications which may affect this procedure.

c. See the **TEST POINT AND ADJUSTMENT LOCATIONS C** foldout page in Section 7, Diagrams and Circuit Board Illustrations.

d. Set the 7854 controls as follows:

POWER switch On (pushbutton in) VERTICAL MODE RIGHT
VERT TRACE SEPARATION (B) Midrange
A TRIGGER SOURCEVERT MODE
A INTENSITY Fully counterclockwise
HORIZONTAL MODE A
B INTENSITY Fully counterclockwise
B TRIGGER SOURCE VERT MODE
READOUT intensity OFF (in detent)
GRAT ILLUM Midrange
CALIBRATOR 4 V pushbutton in

C2. CHECK/ADJUST CALIBRATAOR OUTPUT VOLTAGE (A2R25)

NOTE

First perform step C1, then proceed.

20. Low Capacitance Screwdriver

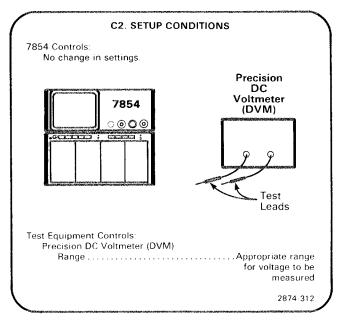
23. Bnc to clip lead adaptor

24. Battery (memory backup)

22. Jumper wire

25. 887 Ω Resistor

26. 909 Ω Resistor



a. Set both the 4 V and 0.4 V CALIBRATOR pushbuttons to the pressed position (this selects dc voltage).

b. Connect the precision dc voltmeter (DVM) test leads between the CALIBRATOR output and chassis ground.

c. CHECK—Meter reading for 0.3968 to 0.4048 volt.

d. **ADJUST**—0.4 VDC adjustment, R25 (located on Mode Switch Board A2), for a meter reading of exactly 0.4008 volt. (Access to adjustment is through the chassis, inside the vertical compartments, near the front of the instrument and under the VERTICAL MODE switch.)

e. Disconnect the DVM and terminator.

f. Connect a 50 ohm terminator to the CALIBRATOR output.

g. Connect the DVM to the terminated CALIBRATOR output.

h. CHECK---Meter reading for 0.0397 to 0.0404 volt.

i. **ADJUST**---If necessary, compromise the setting of R25 to meet the tolerances given in parts (c) and (h).

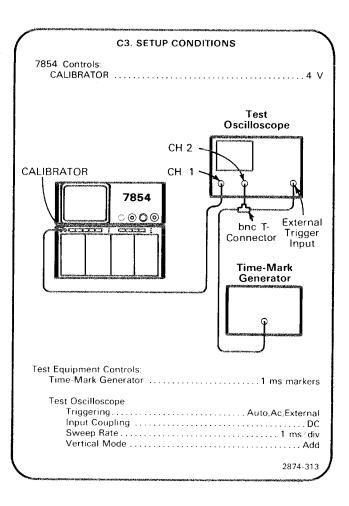
j. Disconnect the DVM.

@

C3. CHECK/ADJUST CALIBRATOR 1-kHz REPETITION RATE (A2R15)

NOTE

If the preceding step was not performed, first perform step C1, then proceed.



NOTE

An alternate method for step C3 is to use a frequency counter, with at least 0.1% accuracy, and adjust A2R15 for exactly 1 kHz.

a. The 1-millisecond time-markers are connected to the test oscilloscope external trigger input and to the noninverting vertical channel of the test oscilloscope (use a bnc-T connector). The 7854 CALIBRATOR output is connected to the inverting input of the test oscilloscope.

b. Set the test oscilloscope triggering level for a stable time-mark display.

c. Set the test oscilloscope vertical deflection factors to display 2 divisions of CALIBRATOR signal and 1 division of time-marker signal.

Calibration Part II—7854 Adjustment and Performance Check

d. Set the test oscilloscope sweep rate for 0.2 second/ division.

e. **CHECK**—The time required for the 1-millisecond time marks to drift from the positive level of the CALIBRATOR signal to the negative level, and back to the positive level must be more than 0.4 second (2 divisions). This time can be measured directly from the display by observing the number of divisions that the markers move across the display area before it returns to the positive level.

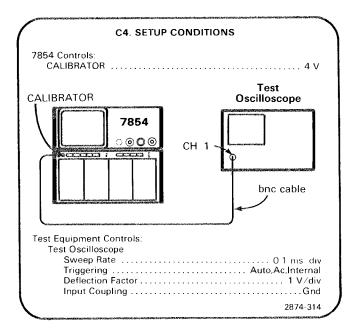
f. **ADJUST**—1 kHz, R15 (located on the Mode Switch Board A2), for minimum drift (access to the adjustment is through the chassis, inside the vertical compartment).

g. Disconnect the bnc cable.

C4. CHECK CALIBRATOR AMPLITUDE

NOTE

If the preceding step was not performed, first perform step C1, then proceed.



a. Set the ground reference level on the test oscilloscope to 2 divisions below graticule center.

b. Set the test oscilloscope input coupling to dc.

c. **CHECK**—Test oscilloscope for a 4-division display within 0.04 division.

d. Set the CALIBRATOR select switch to 0.4 V.

e. Set the test oscilloscope deflection factor to 0.1 V/ division.

f. **CHECK**—Test oscilloscope for a 4-division display within 0.04 division.

g. Set the CALIBRATOR select switch to 40 mV.

h. Set the test oscilloscope deflection factor to 10 mV/ division.

i. **CHECK**—Test oscilloscope for a 4-division display within 0.04 division.

j. Install a 50 Ω terminator between the CALIBRATOR output and the bnc cable.

k. Set the test oscilloscope deflection factor to 5 mV/ division.

I. **CHECK**—Test oscilloscope for a 0.8 division display within 0.01 division.

m. Set the CALIBRATOR select switch to 0.4 V.

n. Set the test oscilloscope deflection factor to 10 mV/ division.

o. **CHECK**—Test oscilloscope for a 4-division display within 0.04 division.

p. Set the CALIBRATOR select switch to 4 V.

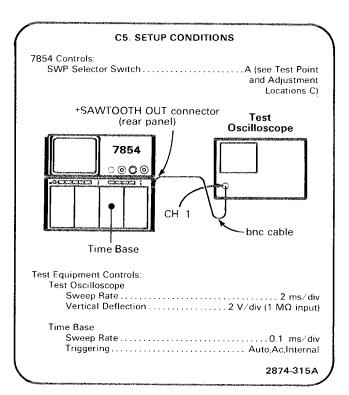
q. Set the test oscilloscope deflection factor to 0.1 V/ division.

r. **CHECK**—Test oscilloscope for a 4 division display within 0.04 division.

C5. CHECK +SAWTOOTH OUTPUT

NOTE

If the preceding step was not performed, first perform step C1, then proceed.



a. **CHECK**—That the slope of the test oscilloscope display is positive-going and that the sawtooth baseline is within 1 volt of ground.

b. Move the time-base unit to the 7854's B HORIZ compartment.

c. Set the internal Sweep Selector Switch (S3 on Signal Output Board A15) to the B position (see TEST POINT AND ADJUSTMENT LOCATIONS C).

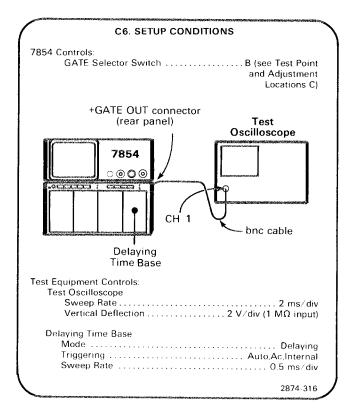
d. **CHECK**—That the test oscilloscope display is positivegoing and that the sawtooth baseline is within 1 volt of ground.

e. Disconnect the bnc cable.

C6. CHECK + GATE OUTPUT

NOTE

If the preceding step was not performed, first perform step C1, then proceed.



a. **CHECK**—Test oscilloscope display for a positive-going gate waveform with a baseline at 0 volt, within 1 volt.

b. Move the time-base unit to the A HORIZ compartment.

c. Set the internal Gate Selector Switch (S46 on Signal Output Board A15) to the A position. (see **TEST POINT AND ADJUSTMENT LOCATIONS C**).

d. **CHECK**—Test oscilloscope display for a positive-going gate waveform with a baseline at 0 volt, within 1 volt.

e. Set the internal Gate Selector Switch, S46, to the Dly'd position.

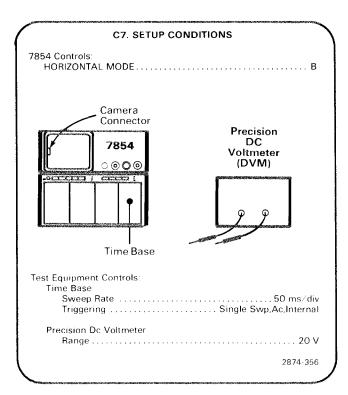
f. **CHECK**—Test oscilloscope display for a positive-going gate waveform with a baseline at 0 volt, within 1 volt.

g. Disconnect the bnc cable.

C7. CHECK SINGLE SWEEP RESET AND CAMERA CONNECTOR

NOTE

If the preceding step was not performed, first perform step C1, then proceed.



a. Connect the precision dc voltmeter between the top pin of the camera connector on the crt bezel and chassis ground.

b. **CHECK**—Voltmeter reading to be +15 volts within 0.15 volt.

c. Connect the precision dc voltmeter between the bottom pin of the camera connector on the crt bezel and chassis ground.

d. **CHECK**—Voltmeter reading to be 0 volt.

e. Momentarily short the center pin of the camera connector on the crt bezel to the bottom pin of the camera connector using the jumper wire.

f. CHECK—Time bases Single Sweep Reset Ready indicator should be illuminated.

g. Momentarily short the center pin of the camera connector on the crt bezel to the bottom pin of the camera connector using the jumper wire.

h. **CHECK**—Time bases Trig'd indicator should illuminate and a sweep should occur.

i. Momentarily short the center pin of the rear-panel SINGLE SWEEP RESET bnc connector to ground using the jumper wire.

j. **CHECK**—Time bases Single Sweep Reset Ready indicator should be illuminated.

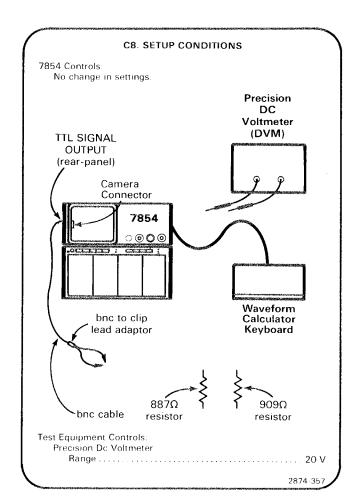
k. Momentarily short the center pin of the rear-panel SINGLE SWEEP RESET bnc connector to ground using the jumper wire.

I. **CHECK**—Time bases Trig'd indicator should illuminate and a sweep should occur.

C8. CHECK TTL SIGNAL OUTPUT

NOTE

If the preceding step was not performed, first perform step C1, then proceed.



a. Connect a 909 Ω resistor (Tek Part No. 321-0189-00) to the red clip lead.

b. Connect the precision dc voltmeter (DVM) across the clip adaptor, observing clip adaptor polarity.

c. Press the SWL pushbutton on the WAVEFORM CALCULATOR keyboard.

d. Momentarily short the unattached end of the resistor to the upper pin of the camera connector (on crt bezel).

e. **CHECK**—Voltmeter reading to be between 0 volt and +0.8 volt.

f. Remove the 909 Ω resistor and replace it with an 887 Ω resistor (Tek Part No. 321-0188-00).

g. Sequentially press the *f* and SWH pushbuttons on the WAVEFORM CALCULATOR keyboard.

h. Momentarily short the unattached end of the resistor to the lower pin of the camera connector (on crt bezel).

i. CHECK—Voltmeter reading to be between +2.4 volts and +5.0 volts.

j. Disconnect bnc cable, clip adaptor and voltmeter.

NOTE

The output at the SIGNAL OUT connector is checked in the Trigger System procedure.

D. TRIGGER SYSTEM

Equipment Required: (Numbers correspond to those	listed in Table 4-3, Test Equipment.)	
1. Test oscilloscope	15. 50-ohm terminators (two required)	
2. Amplifier unit	20. Low capacitance screwdriver	
4 Time base (two required).	21. Phillips head screwdriver	
5. Signal Standardizer	24. Battery (memory backup)	
6. Plug-in extender (rigid calibration fixture)		
14. Coaxial cable (one 18-inch, two 42-inch required)		

Shaded lines identify Performance Requirement CHECK.

D1. TRIGGER SYSTEM PRELIMINARY SETUP

a. Perform the Adjustment and Performance Check Power-up Sequence.

b. Refer to Section 5, Instrument Options, and the Change Information at the rear of this manual for any modifications which may affect this procedure.

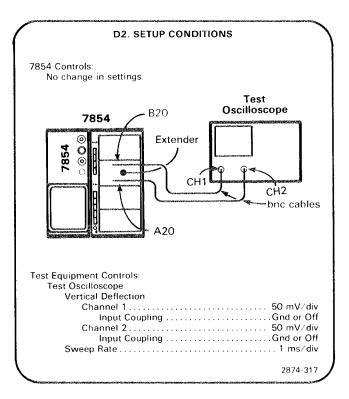
c. See the **TEST POINT AND ADJUSTMENT LOCATIONS D** foldout page in Section 7, Diagrams and Circuit Board Illustrations.

d. Set the 7854 controls as follows:

D2. ADJUST A TRIGGER SELECTOR CENTERING AND GAIN (A13R586, A13R589)

NOTE

First perform step D1, then proceed.





Extreme caution must be used when operating the 7854 with the power unit removed due to the line voltage, high voltage, and high currents present.

a. Temporarily turn the POWER switch to OFF and disconnect the line cord from the power source. Remove all plug-in units from the plug-in compartments. Expose the 7854 trigger system adjustments and test points by removing the power unit from the rear of the 7854 (interconnecting cables must remain connected) and turning the instrument on its side. See the Maintenance Section in this manual for power unit removal instructions.

b. Connect the line cord to the power source and press POWER button in.

c. Within the plug-in extender, disconnect the top connector on the left and right sides (labeled A20 and B20). Connect each female connector to one of the test oscilloscope vertical channels with the 42-inch 50-ohm bnc cables and 50-ohm bnc terminations (omit the 50-ohm bnc terminations if the test oscilloscope has a 50-ohm input impedance).

d. Set the test oscilloscope for differential operation between the two channels (added display mode with one channel inverted).

e. Establish a ground reference level for the test oscilloscope by positioning its trace to the center horizontal line of the graticule. Do not change the test oscilloscope position controls after setting this ground reference.

f. Set both channels of the test oscilloscope for dc input coupling.

g. Set the 7854's VERTICAL MODE switch to RIGHT and its HORIZONTAL MODE switch to A.

h. **EXAMINE**—Test oscilloscope display for a dc level within 1 division (50 millivolts) of the ground reference level in the LEFT, RIGHT, and ADD positions of the 7854's VERTICAL MODE switch.

i. **ADJUST**—A DC Center R586 (located on Trigger Amplifier Board A13) for a dc level within 1 division (50 millivolts) of the ground reference level in the LEFT, RIGHT, and ADD positions of the VERTICAL MODE switch.

j. Install the Signal Standardizer in the LEFT VERT compartment.

k. Set the VERTICAL MODE switch to LEFT.

I. Set the Signal Standardizer Test selector switch to Trigger Gain and the Rep Rate switch to 10 kHz. Use the Signal Standardizer Position control to move the bright center trace display on the test oscilloscope to the center graticule line.

m. **EXAMINE**—Test oscilloscope display for alignment of the 7 center traces with the center 7 graticule lines within 0.3 division (5%).

n. **ADJUST**—A Gain R589 (located on Trigger Amplifier Board A13) for a test oscilloscope display of 7 traces aligned with the center 7 graticule lines.

NOTE

If R589 did not require adjustment omit parts (o) through (r).

o. Remove the Signal Standardizer from the LEFT VERT compartment.

p. Set the test oscilloscope to alternate between channel 1 and channel 2. Re-establish a ground reference for both channels of the test oscilloscope. When ground references have been established, set both channels for dc coupling and reset the test oscilloscope for differential operation.

q. **EXAMINE**—Test oscilloscope display for a dc level within 1 division (50 millivolts) of the established ground reference.

r. **ADJUST**—A DC Center R586 for a dc level within 1 division (50 millivolts) of the ground reference level.

s. Remove the Signal Standardizer and plug-in extender (leave bnc cables connected if next step is to be performed).

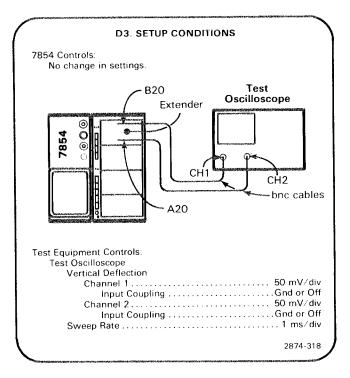
t. If the following step is not to be performed, press the POWER switch to OFF, disconnect the line cord from the power source, and re-install the power supply.

u. Connect the line cord to the power source and press the POWER switch to ON.

D3. ADJUST B TRIGGER SELECTOR CENTERING AND GAIN (A13R686, A13R689)

NOTE

If the preceding step was not performed, first perform step D1, then proceed.



NOTE

If the preceding step was performed, omit part (a) through (c) and begin with part (d).



Extreme caution must be used when operating the 7854 with the power unit removed due to the line voltage, high voltage, and high currents present.

a. Temporarily turn the POWER switch to OFF and disconnect the line cord from the power source. Remove all plug-in units from the plug-in compartments. Expose the 7854 trigger system adjustments and test points by removing the power unit from the rear of the 7854 (interconnecting cables remain connected). See the Maintenance Section in this manual for power unit removal instructions.

b. Connect the line cord to the power source and press POWER button in.

c. Within the plug-in extender, disconnect the top connector on the left and right sides (labeled A20 and B20). Connect each female connector to one of the test oscilloscope channels with the 42-inch 50-ohm bnc cables and 50-ohm bnc terminations (omit the 50-ohm bnc terminations if the test oscilloscope has a 50-ohm input impedance).

d. Set the test oscilloscope for differential operation between the two channels (added display mode with one channel inverted).

e. Establish a ground reference level for the test oscilloscope by positioning the trace to the center horizontal line of the graticule. Do not change the test oscilloscope position controls after setting this ground reference.

f. Set both channels of the test oscilloscope for dc input coupling.

g. Set the 7854's VERTICAL MODE switch to RIGHT and its HORIZONTAL MODE switch to B.

h. **EXAMINE**—Test oscilloscope display for a dc level within 1 division (50 millivolts) of the ground reference level in the LEFT, RIGHT, and ADD positions of the VERTICAL MODE switch.

i. **ADJUST**—B DC Center, R686 (located on Trigger Amplifier Board A13), for a dc level within 1 division (50 millivolts) of the ground reference level for each of the LEFT, RIGHT, and ADD positions of the VERTICAL MODE switch.

j. Install the Signal Standardizer in the LEFT VERT compartment.

k. Set the VERTICAL MODE switch to LEFT.

I. Set the Signal Standardizer Test selector switch to Trigger Gain and the Rep Rate switch to 10 kHz. Use the Signal Standardizer Position control to move the bright center trace displayed on the test oscilloscope to the center graticule line.

m. **EXAMINE**—Test oscilloscope display for alignment of the center 7 traces with the center 7 graticule lines within 0.3 division (5%).

n. **ADJUST**—B Gain R689 (located on Trigger Amplifier Board A13) for a test oscilloscope display of 7 traces aligned with the center 7 graticule lines.

NOTE

If R689 did not require adjustment omit parts (o) through (r).

o. Remove the Signal Standardizer from the LEFT VERT compartment.

p. Set the test oscilloscope to alternate between channel 1 and channel 2. Re-establish a ground reference for both channels of the oscilloscope. When ground references have been established, set both channels for dc coupling and reset the test oscilloscope for differential operation.

q. **EXAMINE**—Test oscilloscope display for a dc level within 1 division (50 millivolts) of the established ground reference.

r. **ADJUST**—B DC Center, R686, for a dc level within 1 division (50 millivolts) of the ground reference level.

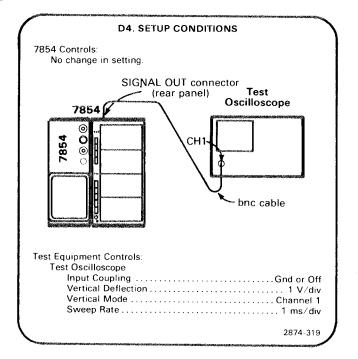
s. If the following step is not to be performed, press the POWER switch to OFF, disconnect the line cord from the power source, and re-install the power supply.

t. Connect the line cord to the power source and press the POWER switch to ON.

D4. CHECK/ADJUST VERTICAL SIGNAL OUT DC CENTERING (A13R547)

NOTE

If the preceding step was not performed, first perform step D1, then proceed.



a. Establish a ground reference for the test oscilloscope by positioning the trace to the graticule center line. Do not change the test oscilloscope position control after setting this ground reference.

b. Set the test oscilloscope input coupling switch to dc.

c. **CHECK**—Test oscilloscope display for a dc level within 1 division of the ground reference established in part (a).

d. **ADJUST**—DC Center R547 (located on Trigger Amplifier Board A13) to set the trace to the ground reference level.

e. Press POWER switch to OFF and disconnect the line cord from the power source.

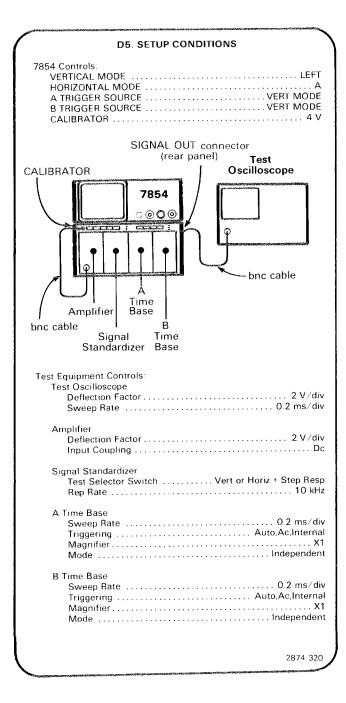
f. Re-install the power supply unit.

g. Connect the line cord to the power source and press the POWER switch to ON.

D5. CHECK TRIGGER SELECTOR OPERATION

NOTE

If the preceding step was not performed, first perform step D1, then proceed.



a. Set the A INTENSITY control for a visible display. Set the amplifier for a 2-division display in the lower half of the graticule area. Set the A time-base unit triggering controls for a stable display.

b. Set the VERTICAL MODE switch to RIGHT.

c. Set the Signal Standardizer Amplitude and Position controls for a 2-division display in the upper half of the graticule area.

d. Set the VERTICAL MODE switch to ALT.

e. **EXAMINE**—For 1-kHz and 10-kHz triggered waveforms on the 7854 crt (adjust the time-base unit trigger level controls as necessary).

f. **CHECK**—For 1-kHz and 10-kHz triggered waveforms on the test oscilloscope crt (adjust the time-base unit trigger level controls as necessary).

q. Set the A TRIGGER SOURCE switch to LEFT VERT.

h. **EXAMINE**--Sequentially select all positions of the VERTICAL MODE switch and check for a stable display of only the 1-kHz waveform on the 7854 crt.

i. CHECK—Sequentially select all positions of the VERTICAL MODE switch and check for a stable display of only the 1-kHz waveform on the test oscilloscope.

j. Set the A TRIGGER SOURCE switch to RIGHT VERT.

k. **EXAMINE**—Sequentially select all positions of the VERTICAL MODE switch and check for a stable display of only the 10-kHz waveform on the 7854 crt.

I. CHECK—Sequentially select all positions of the VERTICAL MODE switch and check for a stable display of only the 10-kHz waveform on the test oscilloscope.

m. Set the VERTICAL MODE switch to ALT, the HORIZONTAL MODE switch to B and the B INTENSITY control for a visible display.

n. **EXAMINE**—For 1-kHz and 10-kHz triggered waveforms on the 7854 oscilloscope.

o. Set the B TRIGGER SOURCE switch to LEFT VERT.

p. **EXAMINE**—Sequentially select alal positions of the VERTICAL MODE switch and check for a stable display of only the 1-kHz waveform on the 7854 oscillocope.

a. Set the B TRIGGER SOURCE switch to RIGHT VERT.

r. **EXAMINE**—Sequentially select all positions of the VERTICAL MODE switch and check for a stable display of only the 10-kHz waveform on the 7854 oscilloscope.

s. Set the VERTICAL MODE switch to ALT, the HORIZONTAL MODE switch to ALT, and the A and B TRIGGER SOURCE switches to VERT MODE.

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t. **EXAMINE**—Vary the 7854 time-base units Trigger Level controls; the B HORIZ time-base unit should be triggered on the 1-kHz waveform and the A HORIZ timebase unit should be triggered on the 10-kHz waveform.

E. HORIZONTAL SYSTEM

Equipment Required: (Numbers correspond to those listed in Table 4-3, Test Equipment)		
2. Amplifier unit (two required)	12. Function Generator	
4 Time base	14. Coaxial bnc cable (one 18-inch, two 42-inch required)	
5. Signal Standardizer unit	20. Low-capacitance screwdriver	
9. Time-mark generator	22. Jumper wire	
10. Low-frequency sine-wave generator	24. Battery (memory backup)	

Shaded lines identify Performance Requirement CHECK.

E1. HORIZONTAL SYSTEM PRELIMINARY SETUP

a. Perform the Adjustment and Performance Check Power-Up Sequence.

b. Refer to Section 5, Instrument Options, and the Change Information at the rear of this manual for any modifications which may affect this procedure.

c. See the **TEST POINT AND ADJUSTMENT LOCATIONS E**. foldout page in Section 7, Diagrams and Circuit Board Illustrations.

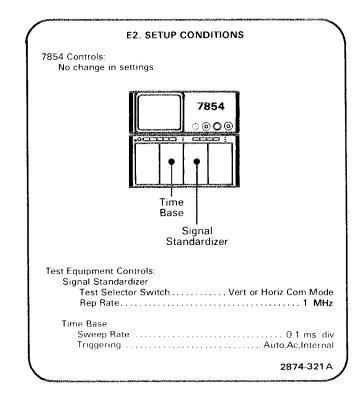
d. Set the 7854 controls as follows:

POWER switch On (pushbutton in) VERTICAL MODE RIGHT
VERT TRACE SEPARATION (B) Midrange
A TRIGGER SOURCE VERT MODE
A INTENSITY Midrange
HORIZONTAL MODE A
B INTENSITY Midrange
B TRIGGER SOURCE VERT MODE
FOCUS Midrange
READOUT intensity OFF (in detent)
GRAT ILLUMAs desired
CRT DISPLAY SCOPE

E2. CHECK/ADJUST HORIZONTAL AMPLI-FIER GAIN AND READOUT JITTER (A17R160, A17R15, A17R30, A17R33)

NOTE

First perform step E1, then proceed.



a. Set the A INTENSITY control for a well-defined trace.

b. Connect test point TP41 to test point TP141 with a jumper wire (located on Horizontal Amplifier Board A17).

c. **EXAMINE**—The vertical trace should be within 0.5 division of the center vertical graticule line.

d. **ADJUST**—The Limit Ctr adjustment R160 (located on Horizontal Amplifier Board A17) to align the displayed trace with the center vertical graticule line.

e. Remove jumper wire.

f. **EXAMINE**—The vertical trace should be within 0.5 division of the center graticule line.

g. **ADJUST**—The horizontal Ctr adjustment R15 (located on Horizontal Amplifier Board A17) to align the trace with the center graticule line.

h. Move the Signal Standardizer to the B HORIZ compartment.

i. Set the HORIZONTAL MODE switch to B.

j. Set the B INTENSITY control for a well-defined trace.

k. Set the Signal Standardizer Test selector switch to Vert or Horiz Gain. Align the bright vertical trace with the center vertical graticule line using the Signal Standardizer Position control.

I. **EXAMINE**—For 8 divisions of deflection between the center nine traces within 0.08 division. Note the exact deflection for comparison in part s.

m. **ADJUST**—The horizontal Gain adjustment R30 (located on Horizontal Amplifier Board A17) for exactly 8 divisions of deflection between the center nine traces measured at the second and tenth graticule lines.

n. **INTERACTION**—The adjustment of R30 affects High Frequency Timing step E3.

o. **EXAMINE**—That each vertical trace within the center eight divisions align with the respective graticule lines within 0.05 division. (The horizontal Gain adjustment R30 should be set for optimum gain for this check to be valid.)

p. **ADJUST**—If necessary, compromise the setting of the horizontal Gain adjustment to meet the requirements of parts (I) and (o).

q. Move the Signal Standardizer to the A HORIZ compartment.

r. Set the HORIZONTAL MODE switch to A.

s. CHECK---For 8 divisions of deflection between the center nine traces within 0.08 division of the deflection noted in part I (or m if performed).

t. **EXAMINE**—That each vertical trace aligns with the respective graticule lines within 0.05 division (the bright vertical trace must be at graticule center).

u. **INTERACTION**—Compromise the setting of R30 as necessary for optimum gain for both A and B HORIZ compartments. If re-adjustment is necessary recheck parts (a) through (s). This verifies that the difference between Horizontal channels is 1% or less.

u. Remove the Signal Standardizer and time-base unit.

v. Install time-base units in the A HORIZ and B HORIZ compartments.

w. Set the time-base Position controls to midrange and the sweep rate selector switches to 50μ s/div. Press the X10 magnifier pushbuttons to obtain a sweep rate of 5μ s/div.

x. Turn the READOUT intensity control to midrange to obtain a crt readout.

v. Set the HORIZONTAL MODE switch to ALT.

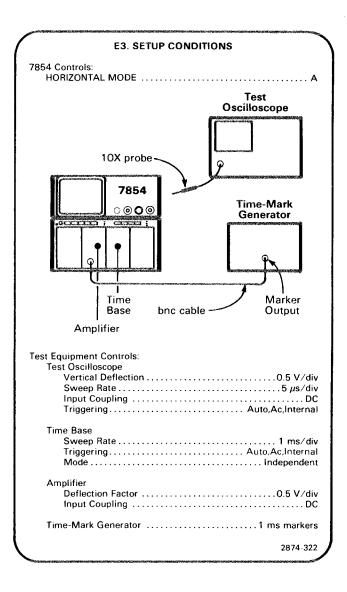
z. EXAMINE---The readout display for objectionable jitter.

aa. **ADJUST**—The Readout Stability adjustment, R33 (on the Horizontal Amplifier Board A17), for minimum readout jitter.

E3. CHECK/ADJUST 1 MS LINEARITY AND HIGH-FREQUENCY TIMING (A17C55, A17C155, A17C32)

NOTE

If the preceding step was not performed, first perform step E1, then proceed.



a. Set the Amplifier unit deflection factor for about 2 divisions of time marker display. Set the A INTENSITY control for a visible display.

b. Set the time-base unit triggering controls for a stable display.

c. Position the first marker to the extreme left line on the graticule.

d. Set the time-base unit sweep calibration pre-set for 1 marker at each major graticule division between the second and tenth graticule lines (center 8 divisions).

e. **CHECK**—That each time-mark aligns with a vertical graticule line along the center horizontal graticule line within 0.05 division (1/4 of a minor division). This verifies 1 ms/div linearity.

f. **CHECK**—Refer to the high-frequency and linearity verification procedures for the time-base unit in use. These are found in the time-base units instruction manual in the Performance Check or Calibration sections. If these checks are met, omit the remainder of step E3 (parts (g) through (r)).

g. Set the time base unit for 2 ns/division sweep rate.

h. Apply 2-nanosecond time-markers and set the Amplifier unit vertical deflection for about 2 divisions of display.

i. **EXAMINE**—For 1 time-mark per division over the center 8 divisions of the display within 0.12 division.

j. **ADJUST**---2 ns timing adjustments C55 and C155 (located on Horizontal Amplifier Board A17) for one timemark per division over the center 8 divisions of the display (position as necessary). Both of these adjustments should be set to approximately the same position.

k. Set the time base unit sweep rate for 1 ns/division. (If the 7B92A is not available, set the time base for 10 ns/division sweep rate with X10 sweep magnification.)

I. Apply 1-nanosecond time markers and set the Amplifier unit vertical deflection for about 2 divisions of display.

m. **EXAMINE**—For 1 time-mark per division over the center 8 divisions of the display within 0.16 division. (External triggering may be required.)

n. **ADJUST**—1 ns timing with the HF Adj capacitor C32 and (for SN B031170 & up) HF Adj resistor R32 (located on Horizontal Amplifier Board A17) for one timemark per division over the center 8 divisions of the display (position as necessary).

o. Set the time base unit for 500 ps/division sweep rate.

p. CHECK---For 1 time-mark every 2 divisions over the center 8 divisions of the display within 0.2 division.

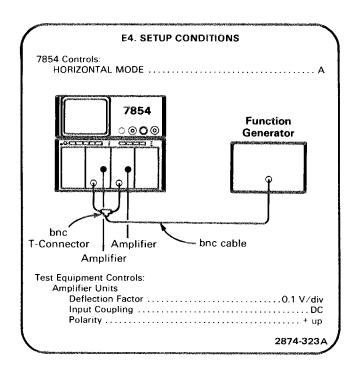
q. **ADJUST**—If necessary, compromise the setting of the HF Adj capacitor, C32 and (for SN B031170 & up) HF Adj resistor, R32 , for optimum 1-ns and 500-ps timing.

r. Remove the time base unit and install it in the B HORIZ compartment. Set the HORIZONTAL MODE switch to B and perform parts (f) through (q).

E4. CHECK X-Y PHASING

NOTE

If the preceding step was not performed, first perform step E1, then proceed.



a. Set the function generator for eight divisions of vertical and horizontal deflection of a 35 kHz sinewave.

b. **CHECK**—Crt Lissajous display (see figure 4-2) for a separation of 0.28 division or less (indicates 2 degrees or less phase shift).

c. Remove the Amplifier unit from the RIGHT VERT compartment and install it in the LEFT VERT compartment.

d. Set the VERTICAL MODE switch to LEFT.

e. **CHECK**—Crt Lissajous display for a separation of 0.28 division or less (indicates 2 degrees or less of phase shift).

NOTE

If the instrument under calibration contains Option 02, omit the remainder of this step.

f. Remove the Amplifier Unit from the A HORIZ compartment and install it in the B HORIZ compartment.

g. Set the HORIZONTAL MODE switch to B.

h. **CHECK**—Crt Lissajous display for a separation of 0.28 division or less (indicates 2 degrees or less of phase shift).

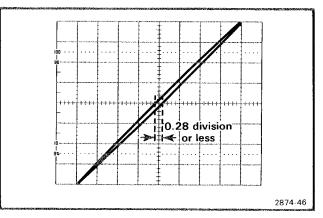


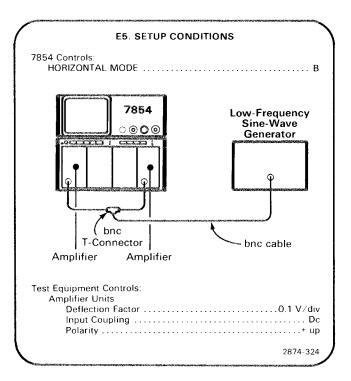
Figure 4-2. Typical display when checking X-Y phase relationships.

E5. CHECK/ADJUST X-Y COMPENSATION (A33C832; OPTION 02 ONLY)

NOTE

If the preceding step was not performed, first perform step E1, then proceed.

If the instrument under calibration does not contain Option 02, omit this step.



a. Set the low-frequency sine-wave generator for eight divisions of vertical and horizontal deflection at 1 megahertz.

b. **CHECK**—Crt Lissajous display (see Figure 4-2) for a separation of 0.28 division or less (indicates 2 degrees or less phase shift).

c. **ADJUST**—X-Y Comp adjustment C832 (located on X-Y Compensation Board A33) for minimum separation of the Crt Lissajous display. It will be necessary to remove the left side cover of the plug-in unit installed in the B HORIZ compartment to provide access to C832.

d. Remove the Amplifier unit from the LEFT VERT compartment and install it in the RIGHT VERT compartment.

e. Set the VERTICAL MODE switch to RIGHT.

f. **CHECK**—Crt Lissajous display for a separation of 0.28 division or less (indicates 2 degrees or less of phase shift).

g. **ADJUST**—If necessary, compromise the setting of the X-Y Comp adjustment, C832, for minimum separation of the crt Lissajous display for both LEFT VERT and RIGHT VERT compartments.

F. VERTICAL SYSTEM

Equipment required: (Numbers correspond to those listed in Table 4-3, Test Equipment.)

2. Amplifier

- 4. Time base (two required)
- 5. Signal Standardizer
- 6. Plug-in Extender
- 7 . Analog Test Card (067-0912-00)
- 10. Low-Frequency sine-wave generator
- 11. High-Frequency sine-wave generator

14. Coaxial cable (one 18-inch, one 42-inch required)

- 15. 50 ohm terminators (two required)
- 16. 2X Attenuator
- 17. Bnc-T connectcor
- 19. Nylon tuning tool
- 24. Battery (memory backup)

Shaded lines identify Performance Requirement CHECK.

F1. VERTICAL SYSTEM PRELIMINARY SETUP

a. Perform the Adjustment and Performance Check Power-Up Sequence.

b. Refer to Section 5, Instrument Options, and the Change Information at the rear of this manual for any modifications which may affect this procedure.

c. See the **TEST POINT AND ADJUSTMENT LOCATIONS F** foldout page in Section 7, Diagrams and Circuit Board Illustrations.

d. Set 7854 Oscilloscope controls as follows:

POWER switch On (pushbutton in)
VERTICAL MODE LEFT
VERT TRACE SEPARTION (B) Midrange
A TRIGGER SOURCE VERT MODE
A INTENSITY Midrange
HORIZONTAL MODEB
B INTENSITY Midrange
B TRIGGER SOURCE VERT MODE
FOCUS Midrange
READOUT intensity OFF (in detent)
GRAT ILLUMAs desired
CRT DISPLAY SCOPE

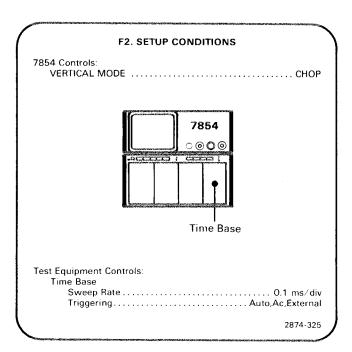
CAUTION

To prevent damage to the Vertical system due to inadvertent shorts, it is recommended that a non-metallic tuning tool be used whenever possible.

F2. ADJUST VERTICAL CENTERING (A19R20, A19R120, A18R105)

NOTE

First perform step F1, then proceed.



a. **EXAMINE**—That displayed traces overlap.

b. **ADJUST**—Left Balance adjustment R120 (located on Vertical Channel Switch Board A19) to overlap the displayed traces.

c. Set the VERTICAL MODE switch to ADD and note the direction and magnitude of trace movement.

d. Set the VERTICAL MODE to CHOP.

e. **ADJUST**—Right Balance adjustment R20 (located on Vertical Channel Switch Board A19) to position one trace one-half the distance and in the opposite direction to trace movement noted in part (c).

f. **ADJUST**—Left Balance adjustment, R120, to overlap the traces.

g. Repeat parts (c) through (f) as required to obtain minimum trace shift.

h. Install a Signal Standardizer in the RIGHT VERT compartment.

i. Set the Signal Standardizer to Test Com Mode.

j. Set the VERTICAL MODE switch to RIGHT.

k. **EXAMINE**—That displayed trace is within 0.5 division of graticule center and note displacement.

I. **ADJUST**—Vert Ctr adjustment R105 (located on Vertical Amplifier Board A18) to position trace to graticule center.

m. Remove the Signal Standardizer from the RIGHT VERT plug-in compartment and install it in the LEFT VERT compartment.

n. Set the VERTICAL MODE switch to LEFT.

o. **EXAMINE**—That displayed trace is within 0.5 division of trace displacement noted in part (k) and no more than 0.5 division from graticule center.

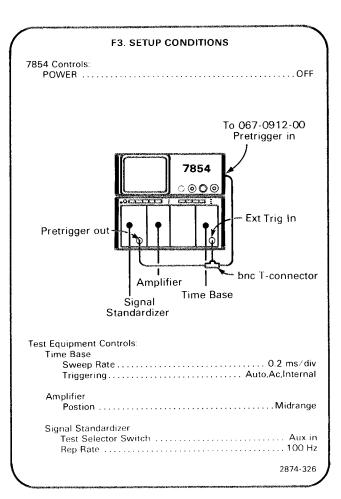
p. **ADJUST**—Compromise the Vert Ctr adjustment R105 so that the displayed trace is at graticule center within 0.5 division for both the LEFT VERT and RIGHT VERT compartments and no more than 0.5 div from each other (parts (h) through (p)).

F3. ADJUST VERTICAL AMPLIFIER THERMAL. COMPENSATIONS (A18R139, A18R169)

NOTE

If the preceding step was not performed, first perform step F1, then proceed.

Before this step may be performed, all digital boards must be removed (A25 through A31; see location of Circuit Boards illustration at the beginning of the Diagrams and Circuit Board Illustration Section) and the 067-0912-00 Analog Test board must be installed as per the appropriate instructions given in the Maintenance section of this manual. The top of the instrument must also be raised per the instructions in the Maintenance section of the Display Unit Kickstand.



a. With the display unit raised and supported by the kickstand, unplug the peltola connector from J91 located on the bottom of the Mother Board A8.

NOTE

There are two brown on white (91) peltola cables plugged into the bottom of the Mother Board. If these are reversed, the instrument still operates properly. However, for this step, the cable going to the rear of the instrument (the one not in the wiring harness) must be disconnected.

b. Connect the XY INH signal from the 067-0912-00 to J91 on the Mother Board using a peltola cable.

c. Press the POWER switch to on.

d. Set the VERTICAL MODE switch to RIGHT and the HORIZONTAL MODE switch to B.

e. Using the Amplifier unit Position control, vertically position one trace to 1 division below the top of the graticule.

f. Using the Signal Standardizer Position control, vertically position the other trace to 1 division above the bottom of the graticule.

g. Set the time-base unit sweep rate to 2 ms/div.

h. Set the time-base triggering to Auto, Ac, External.

i. Use the time-base Triggering controls to obtain a stable display triggered on the negative edge.

j. **EXAMINE**—Abberations for 0.06 divisions or less rolloff and overshoot.

k. **ADJUST**—Thermal Compensation R139, Comp 1 (located on Vertical Amplifier Board A18) for minimum rolloff and overshoot.

I. Set the Signal Standardizer rep rate to 1 kHz.

m. Set the time-base unit sweep rate to .2 ms/div.

n. **EXAMINE**—Abberations for 0.06 division or less rolloff and overshoot.

o. **ADJUST**—Thermal compensation R169, Comp 2 (located on Vertical Amplifier Board A18) for a minimum rolloff and overshoot.

p. Turn the POWER switch to OFF.

q. Unplug the XY INH peltola cable from J91 on the bottom of the Mother Board and re-install the brown on white peltola connector to its original position.

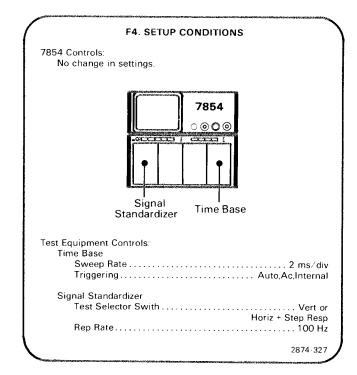
r. Lower and secure the display unit by reversing the Display Unit Kickstand procedure found in the Maintenance section of this manual.

s. Remove the 067-0912-00 Analog Test board and reinstall the digital boards by reversing the Analog Test board procedures given in the Maintenance section of this manual.

F4. ADJUST VERTICAL CHANNEL SWITCH COMPENSATIONS (A19R25, A19R33, A19R37, A19R42, A19R45, A19C50, A19R125, A19R133, A19R142, A19R145, A19C150)

NOTE

If the preceding step was not performed, first perform step F1, then proceed.



a. Set the Signal Standardizer Amplitude control for a 6 division, square-wave display.

b. **EXAMINE**—The square-wave display for less than 0.06 division of abberations at the time-base sweep rates and Signal Standardizer Rep Rates given in Table 4-5.

c. ADJUST—Thermal Compensation adjustments as given in Table 4-5 for minimum overshoot and rolloff.

d. **INTERACTION**—The adjustments listed in Table 4-5 may interact with each other: repeat as necessary.

TABLE 4-5

Vertical Channel Switch Compensation Adjustments for LEFT Channel (Located on Vertical Channel Switch Board A19)

Adjustment	Signal Standardizer Rep Rate	Sweep Rate
R125	100 Hz	5 ms/div
R133	1 KHz	.5 ms∕div
R137	10 KHz	50 <i>µ</i> s∕div
R142	10 KHz	10 µs∕div
R145,C150	100 KHz	5 μs∕div

e. Remove Signal Standardizer from the LEFT VERT compartment and install it in the RIGHT VERT compartment.

f. Set the VERTICAL MODE switch to RIGHT.

g. **EXAMINE**—The square-wave display for less than 0.06 division of abberations at the time-base sweep rates and Signal Standardizer Rep Rates given in Table 4-6.

h. ADJUST—Thermal Compensation adjustments as given in Table 4-6 for minimum overshoot and rolloff.

i. **INTERACTION**—The adjustments listed in Table 4-6 may interact with each other: repeat as necessary.

TABLE 4-6

Vertical Channel Switch Compensation Adjustments for RIGHT Channel (Located on Vertical Channel Switch Board A19)

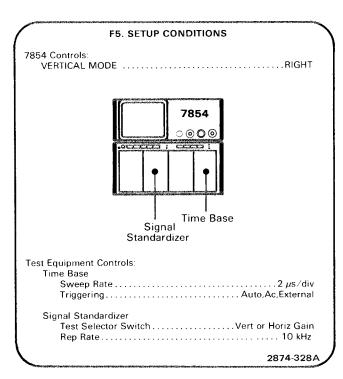
Adjustment	Signal Standardizer Rep Rate	Sweep Rate
R25	100 Hz	5 ms/div
R33	1 KHz	.5 ms/div
R37	10 KHz	50 μs/div
R42	10 KHz	10 μs/div
R45 C50	100 KHz	5 μs/div

j. **INTERACTION**—Adjustments in this step (F4) interact with the adjustments in step H7, H8 and H9.

F5. CHECK/ADJUST VERTICAL GAIN (A18R160)

NOTE

If the preceding step was not performed, first perform step F1, then proceed.



a. Position the Signal Standardizer display to align the bright trace with the graticule center line.

b. **EXAMINE**—For one trace per graticule division within 0.06 division over the center 6 graticule divisions. Note the exact magnitude for comparison in part f.

c. **ADJUST**—The vertical Gain R160 (located on Vertical Amplifier Board A18) for one division between each of the center 7 displayed traces.

d. Remove the Signal Standardizer from the RIGHT VERT compartment and install it in the LEFT VERT compartment.

e. Set the VERTICAL MODE switch to LEFT.

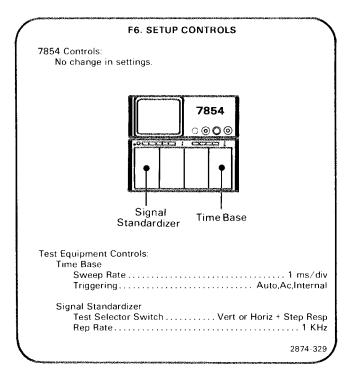
f. **CHECK**—For one trace per graticule division within 0.06 division of the magnitude noted in part (b) (or (c) if performed), over the center 6 graticule divisions (verifies gain difference between vertical channels to be 1% or less).

g. **ADJUST**—If necessary, compromise the setting of the vertical Gain adjustment, R160, for optimum gain for both the LFFT and RIGHT VERT compartments.

F6. CHECK VERTICAL LOW-FREQUENCY LINEARITY

NOTE

If the preceding step was not performed, first perform step F1, then proceed.



a. Set the Signal Standardizer Amplitude and Position controls to display a signal exactly 2 divisions in amplitude in the center of the graticule area.

b. **CHECK**—Position the two-division display vertically and check for not more than 0.1 division of compression or expansion anywhere within the graticule area (verifies low-frequency linearity specification).

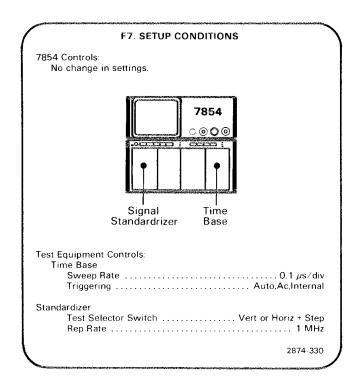
c. **ADJUST**—If the specification of part (b) was not met, perform steps F2, F3, F4 and F5.

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F7. ADJUST HIGH-FREQUENCY COMPEN-SATION (A18R142, A18R172, A18R18, A18C18, A18L20)

NOTE

If the preceding step was not performed, first perform step F1, then proceed.



a. Set the Signal Standardizer Amplitude and Position controls for a 6-division, square-wave display, centered on the graticule.

b. Set the time-base unit Triggering and Position controls for a stable display. Using the Triggering Slope switch, trigger the display on the rising edge of the square wave.

c. **EXAMINE**—Displayed pulse for optimum flat top after the first 50 ns, within 0.06 division.

d. **ADJUST**—HF compensations R142 (Comp 3) and R172 (Comp 4) (located on Vertical Amplifier Board A18) for optimum leveling of the waveform.

e. Set the time-base sweep rate to 50 $\mbox{ns/division}$ and the sweep magnifier to X10.

f. Using the time base Position control, position the display for viewing the leading edge of the square wave. If necessary, advance the B INTENSITY control for a well defined display.

g. **EXAMINE**—Displayed pulse for optimum square corner and flat top within 0.3 division peak-to-peak for the first 20 ns after transition.

Calibration Part II—7854 Adjustment and Performance Check

h. **ADJUST**—HF Compensations R18 (Comp 6), C18 (Comp 7) and L20 (Comp 5) (on the Vertical Amplifier Board A18) for minimum abberations and best square wave response.

i. Set the Signal Standardizer Test selector switch to Vert or Horiz -Step Resp.

j. Position the leading edge of the signal 1 division above the bottom of the graticule with the Signal Standardizer Position control.

k. **EXAMINE**—Displayed pulse for optimum square corner and flat bottom within 0.3 division peak-to-peak for the first 20 ns after transition.

1. **ADJUST**—If necessary, compromise the highfrequency compensation adjustments R18, C18 and L20 for optimum pulse response to both positive and negative steps (parts (g) through (I)).

m. Move the Signal Standardizer to the RIGHT VERT compartment and set the VERTICAL MODE switch to RIGHT.

n. **EXAMINE**—Displayed pulse for optimum square corner and flat response to both positive and negative steps within 0.3 division as in parts (g) and (k).

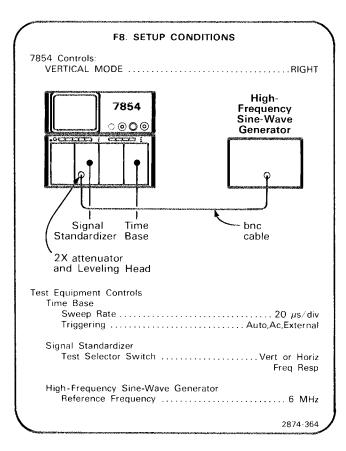
o. **ADJUST**—If necessary, compromise the high-frequency adjustments R18, C18 and L20 for optimum pulse response for both vertical compartments (parts (g) through (o)).

p. **INTERACTION**—If adjustments were made, steps H7 and H9 of the Digitzer procedure must be performed.

F8. EXAMINE VERTICAL AMPLIFIER BANDWIDTH

NOTE

If the preceding step was not performed, first perform step F1, then proceed.



a. With the High-Frequency Sine-Wave Generator connected to the Signal Standardizer Aux In-CW In (Freq Resp) input via a 2X attenuator, set the Signal Standardizer Amplitude control fully clockwise.

b. Set the High-Frequency Sine-Wave Generator for a 10-division display at the reference frequency (less than 10 MHz). (To obtain a 10-division display, first set for 8 divisions, then vertically position the display 1 division down using the Signal Standardizer Position control; then set the sine-wave generator to return the top of the display to the top of the graticule.)

c. Set the Signal Standardizer Amplitude and Position controls for a 6-division display centered on the graticule. (The CW Leveled indicator should be lit.)

d. Without changing the output amplitude, increase the generator frequency to 475 MHz.

e. **EXAMINE**—Crt display to be greater then or equal to 4.24 vertical divisions.

f. Move the Signal Standardizer to the LEFT VERT compartment (leave signal connected) and set the VERTICAL MODE switch to LEFT.

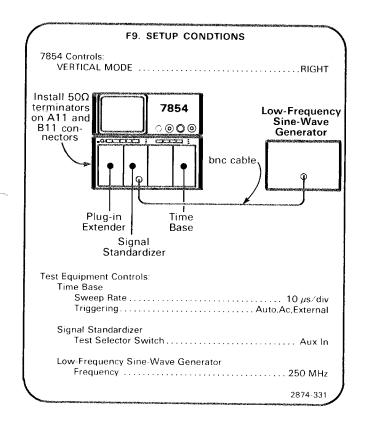
g. **EXAMINE**—Repeat parts (a) through (e) for the LEFT VERT compartment.

h. **ADJUST**—If the guidelines of step (e) or (g) were not met, perform steps F2, F3, F4, F5, F6 and F7.

F9. CHECK VERTICAL CHANNEL ISOLATION

NOTE

If the preceding step was not performed, first perform step F1, then proceed.



a. Set the ouput of the low-frequency sine-wave generator and the Signal Standardizer Amplitude control for 8 divisions of deflection at 250 MHz.

b. Set the VERTICAL MODE switch to LEFT.

c. **CHECK**—The displayed signal for an amplitude of 0.08 division or less while adjusting the low-frequency sine-wave generator from 250 MHz to 50 MHz (verifies 250 MHz isolation of at least 100:1).

d. Move the Signal Standardizer to the LEFT VERT compartment and the Plug-in Extender (with 50 ohm terminators on A11 and B11 connectors) to the RIGHT VERT compartment.

e. Set the output of the low-frequency sine-wave generator and the Signal Standardizer amplitude control for 8 divisions of display at 250 MHz.

f. Set the VERTICAL MODE switch to RIGHT.

g. **CHECK**—Displayed signal for an amplitude of 0.08 division or less while adjusting the low-frequency sinewave generator from 250 MHz to 50 MHz (verifies 250 MHz isolation of at least 100:1).

h. Disconnect the low-frequency sine-wave generator from the Signal Standardizer and connect the highfrequency sine-wave generator to the Signal Standardizer Aux In input.

i. Set the VERTICAL MODE switch to LEFT.

j. Set the output of the high-frequency sine-wave generator and the Signal Standardizer Amplitude control for 8 divisions of display at 475 MHz.

k. Set the VERTICAL MODE switch to RIGHT.

I. **CHECK**—Displayed signal for an amplitude of 0.2 division or less while adjusting the high-frequency sinewave generator from 475 MHz to 250 MHz (verifies 475 MHz isolation of at least 40:1).

m. Move the Signal Standardizer to the RIGHT VERT compartment and the Plug-in Extender to the LEFT VERT compartment.

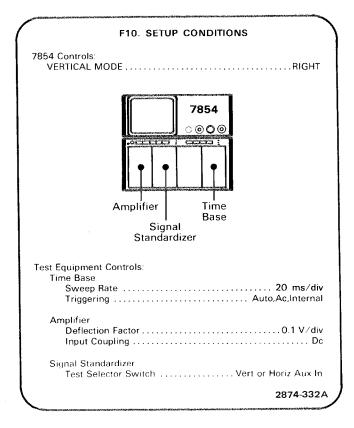
n. Set the output of the high-frequency sine-wave generator and Signal Standardizer Amplitude control for 8 divisions of display at 475 MHz.

o. Set the VERTICAL MODE switch to LEFT.

p. **CHECK**—Displayed signal for an amplitude of 0.2 division or less while adjusting the high-frequency sine-wave generator from 475 MHz to 250 MHz (verifies 475 MHz isolation of at least 40:1).

F10. EXAMINE VERTICAL DISPLAY MODES NOTE

If the preceding step was not performed, first perform step F1, then proceed.



a. Postion the trace to the upper half of the graticule area with the Signal Standardizer Position control.

b. Set the VERTICAL MODE switch to LEFT and position the trace to the lower half of the graticule area with the left vertical-unit Position control.

c. **EXAMINE**—Crt display for two traces in the ALT and CHOP positions of the VERTCAL MODE switch.

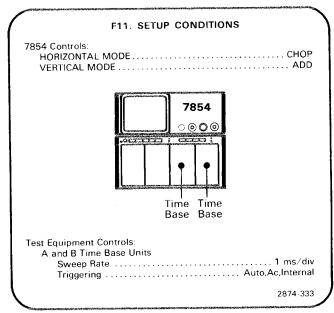
d. Set the VERTICAL MODE switch to ADD.

e. **EXAMINE**—Crt display for a single trace that can be positioned vertically with either left of right vertical-unit Position controls.

F11. EXAMINE VERTICAL TRACE SEPARATION

NOTE

If the preceding step was not performed, first perform step F1, then proceed.



a. **EXAMINE**—Rotate the VERT TRACE SEPARATION (B) control throughout its range and check that the trace produced by the B time-base unit can be positioned above and below the trace produced by the A time-base unit by at least 4 divisions. Repeat with the HORIZONTAL MODE switch set to ALT.

GA. DISPLAY SYSTEM

NOTE

Three procedures for the Display System are available; only one need be performed. Choose the procedure that corresponds to the test equipment and options available with the instrument under test.

1. GA-Recommended procedure; requires the 067-0961-00 Diagnostic Memory Board.

2. GB—To be used only if the 067-0961-00 Diagnostic Memory Board is not available. A Waveform Calculator Keyboard is required.

3. GC—To be used with Option 0D when a 067-0961-00 Diagnostic Memory Board is not available.

Equipment Required: (Numbers correspond to those listed in Table 4-3, Test Equipment).

3. Amplifier Unit

20. Low capacitance screwdriver

Also required is the 067-0961-00 Diagnostic Memory Board and the associated keyboard overlay.

Shaded lines identify Performance Requirement CHECK.

GA1. DISPLAY SYSTEM PRELIMINARY SETUP

a. With the POWER switch OFF, remove the ROM board from the instrument and replace it with the 067-0961-00 Diagnostic Memory Board per the appropriate instructions in the Maintenance section of this manual. Install the keyboard overlay on the Front-Panel Keyboard for the pushbutton nomenclature used in this procedure.

b. Perform the Adjustment and Performance Check Power-Up Sequence.

c. Refer to Section 5, Instrument Options, and the Change Information at the rear of this manual for any modifications that may affect this procedure.

d. See the **TEST POINT AND ADJUSTMENT LOCATIONS G** foldout page in Section 7, Diagrams and Circuit Board Illustrations.

e. Set the 7854 Oscilloscope controls as follows:

 POWER switch
 On (pushbutton in)

 VERTICAL MODE
 LEFT

 VERT TRACE SEPARATION (B)
 Midrange

 A TRIGGER SOURCE
 VERT MODE

 A INTENSITY
 Fully counterclockwise

 HORIZONTAL MODE
 B

 INTENSITY
 Fully counterclockwise

 B INTENSITY
 Fully counterclockwise

 B TRIGGER SOURCE
 VERT MODE

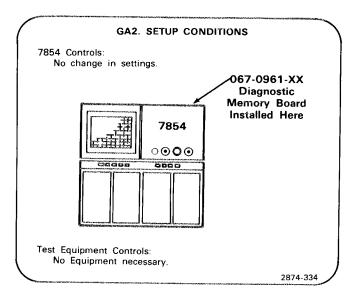
 READOUT intensity
 OFF (in detent)

 GRAT ILLUM
 Midrange

GA2. WAVEFORM/READOUT CENTERING AND GAIN ADJUSTMENT (A29R1205, A29R1300, A18R65, A18R81)

NOTE

First perform step GA1, then proceed.



a. Sequentially press the front-panel keyboard GRAT and DOT pushbuttons to obtain a dot test pattern.

b. Set the front-panel STORED INT control for a usable display.

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c. Set the front-panel FOCUS control for optimum overall focus of the display.

d. **EXAMINE**—The bright center dot should be within 0.05 division of the center crt graticule line.

e. **ADJUST**—The Horizontal Offset adjustment R1205 (on Display Board A29), to horziontally align the bright center dot with the center crt graticule line.

f. **EXAMINE**—The display for horizontal alignment of each displayed dot with the corresponding graticule line within 0.05 division over the center 8 horizontal divisions.

g. **ADJUST**—The Horizontal Gain adjustment R1300 (on the Display Board A29), to align the displayed dots with the corresponding graticule line.

h. **EXAMINE**—The bright center dot should be within 0.05 division of the center crt graticule line.

i. **ADJUST**—The RO-WFM Ctr adjustment R65 (located on A18, Vertical Amplifier board), to align the bright center dot with the center crt graticule line.

j. **EXAMINE**—The display for vertical alignment of each displayed dot with the corresponding graticule line within 0.05 division over the center 6 vertical divisions.

k. **ADJUST**—The RO-WFM Gain adjustment R81 (located on A18, Vertical Amplifier board) to align the displayed dots with the corresponding graticule lines.

NOTE

If further adjustment of the Display system is required, omit the remainder of this step.

I. Turn the POWER switch OFF.

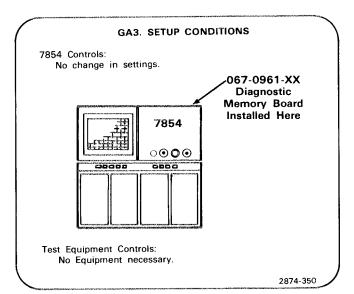
m. Remove the 067-0961-00 Diagnostic Memory Board per instructions in the Maintenance section of this manual.

n. Reinstall the ROM board in its original position.

GA3. VECTOR OFFSET AND GAIN ADJUSTMENT (A29R1620, A29R1621, A29R1625, A29R1720)

NOTE

If the preceding step was not performed, first perform Step GA1, then proceed.



a. Press the front-panel keyboard VECT pushbutton to obtain a vector crosshatch display on the crt.

b. Set the front-panel STORED INT control for a usable display.

c. **EXAMINE**—The display for vertical alignment of the center horizontal vector segments with the center crt graticule line within 0.05 division.

d. **ADJUST**—The Vertical Vectors Offset adjustment, R1625 (on the back of the A29 Display Board), to vertically align the center horizontal vector segments with the graticule center line.

e. **EXAMINE**—The display for vertical alignment of the horizontal vector segments with the 7 center horizontal graticule lines, within 0.05 division.

f. **ADJUST**—The Vertical Vectors Gain adjustment, R1720 (on the back of the A29 Display Board) to vertically align the horizontal vector segments with 7 center horizontal graticule lines.

g. **EXAMINE**—The display for horizontal alignment of the center vertical vector segments with the center crt graticule line, within 0.05 division.

h. **ADJUST**—The Horizontal Vectors Offset adjustment, R1620 (on the back of the A29 Display Board), to horizontally align the center vertical vector segments with the graticule center line.

(a)

i. **EXAMINE**—The display for horizontal alignment of the vertical vector segments with the 9 center vertical graticule lines, within 0.05 division.

j. **ADJUST**—The Horizontal Vectors Gain adjustment, R1621 (on the back of the A29 Display Board), to horizontally align the vertical vector segments with the 9 center vertical graticule lines.

k. Press the front-panel keyboard XY pushbutton to obtain a display alternating between a graticule dot pattern and a vector crosshatch pattern.

I. **EXAMINE**—The display for overlaying of the dot and vector patterns, within 0.05 division.

m. **ADJUST**—If necessary, compromise the settings of the Vertical Vectors Offset adjustment, R1625, and the Horizontal Vectors Offset adjustment, R1620, to overlay the dot and vector patterns.

NOTE

If further adjustment of the Display system is required omit the remainder of this step.

n. Turn the POWER switch to OFF.

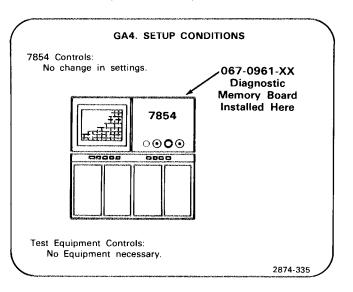
o. Remove the 067-0961-00 Diagnostic Memory Board per instructions in the Maintenance section of this manual.

p. Reinstall the ROM board in its original position.

GA4. WAVEFORM VECTOR TIMING ADJUSTMENT (A29R1700)

NOTE

If the preceding step was not performed, first perform Step GA1, then proceed.



(a)

a. Press the front panel keyboard VECT push button to obtain a vector display on the crt.

b. Set the front-panel STORED INT control for a usable display.

c. **EXAMINE**—The display to ascertain that there are no bright spots or gaps in the trace.

d. **ADJUST**—The WFM vector timing adjustment, R1700 (on the A29 Display Board) for no bright spots or gaps in the display.

e. Press the front panel keyboard GRAT pushbutton to obtain a crosshatch pattern on the crt.

f. **EXAMINE**—The display for gaps less than or equal to 0.05 division at graticule intersections.

g. **ADJUST**—If necessary, compromise the setting of the WFM vector timing adjustment, R1700, for optimum vector display of both the vector timing and vector crosshatch test patterns.

NOTE

If further adjustment of the Display system is required, omit the remainder of this step.

h. Turn the POWER switch OFF.

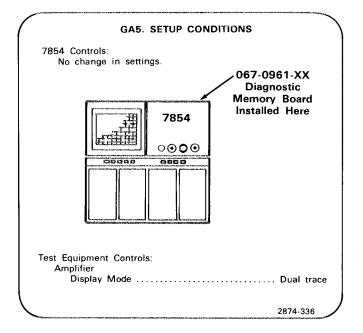
i. Remove the 067-0961-00 Diagnostic Memory Board per instructions in the Maintenance section of this manual.

j. Reinstall the ROM board in its original position.

GA5. CHARACTER DISPLAY ADJUSTMENT (A29R1200, A29R1100, A29R1106, A29R2200, A29R2600)

NOTE

If the preceding step was not performed, first perform Step GA1, then proceed.



a. Press the front panel keyboard CHAR pushbutton to obtain a display of alphanumeric characters.

b. Set the front-panel READOUT intensity control for a usable display.

c. **EXAMINE**—The display for equal horizontal margins between the first and last characters displayed in a line and the corresponding graticule lines, within 0.1 division.

d. **ADJUST**—Character Horizontal Gain adjustment, R1200 (located on the A29 Display Board) to horizontally center the display.

e. **EXAMINE**—The display for vertical centering of the gap between the 8th and 9th character line, within 0.1 division.

f. **ADJUST**—The Character Vertical offset adjustment, R1106 (located on the A29 Display Board), to vertically center the character display.

g. **EXAMINE**—The display for the top margin between the top graticule line and the top of the first row of characters equal to the left and right margins, within 0.1 division. h. **ADJUST**—The Character Vertical Gain adjustment, R1100 (located on the A29 Display Board), to equalize the top and side margins.

i. Press the front-panel keyboard SCOPE pushbutton to obtain a display of the amplifier deflection factors.

j. Press and hold one of the amplifier units trace-identify buttons.

k. **EXAMINE**—The readout display for correct indication of "IDENTIFY". If the readout display is incorrect, adjustment is required.

I. **ADJUST**—Column adjustment R2600, and Row adjustment, R2200 (located on the A29 Display Board) for correct display of "IDENTIFY". Set these adjustments to the center of the adjustment range. This provides correct readout indication. Release the amplifier unit trace-identify button.

m. Turn the POWER switch OFF.

n. Remove the 067-0961-00 Diagnostic Memory Board per the instructions in the Maintenance section of this manual.

o. Reinstall the ROM board in its original position.

GB. DISPLAY SYSTEM

NOTE

Alternate procedure to be used only if the 067-0961-00 Diagnostic Memory Board is not available. A Waveform Calculator Keyboard is required.

Equipment Required: (numbers correspond to those listed in table 4-3, Test Equipment).

20. Low-Capacitance Screwdriver

Shaded lines identify Performance Requirement CHECK.

GB1. DISPLAY SYSTEM PRELIMINARY SETUP

a. Perform the Adjustment and Performance Check Power-Up sequence. MEMORY BACKUP POWER must be disconnected before performing Step GA4.

b. Refer to Section 5, Instrument Options, and the Change Information at the rear of this manual for any modifications which may affect this procedure.

c. See the **TEST POINT AND ADJUSTMENT LOCATIONS G** foldout page in Section 7, Diagrams and Circuit Board Illustrations.

d. Connect the remote WAVEFORM CALCULATOR keyboard to its rear-panel connector and set the 7854 controls as follows:

POWER switch	On (pushbutton in)
VERTICAL MODE	
VERT TRACE SEPARATION	(B) Midrange
A TRIGGER SOURCE	VERT MODE
A INTENSITY F	ully counterclockwise
HORIZONTAL MODE	
B INTENSITY F	ully counterclockwise
B TRIGGER SOURCE	
READOUT intensity	Midrange
GRAT ILLUM	

e. Enter the following program into the 7854 memory using the remote WAVEFORM CALCULATOR keyboard.

NOTE

This program produces a waveform with known horizontal and vertical parameters for calibration of the Display System. This waveform is used as a numerical absolute and the adjustments made in this procedure match this absolute to the crt display.

To enter the program into the 7854 memory, press the PROGRAM ENTRY key on the WAVEFORM CALCULATOR keyboard to initiate program entry. A > (line pointer) should appear at the left of the 7854 crt display.

Sequentially press the following keys. Keystrokes that will not appear in the program shown on the 7854 crt are enclosed in parentheses (). Line numbers are automatically added.

1, 0, 2, 4, (f),>P/W, TIME, (f), DOTS, OFF, 0, WFM, 0, *, (NEXT),

P/W, 1, 0, /, (*f*), >HSCL, P/W, 6, /, 0, (*f*), >CNS, (*f*), CLS, 1, (NEXT),

(*f*),>CNS, 3, CHS, ENTER, 3, ENTER, 1, 0, *f*, LBL, GSB, (NEXT),

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3, ENTER, 3, CHS, ENTER, 1, 0, (f), LBL, GSB, (NEXT),

3, CHS, ENTER, 3, ENTER, 1, 0, (f), LBL, GSB, (NEXT),

3, ENTER. ENTER, 1, 0, (f), LBL, GSB, 0, ENTER, (NEXT),

ENTER, 1, 0, (f), LBL, GSB, 3, CHS, ENTER, ENTER, (NEXT),

1, 0, (f), LBL, GSB, VSCL, VXPD, 0, WFM, 1, (f), >WFM, (NEXT),

1, ., 3, 3, 3, 3, 3, 3, CHS, VXPD, HSCL, 5, *, (f), HPRGT, (NEXT),

0, WFM, 1, (f), VS, STOP, (NEXT),

(f), LNN, O, 5, (f), DOTS, (f), PAUSE, VECT, (f), PAUSE, 5, (f), LBL, (NEXT),

GOTO, (NEXT),

(f), LNN, 1, 0, 2, (f), >CNS, CLX, 1, CNS, (f), >ORD, 1, CNS, 0, (NEXT),

CNS, +, 1, (f), >CNS, 1, -, 2, CNS, X<>Y, (f), >ORD, (NEXT).

ITRP, (f) RTN, (NEXT).

A listing of the program as it will appear on the 7854 crt follows, including the line numbers automatically added. This may be used to check the accuracy of the program as entered.

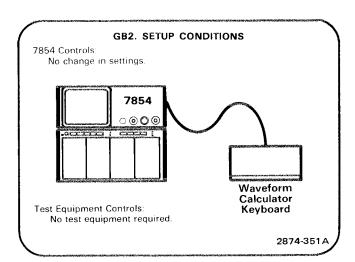
888 1824 >P/H TIME DOTS OFF & NFH & # 881 P/H 18 / >HSCL P/H 6 / 0 >CHS CLS 1 882 >CNS 3CHS ENTER 3 ENTER 10 LBL CSB 883 3 ENTER 3CHS ENTER 10 LBL GSB 004 3CHS ENTER 3 ENTER 10 LBL GSB 005 3 ENTER ENTER 10 LM. CSB 0 ENTER 886 ENTER 10 LBL GSB JCHS ENTER ENTER >007 10 LBL CSB USCL UXPD 0 NFH 1 >NFH 888 1.333333CHS UXPD HSCL 5 & HPRGT 669 6 HFM 1 US STOP 010 L05 DOTS PAUSE VECT PAUSE 5 LBL 011 GOTO 012 L10 2 >CNS CLX 1 CNS >ORD 1 CNS 0 013 CNS + 1 > CNS 1 - 2 CNS X <> Y > ORD 014 ITRP RTN 2874-358

After the program has been entered into the 7854 memory, sequentially press the EXECUTE, STORED, *(f)*, and START keys to generate the calibration waveform. The resulting waveform is a rectangle that is horizontally and vertically bisected to form four, smaller, equal rectangles.

GB2. ADJUST DISPLAY OFFSETS AND GAINS (A29R1205, A18R65, A29R1300, A18R81)

NOTE

First perform step GB1, then proceed.



a. **EXAMINE**—The crt display for horizontal centering of the calibration waveform within 0.05 division at graticule center.

b. **ADJUST**—The Horizontal Offset adjustment, R1205 (located on the Display Board A29) to align the vertical line segment bisecting the calibration waveform with the vertical center line of the crt graticule.

c. **EXAMINE**—The crt display for vertical centering of the calibration waveform within 0.05 division at graticule center.

d. **ADJUST**—The RO-WFM Ctr adjustment, R65 (located on the Vertical Amplifier Board A18) to align the horizontal line segment bisecting the calibration waveform with the horizontal center line of the crt graticule.

e. **EXAMINE**—The crt display for horizontal alignment of the left and right sides of the calibration waveform with the second and tenth vertical graticule lines within 0.05 division.

f. **ADJUST**—The Horizontal Gain adjustment, R1300 (located on the Display Board A29) to align the sides of the calibration waveform with the second and tenth vertical-graticule lines.

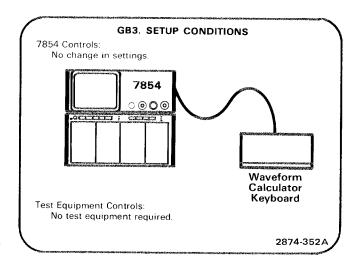
g. **EXAMINE**---The crt display for vertical alignment of the top and bottom of the calibration waveform with the second and eighth horizontal graticule lines within 0.05 division.

h. **ADJUST**—The RO-WFM Gain adjustment, R81 (located on the Vertical Amplifier Board A18), to align the top and bottom of the calibration waveform with the second and eighth horizontal-graticule lines.

GB3. ADJUST VECTOR OFFSETS AND GAINS (A29R1625, A29R1720, A29R1620, A29R1621)

NOTE

If the preceeding step was not performed, first perform step GB1, then proceed.



a. Press the RUN pushbutton on the remote WAVEFORM CALCULATOR keyboard to obtain a display alternating between dot and vector modes.

b. **EXAMINE**—The crt display for a vertical shift between dot and vector displays at graticule center less than or equal to 0.05 division.

c. **ADJUST**—The Vertical Vectors Offset adjustment, R1625 (located on the back of the Display Board A29), for no vertical shift between dot and vector displays at graticule center.

d. **EXAMINE**—The crt display for a horizontal shift between dot and vector displays at graticule center, less than or equal to 0.05 division.

e. **ADJUST**—The Horizontal Vectors Offset adjustment, R1620 (located on the back of the Display Board A29), for no horizontal shift between dot and vector displays at graticule center.

f. **EXAMINE**—The crt display for vertical overlaying of the dot and vector displays at the second and eighth horizontal graticule lines within 0.05 division.

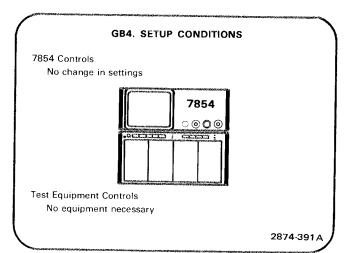
g. **ADJUST**—The Vertical Vectors Gain adjustment, R1720 (located on the back of the Display Board A29) to vertically overlay the dot and vector displays. h. **EXAMINE**—The crt display for horizontal overlaying of the dot and vector displays at the second and tenth vertical-graticule lines within 0.05 division.

i. **ADJUST**—The Horizontal Vectors Gain adjustment, R1621 (located on the back of the Display Board A29) to horizontally overlay the dot and vector displays.

GB4. ADJUST CHARACTER DISPLAY (A29R1100, A29R1106, A29R1200)

NOTE

If the preceding step was not performed, first perform step GB1, then proceed.



a. Disconnect MEMORY BACKUP POWER if applied to the instrument.

b. Momentarily turn the POWER switch OFF to ensure that memory contents are at their default values when instrument power is reapplied. Turn the POWER switch on.

c. Press the STORED pushbutton on the front-panel keyboard to obtain a display of the default data stored in memory.

d. **EXAMINE**—The top row of the character readout display for equal margins between the graticule edges and the ends of the character line within 0.1 division.

e. **ADJUST**—The Character Horizontal Gain adjustment, R1200 (located on the Display Board A29), to equalize the margins at the ends of the top character line displayed.

f. **EXAMINE**—That the top and bottom lines of displayed character information are vertically centered within 0.1 division.

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g. **ADJUST**—The Character Vertical Offset adjustment, R1106 (located on the Display Board A29), to vertically center the top and bottom lines of displayed characters about the graticule center.

h. **EXAMINE**—That the character lines are displayed in the top half of the upper graticule division and in the bottom half of the lower graticule division.

i. **ADJUST**—The Character Vertical Gain adjustment, R1100 (located on the Display Board A29), to center the displayed character lines in the top half of the upper graticule division and the bottom half of the lower graticule division.

GC. DISPLAY SYSTEM

NOTE

(ALTERNATE PROCEDURE FOR OPTION OD; TO BE USED ONLY IN THE ABSENCE OF THE CALCULATOR KEYBOARD)

Equipment Required: (Numbers correspond to those listed in Table 4-3, Test Equipment).

2. Amplifier

14. Coaxial cable (one 42-inch required)

4. Time base

20. Low-Capacitance screwdriver

Shaded lines identify Performance Requirement CHECK.

GC1. DISPLAY SYSTEM PRELIMINARY SETUP

a. Perform the Adjustment and Performance Check Power-Up sequence. MEMORY BACKUP POWER must be disconnected before performing steps GC3 and GC5.

b. Refer to Section 5, Instrument Options, and the Change Information at the rear of this manual for any modifications which may affect this procedure.

c. See the **TEST POINT AND ADJUSTMENT LOCATIONS G** foldout page in Section 7, Diagrams and Circuit Board Illustrations.

d. Set the 7854 Controls as follows:

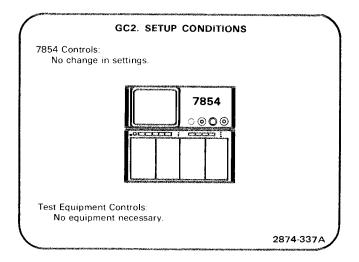
a

POWER switch On (pushbutton in) VERTICAL MODE LEFT
VERT TRACE SEPERATION (B) Midrange
A TRIGGER SOURCE VERT MODE
HORIZONTAL MODEB
B INTENSITY fully counterclockwise
B TRIGGER SOURCE VERT MODE
GRAT ILLUM Midrange
READOUT intensity Midrange
STORED INT Midrange

GC2. PRESET CHARACTER DISPLAY (A29R1100, A29R1200, A29R1106)

NOTE

First perform step CG1, then proceed.



a. Press the STORED pushbutton on the front-panel keyboard to obtain a character readout display.

b. **EXAMINE**—The crt display for viewable character readout display.

c. **ADJUST**—Preset the Character Vertical Gain adjustment, R1100 (located on the Display board A29), to vertically position all character readout information within the graticule area.

d. **ADJUST**—Preset the Character Horizontal Gain adjustment, R1200 (located on the Display Board A29), to horizontally position all character readout information within the graticule area.

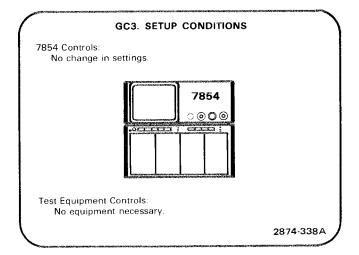
e. **ADJUST**—The Character Vertical Offset adjustment R1106 (located on the Display Board A29), to vertically center the character readout information on the graticule.

f. **ADJUST**—The Character Vertical Gain adjustment, R1100 (located on the Display Board A29), to expand the character readout display vertically almost to the graticule edges (top and bottom).

GC3. ADJUST DISPLAY HORIZONTAL CENTERING AND GAIN (A29R1205, A29R1300)

NOTE

If the preceding step was not performed, first perform step CG1, then proceed.



a. Disconnect MEMORY BACKUP POWER if applied to the instrument.

b. Momentarily turn the POWER switch OFF to ensure that memory contents are at their default values when instrument power is reapplied. Turn the POWER switch on.

c. Press the STORED pushbutton on the front-panel keyboard to obtain a display of the default data in memory (zero reference line).

d. Sequentially press the *f* and CRS1 pushbuttons on the front-panel keyboard to obtain a cursor display.

e. Using the CRS1> and CRS1< pushbuttons on the frontpanel keyboard, position the cursor so the horizontal cursor position readout on the crt indicates HCRD=5S.

f. **EXAMINE**—The cursor should align with the center vertical graticule line within 0.05 division.

g. **ADJUST**—The Horizontal Offset adjustment, R1205 (located on the Display Board A29), to align the cursor with the center vertical graticule line.

h. Using the CRS1< and CRS1> pushbuttons, position the cursor until the horizontal cursor position readout indicates HCRD=996.1 ms.

i. Set the STORED INTensity control to about 1/3 of its range and set the FOCUS control for a well defined display.

j. **EXAMINE**—The cursor should align with the second vertical graticule line within 0.05 division.

k. **ADJUST**—The Horizontal Gain adjustment, R1300 (located on the Display board A29), so the cursor is slightly to the left of but touching the second vertical graticule line.

I. Press the CRS1> pushbutton so that the horizontal cursor position readout indicates HCRD=1.016S.

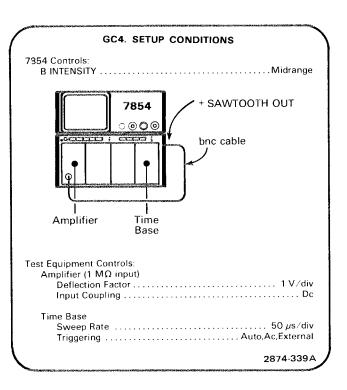
m. **EXAMINE**—The cursor should have moved slightly to the right of the second vertical graticule line.

GC4. ADJUST DISPLAY VERTICAL CENTERING AND GAIN (A18R65, A18R81)

NOTE

The Trace Rotation must have been properly set in step B8 before doing this procedure.

If the preceding step was not performed, first perform step GC1, then proceed.



a. Set the SWP switch on the A15 Output Signal board to the B position.

b. With a bnc cable connected from the rear-panel \pm SAWTOOTH OUT output to the input of the Amplifier unit, press the SCOPE pushbutton on the front-panel keyboard to obtain a real-time display.

c. Using the amplifier unit's Position control, position the trace so it crosses the intersection of both the vertical and horizontal graticule center lines.

d. Sequentially press the STORED and AVERAGE 10 pushbuttons on the front-panel keyboard to obtain a digitized display of the input signal.

e. Sequentially press the *f* and CRS1 pushbuttons on the front-panel keyboard to obtain a cursor display. Using the CRS1> pushbutton on the front-panel keyboard, move the cursor until the vertical cursor position readout is as close as possible to -3V.

f. Press the CRS2-1 pushbutton on the front-panel keyboard to obtain a 2-cursor display.

g. Press the CRS2< pushbutton on the front-panel keyboard until the vertical difference between cursors as indicated by the character readout is as close as possible to \triangle VCRD=6V.

h. **EXAMINE**—That the cursors are vertically equidistant from graticule center within 0.05 division.

i. **ADJUST**—The RO-WFM Ctr adjustment, R65 (located on the Vertical Amplifier board A18), until the cursors are vertically centered about the center horizontal graticule line.

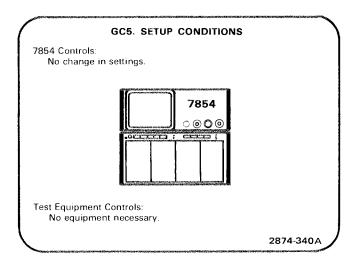
j. **EXAMINE**—That the cursors vertically align with the second and eighth horizontal graticule lines within 0.05 division.

k. **ADJUST**—The RO-WFM Gain adjustment, R81 (located on Vertical Amplifier Board A18), to vertically align the cursors with the graticule lines.

GC5. ADJUST CHARACTER DISPLAY (A29R1100, A29R1106, A29R1200)

NOTE

If the preceding step was not performed, first perform step GC1, then proceed.



a. Disconnect MEMORY BACKUP POWER if applied to the instrument.

b. Momentarily turn the POWER switch OFF to ensure that memory contents are at their default values when instrument power is reapplied. Turn the POWER switch on.

c. Press the STORED pushbutton on the front-panel keyboard to obtain a display of the default data stored in memory.

d. **EXAMINE**—The top row of the character readout display for equal margins between the graticule edges and the ends of the character line within 0.1 division.

e. **ADJUST**—The Character Horizontal Gain adjustment, R1200 (located on the Display Board A29), to equalize the margins at the ends of the top character line displayed.

f. **EXAMINE**—That the top and bottom lines of displayed character information are vertically centered within 0.1 division.

g. **ADJUST**—The Character Vertical Offset adjustment, R1106 (located on the Display Board A29), to vertically center the top and bottom lines of displayed characters about the graticule center.

h. **EXAMINE**—That the character lines are displayed in the top half of the upper graticule division and in the bottom half of the lower graticule division.

i. **ADJUST**—The Character Vertical Gain adjustment, R1100 (located on the Display Board A29), to center the displayed character lines in the top half of the upper graticule division and the bottom half of the lower graticule division.

H. VERTICAL AND HORIZONTAL PICKOFF SYSTEM

16. 2X Attenuator

22. 18" jumper wire

20. Low capacitance screwdriver

24. Battery (memory backup)

Equipment Required: (Numbers correspond to those listed in Table 4-3, Test Equipment).

1. Test Oscilloscope

4. Time base

5. Signal Standardizer

- 9. Time-mark generator
- 12. X10 Probe

14. Coaxial cable (one 18-inch, one 42-inch required)

> Shaded lines identify Performance Requirement CHECK.

H1. PICKOFF SYSTEM PRELIMINARY SETUP

NOTE

Part (a) below should be omitted when performing steps H1 and H8.

Error warnings will be issued through the following adjustment procedures; they are normal and should be ignored.

a. With the POWER switch OFF, remove the MPU board from the Mother Board as per instructions in the Maintenance Section of this manual and remove the IACQ (acquire interrupt) jumper from the board (upper right hand corner). Re-install the MPU board to its original position.

b. Perform the Adjustment and Performance Check Power-Up Sequence.

c. Refer to Section 5, Instrument Options, and the Change Information at the rear of this manual for any modifications which may affect this procedure.

d. See the TEST POINT AND ADJUSTMENT LOCATIONS H foldout page in Section 7, Diagrams and Circuit Board Illustrations.

e. Set the 7854 controls as follows:

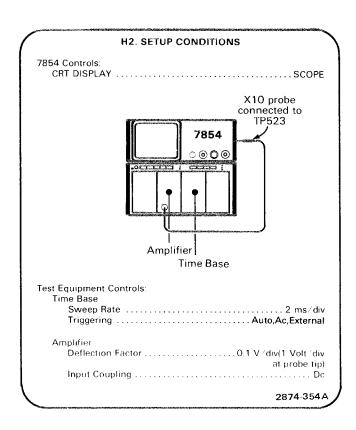
POWER switch On (pushbutton	in)
VERTICAL MODE	ΗŤ
VERT TRACE SEPARATION (B) Midrar	nge
A TRIGGER SOURCE VERT MO	ĎE
A INTENSITY Midrar	nge
HORIZONTAL MODE	Ă
B INTENSITY Midrar	
B TRIGGER SOURCE VERT MO	ĎF
FOCUS Midrar	nae
READOUT intensity OFF (in dete	nt)
GRAT ILLUM As desir	

H2. ADJUST DIGITIZER LSB MATCH AND

NOTE

First perform step H1, then proceed.

LSB CODE (A25R515, A25R623)



4-90

a. Set the Sweep Selector switch, S3 (on the Signal Output Board A15), to the A position.

b. Move the plug on P509 one pin to the right.

c. Connect a jumper wire from the $\pm \text{SAWTOOTH}$ OUT to TP502.

d. **EXAMINE**—That all displayed pulses (both positive and negative) are of equal width within 50%.

e. **ADJUST**—Vary the LSB Code and LSB Match adjustments, R515 and R623 (on the Digitizer Board A25), throughout their range, noting their affect on the displayed waveform. Set both to approximately midrange.

f. **ADJUST**—R515 for optimim matching of all displayed pulse widths both positive and negative. (One pulse may be grossly large or small and will not be affected by adjusting R515. Ignore it when making the adjustment in this step.)

g. **ADJUST**—R623 to match the remaining pulse width to the other displayed pulses (approximately 1 division).

h. Repeat parts (f) and (g) above as necessary to obtain optimum width matching of all pulses displayed.

i. Remove the oscilloscope probe and jumper wire.

j. Re-install the plug at P509 to its original position.

NOTE

If further adjustment of the Digitizer System is required, omit the remainder of this step.

k. Turn the POWER switch OFF.

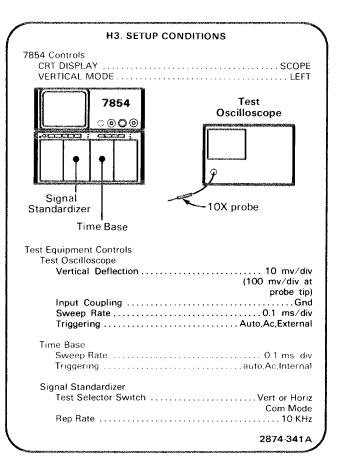
I. Remove the MPU board as per the instructions in the Maintenance section of this manual and re-install the IACQ jumper.

m. Re-install the MPU board.

H3. ADJUST VERTICAL AND HORIZONTAL PICKOFF AMPLIFIER CENTERING (A25R80, A9R45)

NOTE

If the previous step was not performed, first perform step H1, then proceed.



a. Set test scope trace to graticule center.

b. Set test scope coupling switch to dc.

c. Connect the X10 probe of the test scope to the lower lead of R105 (100 Ω , 1W resistor located near J141 on the Digitizer board).

d. **EXAMINE**—Test scope display for a deflection of less than 0.1 division from graticule center.

e. **ADJUST**—The Center adjustment, R80 (located on the Digitizer Board A25), to bring the test scope display to graticule center.

f. Move the Signal Standardizer to the LEFT VERT plug-in compartment.

g. Set the VERTICAL MODE switch to RIGHT.

h. **EXAMINE**—Test scope display for a deflection less than 0.1 division from graticule center.

i. **ADJUST**—If necessary, compromise the adjustment of the Center adjustment, R80, for optimum centering for the RIGHT and LEFT vertical channels.

j. **INTERACTION**—If R80 is adjusted, step H4 must be performed.

k. Move the Signal Standardizer to the A HORIZ compartment and the time-base to the LEFT VERT compartment.

I. Set the HORIZONTAL MODE switch to A and the VERTICAL MODE switch to LEFT.

m. Move the test scope probe to P64-2 (located on the Digitizer Board A25).

n. Set the test scope input coupling to ground and position the trace to graticule center.

o. Set the test scope input coupling to dc.

p. **EXAMINE**—Test scope display for a deflection from graticule center less than or equal to 0.1 division.

q. **ADJUST**----The Center adjustment, R45 (located on the Horizontal Channel Switch Board A9), to position the trace to graticule center. It will be necessary to remove the left side cover of the Signal Standardizer to make this adjustment.

r. Move the Signal Standardizer to the B HORIZ compartment.

s. Set the HORIZONTAL MODE switch to B.

t. **EXAMINE**—Test scope display for a deflection from graticule center less than or equal to 0.1 division.

u. **ADJUST**—If necessary, compromise the setting of the Center adjustment, R45, for optimum centering for both horizontal compartments.

v. INTERACTION—If R45 is adjusted, step H5 must be performed.

w. Remove test scope probe from P64-2 on the Digitizer board.

NOTE

If further adjustment of the digitizer system is required, omit the remainder of this step.

x. Turn the POWER switch OFF.

y. Remove MPU board as per the instructions in the Maintenance section of this manual and re-install the IACO jumper.

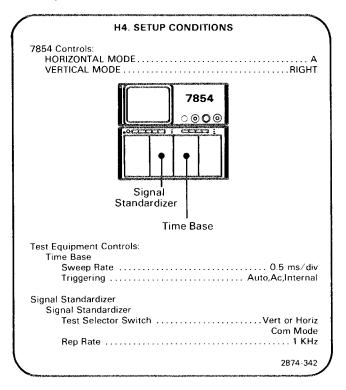
z. Re-install the MPU board.

H4. CHECK/ADJUST VERTICAL SAMPLER OFFSET (A25R280)

NOTE

If the preceding step was not performed, first perform step H1, then proceed.

The realtime Vertical Centering in step F2 and the vertical RO-WFM CTR adjustment of either step GB2 or GC4 must be properly adjusted before performing this procedure.



a. Set the time-base unit triggering controls for a stable display.

b. Press the STORED and AQR pushbuttons on the frontpanel keyboard in sequence to obtain a display of the digitized waveform. It may be necessary to set the STORED INTensity control for a well defined display.

c. **CHECK**—The crt display to be within 0.1 division of graticule center.

d. **ADJUST**—The Vert Pos offset adjustment, R280 (located on the Digitizer Board A25) to align the crt display with the graticule center.

e. Move the Signal Standardizer to the LEFT VERT compartment.

f. Sequentially press the STOP, LEFT and AQR pushbuttons to obtain a display of the digitized waveform.

g. **CHECK**—The crt display to be within 0.1 division of graticule center.

h. ADJUST---If necessary, compromise the Vert Pos offset adjustment, R280 for optimum centering of the digitized waveform for both vertical channels.

i. Sequentially press the STOP, *f*, BOTH and AQR pushbuttons on the front-panel keyboard to obtain a display of the real-time and digitized waveforms.

j. **EXAMINE**—The crt display for vertical overlaying of the waveforms within 0.1 division.

k. Move the Signal Standardizer to the RIGHT VERT compartment.

I. Sequentially press the STOP, RIGHT (VERTICAL MODE switch), *f*, BOTH and AQR pushbuttons to obtain a display of the realtime and digitized waveforms.

m. **EXAMINE**—The crt display for vertical overlaying of the waveforms within 0.1 division.

n. **ADJUST**—If necessary, compromise the Vert Pos offset adjustment, R280, for optimum centering of the digitized waveforms and overlaying of the digitized waveform with the real-time waveform for both vertical channels.

o. Sequentially press the STOP, *f*, and CRS1 pushbuttons to obtain a cursor display.

p. Set the READOUT intensity control for a visible character display.

q. Position the cursor to mid-screen by pressing the CRS1> pushbutton on the front panel keyboard.

r. **CHECK**—The character readout should indicate a vertical displacement from graticule center less than or equal to VCRD=(±)100 m (±0.1 div).

s. Move the Signal Standardizer to the LEFT VERT compartment.

t. Press the STOP, LEFT (VERTICAL MODE switch), *f*, BOTH and AQR pushbuttons in sequence to obtain a display of the realtime and digitized waveforms.

u. Repeat parts (o) through (r) for the LEFT VERT compartment.

NOTE

If further adjustment of the digitizer system is required, omit the remainder of this step.

v. Turn the POWER switch OFF.

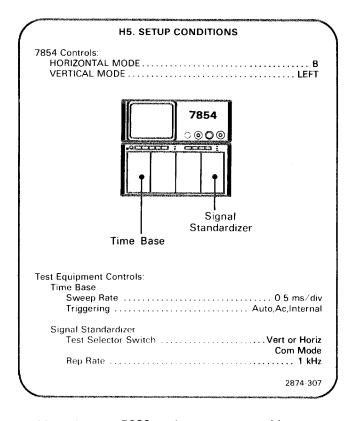
w. Remove the MPU board as per the instructions in the Maintenance section of the manual and re-install the $\overrightarrow{\text{IACQ}}$ jumper.

x. Re-install the MPU board.

H5. CHECK/ADJUST HORIZONTAL SAMPLER OFFSET (A25R380)

NOTE

If the preceding step was not performed, first perform step H1, then proceed with the following instructions.



a. Move jumper P630 to its top-most position.

b. Sequentially press the STOP, B, LEFT, STORED and AQR pushbuttons on the front-panel keyboard to obtain a display of the digitized waveform.

c. Set the time-base unit triggering controls for a stable display.

Calibration Part II—7854 Adjustment and Performance Check

d. **CHECK**—The crt display for alignment of the digitized waveform with the graticule center within 0.1 division.

e. **ADJUST**—The Horiz Pos Offset adjustment, R380 (located on the Digitizer Board A25) to overlay the digitized waveform with the graticule center.

f. Move the Signal Standardizer to the A HORIZ compartment.

g. Sequentially press the STOP, A (HORIZONTAL MODE switch), STORED and AQR pushbuttons to obtain a display of the digitized waveform.

h. **CHECK**—The crt display for alignment of the digitized waveform with the graticule center within 0.1 division.

i. **ADJUST**—If necessary, compromise the Horiz Pos Offset adjustment, R380 for optimum alignment of the digitized waveform with the graticule center for both horizontal channels.

j. Sequentially press the STOP, *f* and CRS1 pushbuttons to obtain a cursor display.

k. Set the READOUT intensity control for a visible character display.

I. Position the cursor to horizontal graticule center by pressing the CRS1> pushbutton on the front-panel keyboard.

m. **CHECK**----The character readout should indicate a horizontal displacement from the left side of the gratiucle of HCRD= $5.00 (\pm 0.1)$.

n. Move the Signal Standardizer unit to the B HORIZ compartment.

o. Press the STOP B (HORIZONTAL MODE), STORED and AQR pushbuttons in sequence to obtain a display of the digitized waveform.

p. Repeat parts (j) through (m) for the B HORIZ compartment.

q. Re-install jumper P630 to its lower-most position.

ΝΟΤΕ

If further adjustment of the digitizer system is required, omit the remainder of this step. If step H6 is to be performed, continue with this procedure. r. Turn the POWER switch OFF.

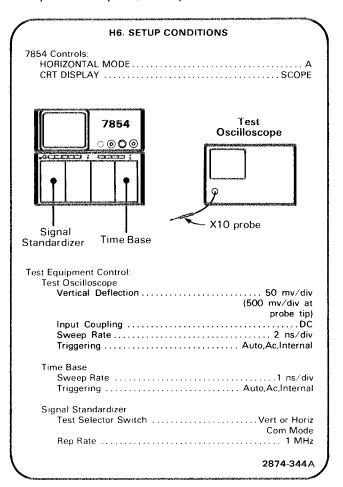
s. Remove the MPU board as per the instructions in the Maintenance section of the manual and re-install the IACO jumper.

t. Re-install the MPU board.

H6. EXAMINE DIGITIZER HORIZONTAL MATCHING (A25R228, A25R328)

NOTE

If the preceding step was not performed, first perform step H1, then proceed.



CAUTION

The components to which the test scope probe is attached in this step are very fragile and susceptible to static damage. Use care when attaching and removing the probe.

a. Connect the test oscilloscope probe to the junction of R243 and T237 (the 39Ω resistor at the rear of the vertical sampling bridge and the associated toroid lead). Connect the probe ground to TP GND.

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b. Set the test scope variable volts/div, vertical position and horizontal position controls for a 6 division display centered on the test scope crt graticule.

c. Set the test oscilloscope triggering controls to obtain a stable display triggered on the falling edge of the pulse.

d. **EXAMINE**—Displayed pulse width at vertical graticule center (50% point) to be less than 11 ns.

e. **ADJUST**—Vert Strobe Width adjustment, R228 (on the Digitizer Board A25), so the pulse width at vertical graticule center is approximately equal to but less than 11 ns.

f. Remove the test scope probe and connect it to the junction of R343 and T337 (the 39Ω resistor at the rear of the horizontal sampling bridge and the associated toroid lead).

g. Set the test scope variable volts/div, vertical position and horizontal position controls for a 6-division display centered on the test scope crt graticule.

h. **EXAMINE**--Displayed pulse width at vertical graticule center (50% point) to be less than 11 ns.

i. **ADJUST**—Horiz Strobe Width adjustment, R328 (on the Digitizer Board A25), so the pulse width at vertical graticule center is approximately equal to but less than 11 ns.

j. Remove the test scope probe.

I. Set the Signal Standardizer Test selector switch to + Step Resp.

m. Set the Signal Standardizer Amplitude and Position controls for a 6-division display, centered on the crt graticule.

n. Vary the time base Position control to move the vertical midpoint on the rising edge of the displayed pulse to vertical and horizontal graticule center.

o. Sequentially press the *f*, BOTH and AQR pushbutton on the front-panel keyboard to obtain both a realtime and a continuously digitized display. It may be necessary to vary the B INTENSITY and STORED intensity controls to make both traces easily visible.

p. **EXAMINE**—Displayed traces should overlay within 0.1 division.

q. **ADJUST**—If the digitized display is to the right of the realtime display, adjust the Horiz Strobe Width adjustment, R328, clockwise to overlay the realtime and digitized displays at graticule center.

r. **ADJUST**—If the digitized display is to the left of the realtime display, adjust the Vert Strobe Width adjustment, R238, clockwise to overlay the realtime and digitized displays at graticule center.

s. **ADJUST**—If adjustment of either R328 or R238 as described in parts (q) and (r) above will not horizontally overlay the traces at graticule center, adjust the remaining Strobe Width adjustment (R238 or R328) clockwise to overlay the digitized and realtime displays.

NOTE

If this concludes the required Digitizer System adjustments omit the remainder of this step.

t. Turn the POWER switch OFF.

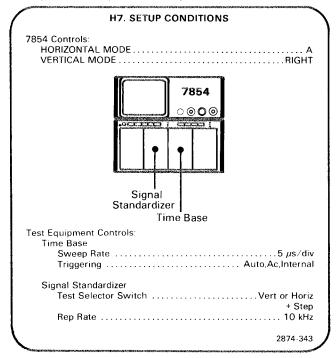
u. Remove the MPU board as per the instructions in the Maintenance section of this manual and remove the IACQ jumper.

 $\boldsymbol{v}.$ Re-install the MPU board and press the POWER switch to on.

H7. ADJUST VERTICAL STEP RESPONSE (A25R13, A25R12, A25R11, A25R60, A25C61, A25R58, A25R40, A25C40, A25C62, A19C195, A19R195, A25C245)

NOTE

If the preceding step was not performed, first perform step H1, then proceed.



a. Sequentially press the *f*, BOTH and AQR pushbutons on the front-panel keyboard to obtain a realtime and a continuously digitized display. b. Set the Signal Standardizer Amplitude control to maximum (fully clockwise) and use its Position control to position the top of the displayed realtime step one division above graticule center.

c. Using the time-base Position control, position the leading edge of the realtime positive step to 1 division from the left edge of the graticule.

d. Sequentially press the STOP, STORED and AQR pushbuttons on the front-panel keyboard to obtain a continuously digitized display.

e. **EXAMINE**—That the first 3.5μ s of the step is within 0.05 division of the remainder of the step.

f. **ADJUST**—the Vert Unity Dot response adjustment, C262, for minimum difference between the first 3.5μ s and the remainder of the step; adjustment of C262 is accomplished by changing the length or position of the wire lead inserted into the body of C262.

g. Set the Signal Standardizer Amplitude and Position controls for a 6-division square-wave, vertically centered on the graticule.

h. Set the time-base triggering controls for a stable display.

i. **EXAMINE**—The displayed pulse for optimum flat top within 0.3 div (peak to peak) for the first 20 ns after step and within 0.06 division thereafter, with time-base sweep rates and Signal Standardizer Rep Rates set as in Table 4-7.

NOTE

The Realtime Vertical system (step F) must be fully calibrated prior to performing the following adjustments.

i. **ADJUST**—Compensation adjustments R13, R12, R11, R58, C40, R40, C61, R60, C62, C245, C195 and R195 according to Table 4-7 for optimum flat top of the displayed waveform.

j. Set the Signal Standadizer Test selector switch to Vert or Horiz – Step and use the Position control to center the 6-division square-wave display on the crt.

k. **EXAMINE**—Displayed pulse for optimum flat bottom within 0.3 division (peak to peak abberations) for the first 20 ns after step and within 0.06 division thereafter with time base sweep rates and Signal Standardizer Rep Rates set as in Table 4-7.

I. **ADJUST**—If necessary, compromise the settings of the adjustments given in Table 4-7 for optimum step response to both positive and negative transitions.

m. Move the Signal Standardizer to the LEFT VERT compartment.

TABLE 4-7Vertical Step Response Adjustments(Signal Rep Rate vs Sweep Rate)

Adjustment	Signal Standardizer Rep Rate	Time Sweep Rate
no adj.	100 Hz	2 ms∕div
A25R13	1 kHz	0.2 ms∕div
A25R12	10 kHz	20 <i>µ</i> s ∕div
A25R11	100 kHz	2 <i>µ</i> s∕div
A25R58	1 MHz	100 ns∕div
A25C40,A25R40	1 MHz	10 ns∕div
A25C61, A25R60, A25C62, A25C245 also A19C195, A19R195 (on the Vertical Channel Switch Board A19		2 ns∕div

n. Sequentially press the STOP, LEFT (VERTICAL MODE switch), STORED and AQR pushbuttons to obtain a continuously digitized display.

o. Set the Signal Standardizer Amplitude and Position controls to obtain a 6-division square-wave display centered on the crt graticule.

p. **EXAMINE**—Displayed pulse to meet the criteria for positive and negative transitions as in parts (h) and (k).

q. **ADJUST**—If necessary, compromise the settings of the adjustments given in Table 4-7 for optimum step response to positive and negative transitions for both the RIGHT VERT and LEFT VERT compartments.

r. **INTERACTION**—Adjustment of C245 will affect Vertical Digitizer gain and offset. If adjusted, steps H4 and H8 must be performed.

NOTE

If further adjustment of the digitizer system is required, omit the remainder of this step.

s. Turn the POWER switch to OFF.

t. Remove the MPU board as per instruction in the Maintenance section of this manual and re-install the IACO jumper.

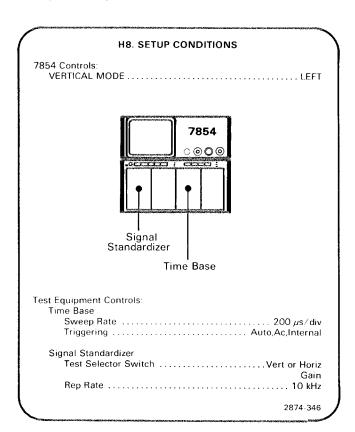
u. Re-install the MPU board.

H8. CHECK/ADJUST DIGITIZER VERTICAL GAIN (A25R290)

NOTE

If the preceding step was not performed, first perform step H1, excluding part a, then proceed with the following instructions beginning at part e.

The RO-WFM Gain adjustment in either step GB2 or GB4 must be properly adjusted before performing the following procedure.



a. Press the POWER switch to OFF.

b. Remove the MPU board as per the instructions in the Maintenance section of this manual and re-install the IACO jumper.

c. Re-install the MPU board.

d. Press the POWER switch to on.

e. Press the SCOPE pushbutton on the front-panel keyboard to obtain a realtime display. It may be necessary to set the A INTENSITY control for an easily visible display.

f. Set the time base Triggering and/or Holdoff controls for a stable staircase display.

g. Set the Signal Standardizer Position control to center the waveform on the crt.

h. Sequentially press the STORED and AVERAGE 10 pushbuttons on the front-panel keyboard to obtain a digitized staircase display. It may be necessary to vary the STORED INTensity control to obtain a visible display.

i. Press the CRS2-1 pushbutton on the front-panel keyboard to obtain a cursor display.

j. Press the CRS1> and <CRS2 pushbuttons on the frontpanel keyboard to position the cursors to the midpoints of the steps, 3 divisions above and 3 divisions below graticule center (6 divisions apart vertically).

k. Turn the READOUT intensity control on and set it for a viewable character display.

I. **CHECK**—The character readout to be between \triangle VCRD = ± 5.94 and \triangle VCRD = ± 6.06 .

m. **ADJUST**—The sampler Gain adjustment, R290, until the requirement of part (I) is met. (It will be necessary to adjust R290 a small amount and then press the AVERAGE 10 pushbutton on the front-panel keyboard to obtain new cursor information: repeat as necessary.)

n. **CHECK**—Vertical difference between cursors to be 6 divisions ± 0.06 division in relation to the crt graticule.

o. **ADJUST**—If necessary, compromise the setting of R290 to bring both the numeric data (cursor readout) and the displayed curve into the limits given in parts (I) and (n) respectively.

p. INTERACTION—Adjustment R290 may affect Horizontal offset, step H5.

NOTE

If this concludes the required Digitizer System adjustments omit the remainder of this step.

q. Turn the POWER switch OFF.

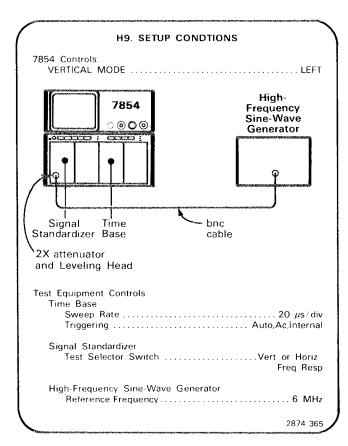
r. Remove the MPU board as per the instructions in the Maintenance section of this manual and remove the IACQ jumper.

s. Re-install the MPU board and press the POWER switch to on.

H9. EXAMINE DIGITIZER BANDWIDTH

NOTE

If the preceeding step was not performed, first perform step F1, then proceed.



a. Sequentially press the STORED and AQR pushbuttons on the front-panel keyboard to obtain a continuously digitized display.

b. With the High Frequency Sine-Wave Generator connected to the Signal Standardizer Aux In-CW In (Freq Resp) input via a 2X attenuator, set the Signal Standardizer Amplitude control fully clockwise.

c. Set the high-frequency sine-wave generator for a 10division display at the reference frequency (less than 10 MHz). (To obtain a 10-division display, first set for 8 divisions, then vertically position the display 1 division down using the Signal Standardizer Position control; then set the sine-wave generator to return the top of the display to the top of the graticule.)

d. Set the Signal Standardizer Amplitude and Position controls for a 6-division display centered on the graticule. (The CW leveled indicator should be lit.)

e. Set the time base Triggering controls for a stable sinewave display.

f. Without changing the output amplitude, increase the generator frequency to 475 MHz.

g. Set the time base sweep rate to 10 ns/division and the sweep Mag switch to X10.

h. **EXAMINE**—Crt display to be greater then or equal to 4.24 division peak-to-peak.

i. Move the Signal Standardizer to the RIGHT VERT compartment (leave signal connected) and set the VERTICAL MODE switch to RIGHT.

j. **EXAMINE**—Repeat parts (b) through (h) for the RIGHT VERT compartment.

k. ADJUST-If the guidelines of step (h) or (j) were not met, perform steps H3, H4, H7 and H8.

NOTE

If further adjustment of the Digitizer System is required, omit the remainder of this step.

I. Turn the POWER switch to OFF.

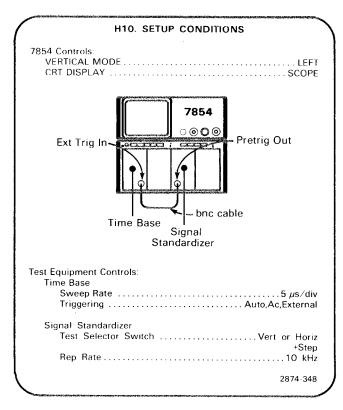
m. Remove the MPU board as per the instructions in the maintenance section of this manual and re-install the IACO jumper.

n. Re-install the MPU board and press the POWER switch to on.

H10. ADJUST HORIZONTAL UNITY DOT RESPONSE (A25C362)

NOTE

If the preceding step was not performed, first perform step H1, then proceed.



a. With a bnc cable connected from the Signal Standardizer Pretrig Out to the time base Ext Trig In, set the Signal Standardizer Amplitude and time base Triggering controls for a stable, 6 division display, triggered on the positive slope.

b. Sequentially press the STORED and AQR pushbuttons on the front-panel keyboard to obtain a continuously digitized display. It may be necessary to vary the STORED INTensity control to view the display.

c. Move jumper P630 to its topmost position to interchange the display axes.

d. Set the Signal Standardizer Amplitude control to midrange.

e. Set the time base Position control to move the transition of the displayed pulse to 4 divisions left of graticule center.

f. Set the Signal Standardizer Position control to move the top of the displayed pulse to 1 division above graticule center.

g. Set the Signal Standardizer Amplitude control to maximum (fully clockwise).

h. **EXAMINE**—The first 3.5μ s of the displayed pulse should vertically align with the remainder of the displayed pulse within 0.05 division.

i. **ADJUST**—The Horiz Unity Dot Response adjustment, C362, should be adjusted for optimum vertical alignment of the first 3.5μ s of the displayed pulse with the remainder of the displayed pulse.

j. Return jumper P630 to its original position.

NOTE

If further adjustment of the digitizer system is required, omit the remainder of this step.

k. Turn POWER switch to OFF.

I. Remove the MPU board as per the instructions in the Maintenance section of this manual and re-install the IACO jumper.

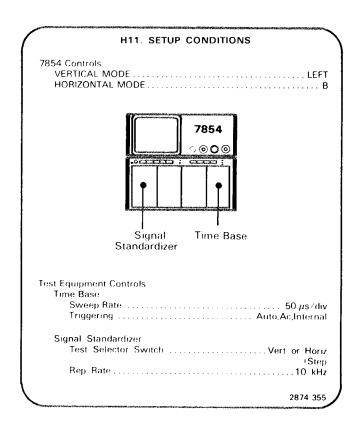
m. Re-install the MPU board.

H11. CHECK/ADJUST DIGITIZER HORI-ZONTAL GAIN

NOTE

If the preceding step was not performed, first perform step H1, then proceed.

The horizontal Ctr and Gain adjustments in step E2 and the Horizontal Gain adjustment in either step GB2 or GC3 must be properly adjusted before performing the following procedure.



a. Set the Signal Standardizer Amplitude and Position controls for a 6-division square-wave, centered on the crt graticule.

b. Set the time base Triggering and Holdoff controls for a stable display.

c. Use a screwdriver to set the time base unit front-panel Swp Cal adjustment for exactly one cycle per 2 horizontal divisions.

d. Sequentially press the STORED and AQR pushbuttons on the front panel keyboard to obtain a continuously digitized display.

e. **CHECK**—The display for one cycle per 2 horizontal divisions over the center 8 horizontal divisions within 0.08 division.

Calibration Part II---7854 Adjustment and Performance Check

f. **ADJUST**—The Gain adjustment, R42 (on the Horizontal Channel Switch and Pickoff Amplifier Board A9), to align the square-wave transition points with the graticule lines.

g. Sequentially press the STOP and CRS2-1 pushbuttons on the front panel keyboard to obtain a cursor display.

h. Position the cursors to the transitions at the second and tenth vertical graticule lines.

i. Set the READOUT intensity control for a visible display of the cursor position information.

j. **CHECK**—The character readout display to be between \triangle HCRD = 396 μ s and \triangle HCRD = 404 μ s.

k. **ADJUST**—If necessary, compromise the setting of the Gain adjustment, R42, for optimum curve (display) and numeric (character readout) gain as in parts (e) and (j).

NOTE

The time base units Swp Cal adjustment should be reset according to the procedure given in the Service Manual for the time base in use.

NOTE

If further adjustment of the digitizer system is required, omit the remainder of this step.

I. Turn POWER switch to OFF.

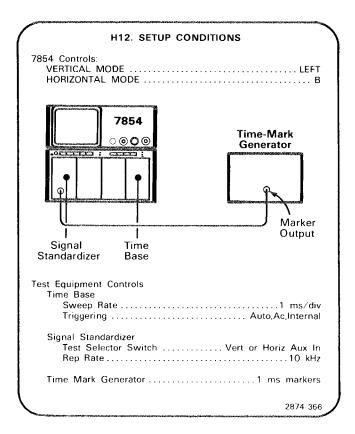
m. Remove the MPU board as per the instructions in the Maintenance section of this manual and re-install the IACQ jumper.

n. Re-install the MPU board.

H12. EXAMINE DIGITIZER 1 MS LINEARITY AND HIGH FREQUENCY TIMING (A9C41, A9R41, A9C65, A9R65)

NOTE

If the preceeding step was not performed, first perform step H1, then proceed.



a. Press the SCOPE pushbutton on the front panel keyboard to obtain a real time display.

b. Set the Signal Standardizer Amplitude and Position controls for a 2-division marker display centered on the crt.

c. Set the time base Triggering controls for a stable display triggered on the rising edge.

d. Use a screwdriver to set the time base units frontpanel Swp Cal adjustment for exactly 1 marker per division over the center 8 divisions.

e. Sequentially press the front-panel STORED and AQR pushbuttons to obtain a continuously digitized marker display.

f. **EXAMINE**—That markers align with the corresponding graticule lines within 0.05 division.

g. Press the STOP pushbuttons on the front-panel keyboard to terminate acquisition.

h. Move the time base to the A HORIZ compartment and set the HORIZONTAL MODE switch to A.

i. Press the AQR pushbutton on the front-panel to obtain a continuously digitized marker display.

j. Use the time base Position control to align the center time mark with graticule center.

k. **EXAMINE**—That the markers align with the corresponding graticule lines within 0.05 division.

I. **ADJUST**—If the guidelines in part (f) or (k) are not met, steps H6 and H11 must be performed.

m. Press the STOP pushbutton on the front-panel keyboard to terminate acquisition.

n. Move the time base to the B horizontal compartment and set the HORIZONTAL MODE switch to B.

o. Press the AQR pushbutton on the front-panel to obtain a continuously digitized display.

p. Set the time base sweep rate to 5 ns 1 division and the sweep Mag switch to X10.

q. Apply a 2 ns sine wave and set the vertical amplifier deflection for 2 divisions of display.

r. EXAMINE—For 2 cycles over the center 8 divisions of the display within 0.2 division.

s. ADJUST --- C41, R41, C65, and R65 for 2 cycles over the center 8 divisions of the display.

NOTE

Selected components A9C44 and A9R44 are factory selected to optimize High Frequency adjustments C41, R41, C64, and R65.

t. Set the time base sweep rate to 10 ns/division and the sweep Mag switch to X10.

u. EXAMINE – For 1 cycle every 2 divisions over the center 8 divisions of the display within 0.16 division.

v. ADJUST—If necessary, compromise the setting of High Frequency adjustments C41, R41, C65, and R65 for optimum 1 ns and 500 ps timing.

w. Press the STOP pushbutton on the front-panel keyboard to terminate acquisition.

x. Move the time base to the A horizontal compartment and set the HORIZONTAL MODE switch to A.

y. Press the AQR pushbutton on the front-panel to obtain a continuously digitized display and perform parts (p) through (v).

NOTE

High Frequency timing adjustments may be compromised to provide optimum timing for A and B horizontals, but the time base must be in the B horizontal compartment to provide access to all four adjustments.

NOTE

If further adjustment of the digitizer system is required, omit the remainder of this step.

z. Turn the POWER switch to OFF.

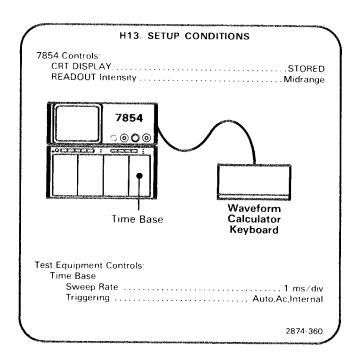
aa. Remove the MPU board as per instructions in the Maintenance section of this manual and re-install the \overline{IACO} jumper.

bb. Re-install the MPU board.

H13. CHECK VERTICAL DIGITIZER NUMERIC NOISE

NOTE

If the preceeding step was not performed, first perform step H1, then proceed.



Calibration Part II-7854 Adjustment and Performance Check

a. With the 7854 in STORED mode and the READOUT intensity set for an easily visible display, press the PROGRAM ENTRY key on the Waveform Calculator keyboard to obtain a program display with a line pointer at the left side of the crt.

b. Sequentially press the following keys to enter the program required to check numeric noise. Keystrokes that will not appear in the program listing shown on the 7854 crt are enclosed in parentheses (). Line numbers are automatically added.

(f), CLS, 2, (f), >CNS, 3, (f), >CNS, (NEXT),

GND, AQR, RMS, (NEXT),

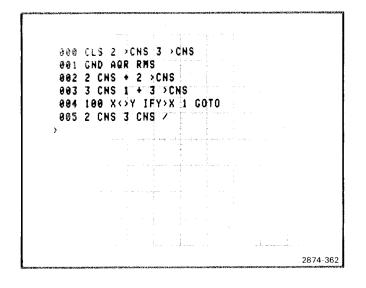
2, CNS, +, 2, (f), >CNS, (NEXT),

3, CNS, 1, +, 3, (f), >CNS, (NEXT),

1, 0, 0, x<>y, IFy>x, 1, GOTO, (NEXT),

2, CNS, 3, CNS, /, (NEXT).

A listing of the program as it will appear on the 7854 crt follows, including the line numbers automatically added. This may be used to check the accuracy of the program as entered.



c. After the program has been entered into the 7854 memory, sequentially press the EXECUTE, (f) and START pushbuttons to run the program.

NOTE

As the program is running, audible warnings will be issued if the rear-panel AUDIBLE ERROR/WARNING switch is in the ON position. This is normal. d. **CHECK**—The character display at the lower edge of the crt to indicate 100 (100 RMS measurements) and less than or equal to 8.000m (the average of these measurements). The remainder of the display line should be ignored.

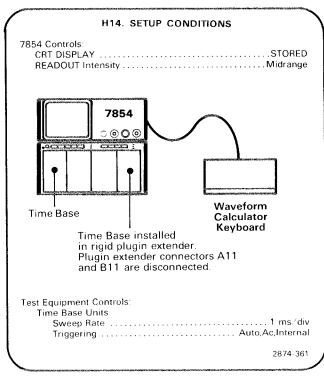
NOTE

If the instrument under test does not have the Waveform Calculator keyboard (Option OD), numeric noise may be checked by manually recording the RMS values obtained by sequentally pressing the GND, AQR and RMS keys on the front-panel Measurement keyboard when set up as indicated above (minus the Waveform Calculator keyboard). These measurements are totaled and divided by the number of measurements taken (averaged). Average noise is specified at 100 measurements.

H14. CHECK HORIZONTAL DIGITZER NUMERIC NOISE

NOTE

If the preceeding step was not performed first perform step H1, excluding part a, then proceed with the following instructions. If the preceeding step was performed, begin at step c after setting up the instrument as shown below.



a. With the 7854 in STORED mode and the READOUT intensity set for an easily visible display, press the PROGRAM ENTRY key on the Waveform Calculator keyboard to obtain a program display with a line pointer at the left side of the crt.

b. Sequentially press the following keys to enter the program required to check numeric noise. Keystrokes that will not appear in the program listing shown on the 7854 crt are enclosed in parentheses (). Line numbers are automatically added.

NOTE

The following program is identical to the one in step H13.

(f), CLS, 2, (f), >CNS, 3, (f), >CNS, (NEXT),

GND, AQR, RMS, (NEXT),

2, CNS, +, 2, (f), >CNS, (NEXT),

3, CNS, 1, +, 3, (f), >CNS, (NEXT),

1, 0, 0, x<>y, IFy>x, 1, GOTO, (NEXT),

2, CNS, 3, CNS, /, (NEXT).

A listing of the program as it will appear on the 7854 crt follows, including the line numbers added. This may be used to check the accuracy of the program as entered.

000 CLS 2 > CNS 3 > CNS 001 CND AQR RMS 002 2 CNS + 2 > CNS 003 3 CNS 1 + 3 > CNS 004 100 X<>Y IFY>X 1 GOTO 005 2 CNS 3 CHS / / c. With the A11 and B11 bnc connectors on the rigid plug-in extender disconnected, move jumper P630 (on the Digitizer Board A25) to its topmost position to interchange the display axes of the digitized data.

d. Sequentially press the EXECUTE, *(f)* and START pushbuttons on the Waveform Calculator keyboard to run the program.

e. **CHECK**—The character display at the lower edge of the crt to indicate 100 (100 RMS measurements) and less than or equal to 10 μ s (the average of these measurements). The remainder of the display line should be ignored.

f. Return jumper P630 to its original position.

NOTE

If the instrument under test does not have the Waveform Calculator keyboard (Option OD), numeric noise may be checked by manually recording the RMS values obtained by sequentially pressing the GND, AQR and RMS keys on the front-panel Measurement keyboard when setup as indicated above (minus the Waveform Calculator keyboard). These measurements are totaled and divided by the number of measurements taken (averaged). Average noise is specified at 100 measurements.

I. CALCULATOR KEYBOARD

NOTE

If step GB1, H13 or H14 has been performed, the Calculator keyboard has been implicitly checked and the following procedure need not be performed.

Equipment Required: (Numbers correspond to those listed in Table 4-6, Test Equipment).

No test equipment required.

I1. CALCULATOR KEYBOARD PRELIMINARY SETUP

a. Perform the Adjustment and Performance Check Power-Up Sequence.

b. Refer to Section 5, Instrument Options, and the Change Information at the rear of this manual for any modifications which may affect this procedure.

c. See the **TEST POINT AND ADJUSTMENT LOCATIONS I** foldout in section 7, Diagrams and Circuit Board Illustrations.

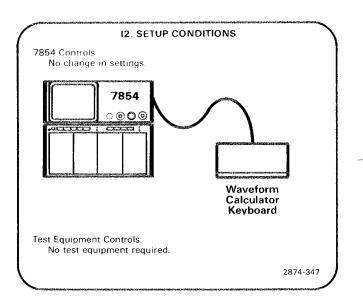
d. With the POWER switch OFF, connect the CALCULATOR KEYBOARD to the rear-panel EXTERNAL KEYBOARD connector.

e. Set the 7854 controls as follows:

POWER switch On (pushbutton in)
VERTICAL MODE LEFT
VERT TRACE SEPARATION (B) Midrange
A TRIGGER SOURCE VERT MODE
A INTENSITY Fully counterclockwise
HORIZONTAL MODEB
B INTENSITY Fully counterclockwise
B TRIGGER SOURCE VERT MODE
FOCUS Midrange
READOUT Intensity Midrange
GRAT ILLUMAs desired

12. EXAMINE KEYBOARD ADDRESSING

First perform step I1, then proceed.



a. Press the PROGRAM ENTRY/EXECUTE key on the WAVEFORM CALCULATOR keyboard to obtain a line pointer displayed on the crt.

b. Sequentially press the ENTER, ABS, MIN, CNS and STOP keys on the WAVEFORM CALCULATOR keyboard.

c. **EXAMINE**—That as each key is pressed, the correct name of the key is displayed on the crt. This verifies that the keyboard is being properly addressed.

INSTRUMENT OPTIONS

Your 7854 Oscilloscope may be equipped with one or more instrument options. This section includes a brief description of each available option, and an Option Information Locator Table. The Option Information Locator lists all the available options and tells where they are mentioned in this manual. For further information about options, see your Tektronix Products catalog or contact your Tektronix Field Office.



To avoid electric shock hazard, operating personnel must not remove the protective instrument covers. Component replacement and internal adjustments must be made by qualified service personnel only.

OPTION 02

Option 02 is an X-Y delay-compensation network to equalize signal delay between the vertical and horizontal deflection systems. With this network installed and activated, the phase shift between the vertical and horizontal channels is adjustable to less than 2° from dc to 1 MHz.

OPTION 03

Option 03 includes parts that enable the instrument to meet the electromagnetic compatibility listed in Section 2 of the Operators Manual.

OPTION 78

Option 78 subtitutes a P11 phosphor crt for the standard P31 phosphor crt.

OPTION OD

Option OD deletes the GPIB, the Waveform Calculator, and 2K of RAM from the instrument. Operation of the instrument is not changed, except for:

1. GPIB /IEEE-488-1978 facilities are not available. ROS, keyboard command is made inoperative and the I/O, SRQ, and REMOTE ONLY status indicators are no longer operative. The GPIB BINARY ADDRESS SELECTION switch and the 24 pin GPIB connectors are replaced with a blank plate.

2. Access to Waveform Calculator commands is denied.

NOTE

The GPIB facilities cannot be used without the Waveform Calculator.

OPTION 2D

Option 2D adds an additional 4096 words of memory to expand program, constant, and waveform storage capabilities. Program storage is increased to 1000 program lines. Constant storage is increased to 100 constants. Waveform storage is increased to 5120 waveform data points. Otherwise, operation of the instrument is not changed.

OPTION 1S

Option 1S makes the currently applicable version of Diagnostic Memory Card, 067-0961-xx, available at the time of instrument purchase.

The 067-0961-xx is a component of the digital service package and is not required for instrument operation.

OPTION 2S

Option 2S makes the currently applicable version of Signature Tables, 070-2972-xx, available at the time of instrument purchase.

The 070-2972-xx is required for signature analysis troubleshooting and is not required for instrument operation and/or understanding instrument operation.

POWER CORD OPTIONS

The following options can replace the standard power cord. This allows customers outside North America to obtain instrument with power plugs compatible with their locales. 161-0066-00 is the 115 V North American standard.

Option Number	Description	Part Number
A1	Universal European, 220 V	161-0066-09
A2	UK, 240 V	161-0066-10
A3	Australian, 240 V	161-0066-11
A4	North American, 240 V	161-0066-12

		In Manual		
Option	Section	Heading	Information	
Option 02	2 Theory of Operation	X-Y Delay Compensation (Option 02)	Provides a discussion of circuitry.	
	4 Calibration	Check X-Y Compensation (Option 02 Only)	Checkout procedure.	
		Check/Adjust X-Y Compensation (Option 02 Only)	Checkout and adjustment procedure.	
	5 Instrument Options	Option 02	Includes brief description of Option 02	
	6 Replaceable Electrical Parts	A33 CKT BOARD ASSY; X-Y	List of electrical components unique to Option 02.	
	7 Diagrams and	Diagram 10	Shows circuitry unique to Option 02.	
Circuit Board Illustrations	7854 Circuit Board Locations	Shows location of A33 (Option 02) circuit board.		
		Assemblies A9, A10 & A33 (pullout)	Shows location of Compensation Board (A33).	

TABLE 5-1 Option Information Locator

5-2

TABLE 5-1 (CONT) Option Information Locator

	Location In Manual			
Option	Section	Heading	Information	
Option 03	5 Instrument Options	Option 03	Includes a brief description of Option 03.	
	8 Replaceable Mechanical Parts	Option 03 (pullout page)	Provides a mechanical parts list and a exploded-view drawing of Option 03.	
Option 78	5 Instrument Options	Option 78	Includes a brief description of Option 78.	
Option OD	4 Calibration	GA. Display Systems	Note directing calibrators of Option 03 instruments to Display System procedure GC.	
		GC. Display System	Display System calibration procedure for Option OD instruments.	
	5 Instrument Options	Option OD	Includes a brief description of Option OD.	
	7 Diagrams and Circuit Board	Diagrams 19 and 35	All circuitry shown is deleted for Option OD	
	Illustrations	Diagrams 30 and 32	Partial delection of circuity for Option OD.	
Option 2D	5 Instrument Options	Option 2D	Includes brief description of Option 2D.	
	6 Replaceable Electrical Parts	Ckt Board Assembly: RAM	Components unique to Option 2D are noted.	
	7 Diagrams and Circuit Board Illustrations.	Diagram 30	Shows circuitry added for Option 2D.	

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	Location	n In Manual		
Option	Section	Heading	Information	
Option 1S	2 Theory of Operation	Signature Analysis	Mentions that the Diagnostic Memory card is used when taking signatures.	
	3 Maintenance	Service Identification Tag	Means of identifying the diagnostic firmware required.	
		Digital Troubleshooting Equipment	Brief description of Option 1S.	
	5 Instrument Options	Option 1S	Includes brief description of Option 1S.	
Option 2S	2 Theory of Operation	Signature Analysis	Mentions that signature tables are required for signature analysis.	
	3 Maintenance	Service Identification Tag	Means of identifying the required signature tables.	
		Digital Troubleshooting Equipment	Brief description of Option 2S.	
	5 Instrument Options	Option 2S	Includes brief description of Option 2S.	
Options: A1 A2 A3 A4	5 Instrument Options	Power Cord Options	Includes brief description of Options A1, A2, A3, and A4.	

TABLE 5-1 (CONT) Option Information Locator

WHICH OPTIONS DOES YOUR 7854 HAVE?

Instruments with one or more Options (02, 03, 78, 0D, 2D, A1, A2, A3, A4) will have a tag to identify each Option. The tag(s) will be attached to the rear of the 7854 (see Fig. 5-1). Instruments with Options 1S or 2S will have no identification tags since those Options are not part of the 7854.

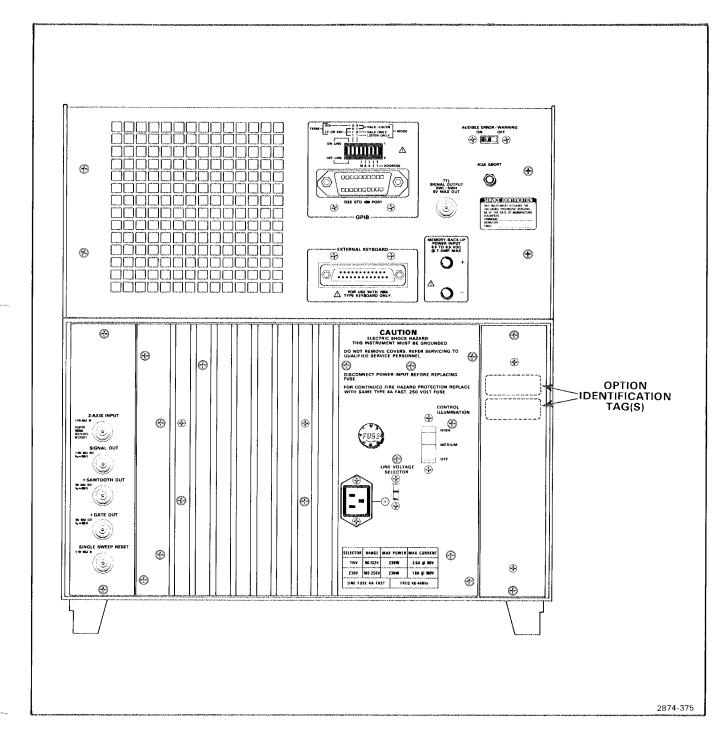


Figure 5-1. Location of Option identification tags.

REPLACEABLE ELECTRICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

LIST OF ASSEMBLIES

A list of assemblies can be found at the beginning of the Electrical Parts List. The assemblies are listed in numerical order. When the complete component number of a part is known, this list will identify the assembly in which the part is located.

CROSS INDEX-MFR. CODE NUMBER TO MANUFACTURER

The Mfr. Code Number to Manufacturer index for the Electrical Parts List is located immediately after this page. The Cross Index provides codes, names and addresses of manufacturers of components listed in the Electrical Parts List.

ABBREVIATIONS

Abbreviations conform to American National Standard Y1.1.

COMPONENT NUMBER (column one of the Electrical Parts List)

A numbering method has been used to identify assemblies, subassemblies and parts. Examples of this numbering method and typical expansions are illustrated by the following:

Example a.	component number
A23R1234	A23 R1234
Assembly number	Circuit number
Read: Resi	stor 1234 of Assembly 23
Example b.	component number
A23A2R1234	Á23 A2 R1234
Assembly	Subassembly Circuit
number	number number

Read: Resistor 1234 of Subassembly 2 of Assembly 23

Only the circuit number will appear on the diagrams and circuit board illustrations. Each diagram and circuit board illustration is clearly marked with the assembly number. Assembly numbers are also marked on the mechanical exploded views located in the Mechanical Parts List. The component number is obtained by adding the assembly number prefix to the circuit number.

The Electrical Parts List is divided and arranged by assemblies in numerical sequence (e.g., assembly A1 with its subassemblies and parts, precedes assembly A2 with its subassemblies and parts).

Chassis-mounted parts have no assembly number prefix and are located at the end of the Electrical Parts List.

TEKTRONIX PART NO. (column two of the Electrical Parts List)

Indicates part number to be used when ordering replacement part from Tektronix.

SERIAL/MODEL NO. (columns three and four of the Electrical Parts List)

Column three (3) indicates the serial number at which the part was first used. Column four (4) indicates the serial number at which the part was removed. No serial number entered indicates part is good for all serial numbers.

NAME & DESCRIPTION (column five of the Electrical Parts List)

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

MFR. CODE (column six of the Electrical Parts List)

Indicates the code number of the actual manufacturer of the part. (Code to name and address cross reference can be found immediately after this page.)

MFR. PART NUMBER (column seven of the Electrical Parts List)

Indicates actual manufacturers part number.

CROSS INDEX-MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
0000L	MATSUSHITA ELECTRIC	200 PARK AVENUE, 54TH FLOOR	NEW YORK, NY 10017
0000W	UNITED CHEMICON, INC.	731 JAMES STREET	SYRACUSE, NY 13203
00779	AMP, INC.	P O BOX 3608	HARRISBURG, PA 17105
00853	SANGAMO ELECTRIC CO., S. CAROLINA DIV.	P O BOX 128	PICKENS, SC 29671
01002	GENERAL ELECTRIC COMPANY, INDUSTRIAL		
	AND POWER CAPACITOR PRODUCTS DEPARTMENT	JOHN STREET	HUDSON FALLS, NY 12839
01121	ALLEN-BRADLEY COMPANY	1201 2ND STREET SOUTH	MILWAUKEE, WI 53204
01295	TEXAS INSTRUMENTS, INC., SEMICONDUCTOR	P O BOX 5012, 13500 N CENTRAL	
	GROUP	EXPRESSWAY	DALLAS, TX 75222
01961	PULSE ENGINEERING, INC.	7250 CONVOY COURT	SAN DIEGO, CA 92111
02111	SPECTROL ELECTRONICS CORPORATION	17070 EAST GALE AVENUE	CITY OF INDUSTRY, CA 91745
02735	RCA CORPORATION, SOLID STATE DIVISION	ROUTE 202	SOMERVILLE, NY 08876
02777	HOPKINS ENGINEERING COMPANY	12900 FOOTHILL BLVD.	SAN FERNANDO, CA 91342
03508	GENERAL ELECTRIC COMPANY, SEMI-CONDUCTOR		,
03500	PRODUCTS DEPARTMENT	ELECTRONICS PARK	SYRACUSE, NY 13201
03888	KDI PYROFILM CORPORATION	60 S JEFFERSON ROAD	WHIPPANY, NJ 07981
04222	AVX CERAMICS, DIVISION OF AVX CORP.	P O BOX 867, 19TH AVE. SOUTH	MYRTLE BEACH, SC 29577
04713	MOTOROLA, INC., SEMICONDUCTOR PROD. DIV.	5005 E MCDOWELL RD, PO BOX 20923	
05347	ULTRONIX, INC.	461 N 22ND STREET	GRAND JUNCTION, CO 81501
07263	FAIRCHILD SEMICONDUCTOR, A DIV. OF	401 W ZZWD BINDHI	oland beneficity of erser
07205	FAIRCHILD SEMICONDUCTOR, A DIV. OF	464 ELLIS STREET	MOUNTAIN VIEW, CA 94042
07716		404 ELEIS SIRLEI	HOUMIAIN VIEW, ON 94042
07710	TRW ELECTRONIC COMPONENTS, IRC FIXED	2850 MT. PLEASANT	BURLINGTON, IA 52601
00004	RESISTORS, BURLINGTON DIV.	2000 MI. FLERSRNI	BORLINGION, IN 52001
08806	GENERAL ELECTRIC CO., MINIATURE	NICT A DADU	CLEVELAND, OH 44112
00000	LAMP PRODUCTS DEPARTMENT	NELA PARK	CLEVELAND, OH 44112
09023	CORNELL-DUBILIER ELECTRONIC DIVISION	OF THE NAME OF	CANFORD NC 27220
1005/	FEDERAL PACIFIC ELECTRIC CO.	2652 DALRYMPLE ST.	SANFORD, NC 27330
12954	SIEMENS CORPORATION, COMPONENTS GROUP	8700 E THOMAS RD, P O BOX 1390	SCOTTSDALE, AZ 85252
12969	UNITRODE CORPORATION	580 PLEASANT STREET	WATERTOWN, MA 02172
14193	CAL-R, INC.	1601 OLYMPIC BLVD.	SANTA MONICA, CA 90404
14298	AMERICAN COMPONENTS, INC., AN		
	INSILCO COMPANY	8TH AVE. AT HARRY STREET	CONSHOHOCKEN, PA 19428
14433	ITT SEMICONDUCTORS	3301 ELECTRONICS WAY	
		P O BOX 3049	WEST PALM BEACH, FL 33402
14552	MICRO SEMICONDUCTOR CORP.	2830 E FAIRVIEW ST.	SANTA ANA, CA 92704
14936	GENERAL INSTRUMENT CORP., SEMICONDUCTOR		
	PRODUCTS GROUP	P.O. BOX 600,600 W. JOHN ST.	HICKSVILLE, NY 11802
15454	RODAN INDUSTRIES, INC.	2905 BLUE STAR ST.	ANAHEIM, CA 92806
16299	CORNING GLASS WORKS, ELECTRONIC		
	COMPONENTS DIVISION	3900 ELECTRONICS DR.	RALEIGH, NC 27604
18324	SIGNETICS CORP.	811 E. ARQUES	SUNNYVALE, CA 94086
22229	SOLITRON DEVICES, INC.,	· · · · · · · · · · · · · · · · · · ·	
	SEMICONDUCTOR GROUP	8808 BALBOA AVENUE	SAN DIEGO OPERS, CA 92123
24546	CORNING GLASS WORKS, ELECTRONIC		
	COMPONENTS DIVISION	550 HIGH STREET	BRADFORD, PA 16701
25088	SIEMENS CORP.	186 WOOD AVE. S	ISELIN, NJ 08830
26805	OMNI SPECTRA INC.,		
	MICROWAVE CONNECTOR DIV.	140 FOURTH AVE	WALTHAM, MA 02154
27014	NATIONAL SEMICONDUCTOR CORP.	2900 SEMICONDUCTOR DR.	SANTA CLARA, CA 95051
32997	BOURNS, INC., TRIMPOT PRODUCTS DIV.	1200 COLUMBIA AVE.	RIVERSIDE, CA 92507
34335	ADVANCED MICRO DEVICES	901 THOMPSON PL.	SUNNYVALE, CA 94086
50157	MIDWEST COMPONENTS INC.	P. O. BOX 787	
		1981 PORT CITY BLVD.	MUSKEGON, MI 49443
50434	HEWLETT-PACKARD COMPANY	640 PAGE MILL ROAD	PALO ALTO, CA 94304
50558	ELECTRONIC CONCEPTS, INC.	526 INDUSTRIAL WAY WEST	EATONTOWN, NJ 07724
51642	CENTRE ENGINEERING INC.	2820 E COLLEGE AVENUE	STATE COLLEGE, PA 16801
52306	HIGH VOLTAGE DEVICES, INC.	7485 AVENUE 304	VISALIA, CA 93277
52769	SPRAGUE GOODMAN ELEC., INC.	134 FULTON AVENUE	GARDEN CITY PARK, NY 11040
52961	PRODUCTS SERVICES CO.	86365 COLLEGE VIEW RD.	EUGENE, OR 97405
	ELT INC., GLOW LITE DIVISION	BOX 698	PAULS VALLEY, OK 73075
53944	MATSUSHITA ELECTRIC, CORP. OF AMERICA	1 PANASONIC WAY	SECAUCUS, NJ 07094
53944 54473		PO BOX 85, OFF ROUTE 45	SPRING MILLS, PA 16875
54473	GETTIG ENG. AND MFG. COMPANY	IO BOX OJ, OFF ROUTE 45	STRING HEBES, IN 10075
54473 55210	GETTIG ENG. AND MFG. COMPANY NICHICON/AMERICA/CORP.		
54473 55210 55680	NICHICON/AMERICA/CORP.	6435 N PROESEL AVENUE	CHICAGO, IL 60645
54473 55210			

CROSS INDEX-MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
71400	BUSSMAN MFG., DIVISION OF MCGRAW-	a ya 1990 miliyo kata miliyo kata kata kata kata kata kata kata kat	annan mar ann an ann an ann an 1960. An 1980 ann an 1980 ann an 1980 ann ann an 1980 ann ann ann ann ann ann a Tha ann ann ann ann an 1980 ann ann an 1980 ann an 1980 ann an 1980 ann ann an 1980 ann ann ann ann ann ann ann
	EDISON CO.	2536 W. UNIVERSITY ST.	ST. LOUIS, MO 63107
72982	ERIE TECHNOLOGICAL PRODUCTS, INC.	644 W. 12TH ST.	ERIE, PA 16512
73138	BECKMAN INSTRUMENTS, INC., HELIPOT DIV.	2500 HARBOR BLVD.	FULLERTON, CA 92634
73803	TEXAS INSTRUMENTS, INC., METALLURGICAL		
	MATERIALS DIV.	34 FOREST STREET	ATTLEBORO, MA 02703
73899	JFD ELECTRONICS COMPONENTS CORP.	PINETREE ROAD	OXFORD, NC 27565
74970	JOHNSON, E. F., CO.	299 10TH AVE, S. W.	WASECA, MN 56093
75042	TRW ELECTRONIC COMPONENTS, IRC FIXED		
	RESISTORS, PHILADELPHIA DIVISION	401 N. BROAD ST.	PHILADELPHIA, PA 19108
76493	BELL INDUSTRIES, INC.,		
	MILLER, J. W., DIV.	19070 REYES AVE., P O BOX 5825	COMPTON, CA 90224
76854	OAK INDUSTRIES, INC., SWITCH DIV.	S. MAIN ST.	CRYSTAL LAKE, IL 60014
77342	AMF INC., POTTER AND BRUMFIELD DIV.	200 RICHLAND CREEK DRIVE	PRINCETON, IN 47670
78488	STACKPOLE CARBON CO.		ST. MARYS, PA 15857
79727	C-W INDUSTRIES	550 DAVISVILLE RD.,P O BOX 96	WARMINISTER, PA 18974
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077
80031	ELECTRA-MIDLAND CORP., MEPCO DIV.	22 COLUMBIA ROAD	MORRISTOWN, NJ 07960
81073	GRAYHILL, INC.	561 HILLGROVE AVE., PO BOX 373	LA GRANGE, IL 60525
82389	SWITCHCRAFT, INC.	5555 N. ELSTON AVE.	CHICAGO, IL 60630
83003	VARO, INC.	P O BOX 411, 2203 WALNUT STREET	
84411	TRW ELECTRONIC COMPONENTS, TRW CAPACITORS	112 W. FIRST ST.	OGALLALA, NE 69153
88407	BULOVA WATCH CO. INC. ELECTRONICS DIV.	61-20 WOODSIDE AVE	WOODSIDE, NY 11377
90201	MALLORY CAPACITOR CO., DIV. OF	3029 E. WASHINGTON STREET	
	P. R. MALLORY AND CO., INC.	P. O. BOX 372	INDIANAPOLIS, IN 46206
91418	RADIO MATERIALS COMPANY, DIV. OF P.R.		
	MALLORY AND COMPANY, INC.	4242 W BRYN MAWR	CHICAGO, IL 60646
91637	DALE ELECTRONICS, INC.	P. O. BOX 609	COLUMBUS, NE 68601
95275	VITRAMON, INC.	P O BOX 544	BRIDGEPORT, CT 06601

A27 670-5845-01 B010300 CKT BOARD ASSY:M.P.U. 80009 670-58 A28 670-5848-00 CKT BOARD ASSY:RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58	40-00 40-01 554-00 553-00 442-01 442-01 443-00 443-01 552-00 352-01 344-00
A2 670-584.0-01 B010100 B010195 CKT BOARD ASSY:HODE SWITCH B0009 670-58 A3 670-585.0-00 CKT BOARD ASSY:HONE SWITCH B0009 670-58 A4 670-585.0-00 CKT BOARD ASSY:HONE FAREL BUTTON B0009 670-58 A5 670-584.2-01 B030860 CKT BOARD ASSY:HONE FAREL BUTTON B0009 670-58 A6 670-584.0-00 B030809 CKT BOARD ASSY:HONE FAREL BUTTON B0009 670-58 A6 670-584.0-00 B030809 CKT BOARD ASSY:HOT ADJUST B0009 670-58 A7 670-584.2-00 B010100 B020175 CKT BOARD ASSY:HOTHER B0009 670-58 A8 670-584.4-01 B020176 CKT BOARD ASSY:HOTHER B0009 670-58 A9 670-584.6-01 B010100 B010199 CKT BOARD ASSY:HOTHER B0009 670-58 A10 670-583.0-00 CKT BOARD ASSY:HOTHER B0009 670-58 A11 670-583.0-00 CKT BOARD ASSY:HOTHER B0009 670-58 A11 670-583.0-00 CK	40-01 53-00 42-00 442-01 443-00 52-00 552-00 352-01
A2 670-584-00 CKT BOARD ASSY: MONE SWITCH 80009 670-58 A4 670-5583-00 CKT BOARD ASSY: FRONT PAREL 80009 670-58 A5 670-5842-00 B01010 B030859 CKT BOARD ASSY: FRONT PAREL 80009 670-58 A5 670-5842-01 B030800 CKT BOARD ASSY: INTENSITY CONTROL 80009 670-58 A6 670-5842-01 B03080 CKT BOARD ASSY: INDUST 80009 670-58 A6 670-5842-01 B03080 CKT BOARD ASSY: MOTHER 80009 670-58 A7 670-5832-01 B01000 B020175 CKT BOARD ASSY: MOTHER 80009 670-58 A7 670-5832-01 B01000 CKT BOARD ASSY: MOTHER 80009 670-58 A8 670-5844-01 B020176 CKT BOARD ASSY: MOTHER 80009 670-58 A9 670-5836-01 B01100 B01219 CKT BOARD ASSY: MAIN INTERFACE 80009 670-58 A11 670-5836-01 B011010 B01019 CKT BOARD ASSY: MAIN INTERFACE 80009 67	554-00 553-00 542-00 542-01 543-00 552-00 552-00 552-01
A3 670-5854-00 CKT BOARD ASSY: FRONT PAREL 80009 670-58 A5 670-5842-00 B010100 B030859 CKT BOARD ASSY: INTENSITY CONTROL 80009 670-58 A5 670-5842-00 B010100 B030859 CKT BOARD ASSY: INTENSITY CONTROL 80009 670-58 A6 670-5842-00 B010100 B030859 CKT BOARD ASSY: INTENSITY CONTROL 80009 670-58 A6 670-5842-00 B010100 B010599 CKT BOARD ASSY: INTERSITY CONTROL 80009 670-58 A7 670-5842-00 B010100 B02175 CKT BOARD ASSY: HORTER 80009 670-58 A7 670-5832-00 B010100 B02175 CKT BOARD ASSY: HORTER 80009 670-58 A8 670-5836-00 CKT BOARD ASSY: HORTE Z INTERCONNECT 80009 670-58 A11 670-5836-00 B010100 B010115 CKT BOARD ASSY: CIANNEL INTERFACE 80009 670-58 A11 670-5836-00 B010100 B010115 CKT BOARD ASSY: CIANNEL INTERFACE 80009 670-58 A11 670-5837-00 B010100 B010115 CKT BOARD ASSY: CIANNEL INTERFACE	42-00 42-01 43-00 443-01 552-00 552-01 444-00
AS 570-5842-00 B010100 B030860 CKT B0ARD ASSY: INTENSITY CONTROL 80009 670-58 AS 670-5842-01 B01000 B030860 CKT B0ARD ASSY: INTENSITY CONTROL 80009 670-58 AS 670-5842-01 B010100 B03059 CKT B0ARD 855Y: INTENSITY CONTROL 80009 670-58 A7 670-5852-01 B010100 B020175 CKT B0ARD ASSY: AUX RECULATOR 80009 670-58 A8 670-5844-01 B020176 CKT B0ARD ASSY: HOTLER 80009 670-58 A9 670-5839-00 B010100 B020176 CKT B0ARD ASSY: HORLZ CHANNEL SW 80009 670-58 A10 670-5839-00 B010100 B010189 CKT B0ARD ASSY: HATS B1009 670-58 A11 670-5839-00 B010100 B010189 CKT B0ARD ASSY: HATS B1009 670-58 A12 670-5839-00 B010100 B010184 CKT B0ARD ASSY: HATS B1009 670-58 A14 </td <td>42-00 442-01 443-00 443-01 552-00 552-01 444-00</td>	42-00 442-01 443-00 443-01 552-00 552-01 444-00
55 670-5842-01 B03060 CKT BOARD ASSY: INTENSITY CONTROL 80009 670-58 65 670-5843-00 B03060 CKT BOARD ASSY: POT ADJUST 80009 670-58 67 670-5852-00 B010100 B010599 CKT BOARD ASSY: POT ADJUST 80009 670-58 670-5852-01 B01000 B02175 CKT BOARD ASSY: MUTHER 80009 670-58 670-5842-01 B010100 B02175 CKT BOARD ASSY: MUTHER 80009 670-58 670-5836-01 B020176 CKT BOARD ASSY: MUTHER 80009 670-58 670-5836-01 B010100 B010189 CKT BOARD ASSY: MUTHER 80009 670-58 A11 670-5836-01 B010100 B010189 CKT BOARD ASSY: MUTHER 80009 670-58 A12 670-5959-01 B010100 B010189 CKT BOARD ASSY: CONTROL RECT 80009 670-58 A12 670-5837-00 B010100 B010184 CKT BOARD ASSY: CONTROL RECT 80009 670-58 A12 670-5837-00 B010100 B010184 <td< td=""><td>442-01 443-00 443-01 452-00 452-01 444-00</td></td<>	442-01 443-00 443-01 452-00 452-01 444-00
AS 670-5843-00 D010100 B0303059 CKT B0ARD ASSY: POT ADJUST B0009 670-58 A7 670-5852-00 B010100 B010599 CKT B0ARD ASSY: AUX RECULATOR B0009 670-58 A7 670-5852-00 B010100 B020175 CKT B0ARD ASSY: AUX RECULATOR B0009 670-58 A8 670-584-00 B020176 CKT B0ARD ASSY: MUX RECULATOR B0009 670-58 A8 670-584-01 B020176 CKT B0ARD ASSY: MOTIER B0009 670-58 A8 670-5835-00 B020176 CKT B0ARD ASSY: MORIZ CHANNEL SW B0009 670-58 A10 670-5836-01 B010100 B010189 CKT B0ARD ASSY: MORIZ CHANNEL SW B0009 670-58 A11 670-5836-01 B010100 B010115 CKT B0ARD ASSY: CONTROL RECT B0009 670-58 A12 670-5939-01 B010100 B010115 CKT B0ARD ASSY: CONTROL RECT B0009 670-58 A11 670-5837-01 B010100 B010185 CKT B0ARD ASSY: CONTROL RECT B0009 670-58	443-00 443-01 352-00 352-01
A6 670-583-01 B030860 CKT BOARD ASSY:POT ADJUST 80009 670-58 A7 670-5852-00 B010100 B010599 CKT BOARD ASSY:AUX REGULATOR 80009 670-58 A8 670-5852-01 B010100 B020175 CKT BOARD ASSY:AUX REGULATOR 80009 670-58 A8 670-5844-01 B020176 CKT BOARD ASSY:HORTER 80009 670-58 A9 670-5836-00 B010100 B010189 CKT BOARD ASSY:HORTE 80009 670-58 A11 670-5836-01 B010109 CKT BOARD ASSY:HORTZ CHANNEL SW 80009 670-58 A12 670-5836-01 B010109 CKT BOARD ASSY:HAIN INTERFACE 80009 670-58 A12 670-5959-01 B010100 B010189 CKT BOARD ASSY:IAUN INTERFACE 80009 670-58 A14 670-5837-00 B010100 B010184 CKT BOARD ASSY:ISCHAL WITELAECT 80009 670-58 A14 670-5837-00 B010100 B010185 CKT BOARD ASSY:ISCHAL WITELAECT 80009 670-58 A14	343-01 352-00 352-01 344-00
A7 670-5852-01 B01000 CKT BOARD ASSY:AUX RECULATOR 80009 670-58 A7 670-5852-01 B01000 B02175 CKT BOARD ASSY:AUX RECULATOR 80009 670-58 A88 670-5844-01 B02175 CKT BOARD ASSY:MOTHER 80009 670-58 A9 670-583-00 CKT BOARD ASSY:HOTHER 80009 670-58 A10 670-583-00 CKT BOARD ASSY:HORLZ UNTRECONNECT 80009 670-58 A11 670-5836-00 B010100 B010189 CKT BOARD ASSY:HORLZ UNTRECONNECT 80009 670-58 A11 670-5836-00 B010100 B010150 CKT BOARD ASSY:HORLZ UNTRECONNECT 80009 670-58 A12 670-5959-00 B010100 B010150 CKT BOARD ASSY:HORLZ UNTROL RECT 80009 670-58 A13 670-5837-00 B010100 B010184 CKT BOARD ASSY:LOGIC 80009 670-58 A14 670-5837-00 B010100 B030919 CKT BOARD ASSY:LOGIC 80009 670-58 A14 670-5833-00 B010100 B030919 CKT BOARD ASSY:FANALDUTPUT 80009 670-58 </td <td>352-00 352-01 344-00</td>	352-00 352-01 344-00
A7 670-5852-01 B010600 CKT BOARD ASSY:AUX RECULATOR 80009 670-58 A8 670-5844-00 B010100 B020175 CKT BOARD ASSY:MOTHER 80009 670-58 A8 670-5839-00 CKT BOARD ASSY:MOTHER 80009 670-58 A9 670-5836-00 CKT BOARD ASSY:HORLZ LINERCONNECT 80009 670-58 A10 670-5836-00 B010100 B010189 CKT BOARD ASSY:HORLZ INTERCONNECT 80009 670-58 A11 670-5836-01 B010100 B010180 CKT BOARD ASSY:HAIN INTERFACE 80009 670-58 A12 670-5959-01 B010100 B01018 CKT BOARD ASSY:HAIN INTERFACE 80009 670-58 A14 670-5837-00 B010100 B01184 CKT BOARD ASSY:HORL RECT 80009 670-58 A14 670-5837-00 B010100 B01184 CKT BOARD ASSY:HORL 80009 670-58 A14 670-5832-00 B010100 B01184 CKT BOARD ASSY:HORL 80009 670-58 A18 670-5832-00	352-01 344-00
A8 670-5844-00 670-5844-01 b020176 B010100 b020175 CKT K K K K K B0ARD CKT B0ARD CKT B0ARD ASSY:HORIZ C	344-00
A8 670-5844-01 B020176 CKT BOARD ASSY:MOTHER B0009 670-58 A9 670-5839-00 CKT BOARD ASSY:HORIZ CHANNEL SW B0009 670-58 A10 670-3860-00 CKT BOARD ASSY:HORIZ CHANNEL SW B0009 670-58 A11 670-5836-00 B010100 B010100 CKT BOARD ASSY:HAIN INTERFACE 80009 670-58 A11 670-5836-01 B010100 CKT BOARD ASSY:MAIN INTERFACE 80009 670-58 A11 670-5836-01 B010100 CKT BOARD ASSY:CONTROL RECT 80009 670-58 A12 670-5959-00 B010100 B01018 CKT BOARD ASSY:CONTROL RECT 80009 670-58 A13 670-5837-00 B010100 B010184 CKT BOARD ASSY:LOGIC 80009 670-58 A14 670-5837-01 B010185 CKT BOARD ASSY:LOGIC 80009 670-58 A15 670-5837-00 B010100 B03090 CKT BOARD ASSY:VERTICAL OUTPUT 80009 670-58 A14 670-5832-00 B010100 B03090 CKT BOARD ASSY:VERTICAL	
A9 670-5839-00 CKT BOARD ASSY:HORIZ CHANNEL SH 80009 670-58 A10 (NO ELECTRICAL PARTS) 80009 670-39 A11 670-5836-00 BO10100 B010189 CKT BOARD ASSY:HORIZ INTERCONNECT 80009 670-58 A11 670-5836-01 BO10100 B010189 CKT BOARD ASSY:HORIZ INTERFACE 80009 670-58 A12 670-5959-00 BO10100 B010115 CKT BOARD ASSY:HORIZ INTERFACE 80009 670-58 A12 670-5959-01 BO10100 B010184 CKT BOARD ASSY:HORIZ CHARD 80009 670-58 A12 670-5837-02 BO10100 B010184 CKT BOARD ASSY:HORIZ CHARD 80009 670-58 A14 670-5837-01 BO10185 CKT BOARD ASSY:HORIZONTAL OUTPUT 80009 670-58 A15 670-5832-00 BO10100 B030899 CKT BOARD ASSY:VERTICAL OUTPUT 80009 670-58 A18 670-5832-01 BO10100 B030899 CKT BOARD ASSY:VERTICAL OUTPUT 80009 670-58 A19 670-5830-01 BO10100 B030800 CKT BOARD ASSY:VERTICAL OUTPUT	44-01
A9 670-5839-00 CKT BOARD ASSY.HORIZ INTERCONNECT 80009 670-39 A10 670-3960-00 CKT BOARD ASSY.HORIZ INTERCONNECT 80009 670-39 A11 670-5836-00 B010100 B010190 CKT BOARD ASSY.HORIZ INTERCONNECT 80009 670-58 A11 670-5836-01 B010100 CKT BOARD ASSY.HORIZ INTERCONNECT 80009 670-58 A12 670-5959-01 B010100 CKT BOARD ASSY.CONTROL RECT 80009 670-58 A12 670-5959-01 B010100 B01018 CKT BOARD ASSY.ICONTROL RECT 80009 670-58 A14 670-5837-00 B010100 B01018 CKT BOARD ASSY.ICORTCOL 80009 670-58 A14 670-5837-00 B010100 B010185 CKT BOARD ASSY.ICORTCOL 80009 670-58 A15 670-5837-00 B010100 B030919 CKT BOARD ASSY.ICAL OUTPUT 80009 670-58 A16 670-5832-00 B010100 B030920 CKT BOARD ASSY.ICAL OUTPUT 80009 670-58 A18 670-5838-01 B	
A10 670-3960-00 CKT BOARD ASSY:HORIZ INTERCONNECT (NO ELECTRICAL PARTS) 80009 670-39 A11 670-5836-01 B010100 B010189 CKT BOARD ASSY:HORIZ INTERCONNECT (NO ELECTRICAL PARTS) 80009 670-58 A11 670-5836-01 B010190 CKT BOARD ASSY:MAIN INTERFACE B0009 80009 670-58 A12 670-5959-01 B010100 CKT BOARD ASSY:CONTROL RECT B0009 80009 670-58 A13 670-3957-02 CKT BOARD ASSY:CONTROL RECT B0009 80009 670-58 A14 670-5837-00 B010100 B010184 CKT BOARD ASSY:CONTROL RECT B0009 80009 670-58 A14 670-5837-00 B010100 B010184 CKT BOARD ASSY:LOGIC B0009 80009 670-58 A15 670-5837-00 B010100 B030919 CKT BOARD ASSY:FORIZONTAL OUTPUT B0009 80009 670-58 A15 670-5832-00 B010100 B030899 CKT BOARD ASSY:VERTICAL CHANNEL SW B0009 80009 670-58 A19 670-5834-00 B010100 B010180 CKT BOARD ASSY:VERTICAL CHANNEL SW B0009 80009 670-58 A20 670	39-00
A11 670-5836-01 B010190 CKT BOARD ASSY:MIN INTERFACE 80009 670-58 A12 670-5959-00 B010100 B010115 CKT BOARD ASSY:CONTROL RECT 80009 670-59 A13 670-3957-02 CKT BOARD ASSY:CONTROL RECT 80009 670-59 A14 670-5837-00 B010100 B010184 CKT BOARD ASSY:LIGGEC 80009 670-58 A14 670-5837-00 B010185 CKT BOARD ASSY:LIGGIC 80009 670-58 A14 670-5837-00 B010185 CKT BOARD ASSY:LIGGIC 80009 670-58 A15 670-5833-00 CKT BOARD ASSY:LIGGIC 80009 670-58 A18 670-5832-00 B010100 B03919 CKT BOARD ASSY:VERTICAL 0UTPUT 80009 670-58 A18 670-5838-01 B010100 B030890 CKT BOARD ASSY:VERTICAL 0UTPUT 80009 670-58 A19 670-5841-00 B010100 B018010	60-00
A11 670-5836-01 B010190 CKT BOARD ASSY:MIN INTERFACE 80009 670-58 A12 670-5959-00 B010100 B010115 CKT BOARD ASSY:CONTROL RECT 80009 670-59 A13 670-3957-02 CKT BOARD ASSY:CONTROL RECT 80009 670-59 A14 670-5837-00 B010100 B010184 CKT BOARD ASSY:LIGGEC 80009 670-58 A14 670-5837-00 B010185 CKT BOARD ASSY:LIGGIC 80009 670-58 A14 670-5837-00 B010185 CKT BOARD ASSY:LIGGIC 80009 670-58 A15 670-5833-00 CKT BOARD ASSY:LIGGIC 80009 670-58 A18 670-5832-00 B010100 B03919 CKT BOARD ASSY:VERTICAL 0UTPUT 80009 670-58 A18 670-5838-01 B010100 B030890 CKT BOARD ASSY:VERTICAL 0UTPUT 80009 670-58 A19 670-5841-00 B010100 B018010	36-00
A12 670-5959-00 B010100 B010115 CKT BOARD ASSY:CONTROL RECT 80009 670-59 A12 670-5959-01 B010116 CKT BOARD ASSY:CONTROL RECT 80009 670-59 A14 670-5837-00 B010100 B010184 CKT BOARD ASSY:LOGIC 80009 670-59 A14 670-5837-00 B010100 B010184 CKT BOARD ASSY:LOGIC 80009 670-58 A15 670-5835-00 CKT BOARD ASSY:LOGIC 80009 670-58 A15 670-5833-00 CKT BOARD ASSY:ICRICAL OUTPUT 80009 670-58 A16 670-5832-00 B010100 B030919 CKT BOARD ASSY:VERTICAL OUTPUT 80009 670-58 A18 670-5832-01 B010100 B030899 CKT BOARD ASSY:VERTICAL OUTPUT 80009 670-58 A19 670-5838-01 B010100 B030899 CKT BOARD ASSY:VERTICAL CHANNEL SW 80009 670-58 A20 670-5841-02 B010100 B010180 CKT BOARD ASSY:VERTICAL CHANNEL SW 80009 670-58 A21 670-5841-02 B010410 CKT BOARD ASSY:VERTICAL CHANNEL SW 80009 670-58 A22 670-5844-00 B0101010 B010180	
A12 670-5959-01 B010116 CKT BOARD ASSY:TRIGGER SELECT 80009 670-39 A13 670-3957-02 B010100 B010184 CKT BOARD ASSY:TRIGGER SELECT 80009 670-38 A14 670-5837-00 B010108 CKT BOARD ASSY:LOGIC 80009 670-58 A14 670-5837-00 B010185 CKT BOARD ASSY:LOGIC 80009 670-58 A15 670-5837-00 CKT BOARD ASSY:FAN 80009 670-58 A16 670-5832-00 B010100 B030919 CKT BOARD ASSY:VERTICAL OUTPUT 80009 670-58 A18 670-5832-01 B010100 B030899 CKT BOARD ASSY:VERTICAL OUTPUT 80009 670-58 A19 670-5838-01 B030900 CKT BOARD ASSY:VERTICAL OUTPUT 80009 670-58 A20 670-5841-00 B010100 B030899 CKT BOARD ASSY:VERTICAL CHANNEL SW 80009 670-58 A20 670-5841-01 B010100 B010180 CKT BOARD ASSY:VERTICAL CHANNEL SW 80009 670-58 A21 670-5841-02 B010100 B010180 CKT BOARD ASSY:VERTICAL CHANNEL SW 80009 670-58 A22 670-5840-00 B010100 B010115 <td>159-00</td>	159-00
A14 670-5837-00 B010100 B010184 CKT B0ARD ASSY:LOGIC 80009 670-583 A14 670-5837-01 B010185 CKT B0ARD ASSY:LOGIC 80009 670-583 A15 670-5835-00 CKT B0ARD ASSY:SIGNAL OUTPUT 80009 670-583 A16 670-5832-00 B010100 B030919 CKT B0ARD ASSY:VERTICAL OUTPUT 80009 670-583 A18 670-5832-01 B030920 CKT B0ARD ASSY:VERTICAL OUTPUT 80009 670-583 A19 670-5838-00 B010100 B030899 CKT B0ARD ASSY:VERTICAL CHANNEL SW 80009 670-583 A20 670-5834-00 B010100 B010180 CKT B0ARD ASSY:HICH VOLTAGE 80009 670-583 A20 670-5841-01 B010181 B010420 CKT B0ARD ASSY:HICH VOLTAGE 80009 670-583 A21 670-584-00 B010100 B010105 CKT B0ARD ASSY:HICH VOLTAGE 80009 670-584	159-01
A14 670-5837-01 B010185 CKT BOARD ASSY:LOGIC 80009 670-58 A15 670-5835-00 CKT BOARD ASSY:SIGNAL OUTPUT 80009 670-58 A15 670-641-00 CKT BOARD ASSY:SIGNAL OUTPUT 80009 670-58 A16 670-5832-00 B010100 B030919 CKT BOARD ASSY:VERTICAL OUTPUT 80009 670-58 A18 670-5832-01 B030920 CKT BOARD ASSY:VERTICAL OUTPUT 80009 670-58 A19 670-5838-01 B030900 CKT BOARD ASSY:VERTICAL CHANNEL SW 80009 670-58 A20 670-5841-00 B010100 B030900 CKT BOARD ASSY:VERTICAL CHANNEL SW 80009 670-58 A20 670-5841-01 B010181 B010419 CKT BOARD ASSY:VERTICAL CHANNEL SW 80009 670-58 A21 670-5843-02 B010420 CKT BOARD ASSY:VERTICAL CHANNEL SW 80009 670-58 A22 670-5843-00 B010100 B01015 CKT BOARD ASSY:VERTICAL CHANNEL SW 80009 670-558 A22 670-58450-01 B010100 B0	57-02
A15 670-5835-00 CKT BOARD ASSY:SIGNAL OUTPUT 80009 670-58 A16 670-4641-00 CKT BOARD ASSY:FAN 80009 670-58 A17 670-5832-00 B010100 B030919 CKT BOARD ASSY:VERTICAL OUTPUT 80009 670-58 A18 670-5832-01 B030920 CKT BOARD ASSY:VERTICAL OUTPUT 80009 670-58 A19 670-5838-01 B030900 CKT BOARD ASSY:VERTICAL CHANNEL SW 80009 670-58 A19 670-5841-01 B010100 B01080 CKT BOARD ASSY:VERTICAL CHANNEL SW 80009 670-58 A20 670-5841-01 B0101018 B01010 CKT BOARD ASSY:HIGH VOLTAGE 80009 670-58 A20 670-5841-02 B010420 CKT BOARD ASSY:HIGH VOLTAGE 80009 670-58 A21 670-5841-02 B010100 B010115 CKT BOARD ASSY:LICH VOLTAGE 80009 670-58 A22 670-5841-02 B010100 CKT BOARD ASSY:LICH VOLTAGE 80009 670-58 A22 670-5864-00 CKT BOARD ASSY:LICH VOLTAGE 80009 670-58 A22 670-5864-00 CKT BOARD ASSY:LICH VOLTAGE 80009 <td>37-00</td>	37-00
A16 670-4641-00 CKT BOARD ASSY: FAN 80009 670-46 A17 670-5833-00 CKT BOARD ASSY: VERTICAL OUTPUT 80009 670-58 A18 670-5832-01 B010100 B030919 CKT BOARD ASSY: VERTICAL OUTPUT 80009 670-58 A18 670-5832-01 B030920 CKT BOARD ASSY: VERTICAL OUTPUT 80009 670-58 A19 670-5838-01 B030900 CKT BOARD ASSY: VERTICAL CHANNEL SW 80009 670-58 A19 670-5838-01 B030900 CKT BOARD ASSY: VERTICAL CHANNEL SW 80009 670-58 A20 670-5841-00 B010100 B010180 CKT BOARD ASSY: VERTICAL CHANNEL SW 80009 670-58 A20 670-5841-02 B010420 CKT BOARD ASSY: VERTICAU CHANEL 80009 670-58 A21 670-5960-01 B010100 B010115 CKT BOARD ASSY: VERTICAU CHANE 80009 670-58 A22 670-5960-01 B010100 B010115 CKT BOARD ASSY: LV REGULATOR 80009 670-58 A22 670-5960-01 B01016 CKT BOARD ASSY: LV REGULATOR 80009 670-58 A23 670-5845-00 CKT BOARD ASSY: LV	
A17 670-5833-00 CKT BOARD ASSY:HORIZONTAL OUTPUT 80009 670-58 A18 670-5832-01 B030920 CKT BOARD ASSY:VERTICAL OUTPUT 80009 670-58 A19 670-5832-01 B030920 CKT BOARD ASSY:VERTICAL OUTPUT 80009 670-58 A19 670-5838-01 B030900 CKT BOARD ASSY:VERTICAL CHANNEL SW 80009 670-58 A20 670-5841-00 B010100 B010180 CKT BOARD ASSY:HIGH VOLTACE 80009 670-58 A20 670-5841-01 B010181 B010419 CKT BOARD ASSY:HIGH VOLTACE 80009 670-58 A21 670-5841-02 B010420 CKT BOARD ASSY:LOR REGULATOR 80009 670-58 A22 670-5960-00 B010100 B010115 CKT BOARD ASSY:LV REGULATOR 80009 670-58 A22 670-5960-00 B010100 B010115 CKT BOARD ASSY:LV REGULATOR 80009 670-58 A22 670-5960-00 B010100 B010115 CKT BOARD ASSY:LV REGULATOR 80009 670-58 A23 670-5960-00 B010100 B010105 CKT BOARD ASSY:LV REGULATOR 80009 670-58 </td <td></td>	
A18 670-5832-00 B010100 B03920 CKT BOARD ASSY:VERTICAL OUTPUT 80009 670-58 A19 670-5838-00 B010100 B030899 CKT BOARD ASSY:VERTICAL OUTPUT 80009 670-58 A19 670-5838-01 B030900 CKT BOARD ASSY:VERTICAL CHANNEL SW 80009 670-58 A20 670-5841-00 B010100 B010180 CKT BOARD ASSY:VERTICAL CHANNEL SW 80009 670-58 A20 670-5841-02 B010420 CKT BOARD ASSY:HIGH VOLTACE 80009 670-58 A20 670-5841-02 B010420 CKT BOARD ASSY:HIGH VOLTACE 80009 670-58 A21 670-5840-00 B010100 B010115 CKT BOARD ASSY:LV REGULATOR 80009 670-58 A22 670-5960-01 B010100 B010115 CKT BOARD ASSY:LV REGULATOR 80009 670-58 A23 670-5960-01 B010100 CKT BOARD ASSY:LV REGULATOR 80009 670-58 A24 119-1048-00 <td< td=""><td></td></td<>	
A18 670-5832-01 B030920 CKT BOARD ASSY: VERTICAL OUTPUT 80009 670-583 A19 670-5838-00 B010100 B030900 CKT BOARD ASSY: VERTICAL CHANNEL SW 80009 670-583 A19 670-5838-01 B030900 CKT BOARD ASSY: VERTICAL CHANNEL SW 80009 670-583 A20 670-5841-00 B010100 B010181 CKT BOARD ASSY: HICH VOLTAGE 80009 670-583 A20 670-5841-02 B010181 B0101910 CKT BOARD ASSY: HICH VOLTAGE 80009 670-583 A21 670-5841-00 B010100 B010115 CKT BOARD ASSY: LV REGULATOR 80009 670-583 A22 670-5960-00 B010100 B010115 CKT BOARD ASSY: LV REGULATOR 80009 670-583 A22 670-5960-01 B010100 B010115 CKT BOARD ASSY: LV REGULATOR 80009 670-563 A23 670-5845-00 B010100	
A19 670-5838-00 B010100 B030909 CKT BOARD ASSY: VERTICAL CHANNEL SW 80009 670-583 A20 670-5838-01 B030900 CKT BOARD ASSY: VERTICAL CHANNEL SW 80009 670-583 A20 670-5841-00 B010100 B01018 CKT BOARD ASSY: HICH VOLTACE 80009 670-583 A20 670-5841-02 B010420 CKT BOARD ASSY: HICH VOLTACE 80009 670-583 A21 670-5834-00 B010100 B010115 CKT BOARD ASSY: LV REGULATOR 80009 670-583 A22 670-5960-00 B010100 B010115 CKT BOARD ASSY: LV REGULATOR 80009 670-583 A22 670-5960-01 B010100 B010116 CKT BOARD ASSY: LV REGULATOR 80009 670-583 A23 670-58650-00 B010100 B010129 CKT BOARD ASSY: DIGITIZER 80009 670-583 A24 119-1048-00 CKT BOARD <	
A19 670-5838-01 B030900 CKT BOARD ASSY:VERTICAL CHANNEL SW 80009 670-58 A20 670-5841-00 B010100 B010180 CKT BOARD ASSY:HIGH VOLTAGE 80009 670-58 A20 670-5841-01 B010181 B010419 CKT BOARD ASSY:HIGH VOLTAGE 80009 670-58 A20 670-5841-02 B010420 CKT BOARD ASSY:HIGH VOLTAGE 80009 670-58 A21 670-5843-00 B010420 CKT BOARD ASSY:LV REGULATOR 80009 670-58 A22 670-5960-01 B010100 B010115 CKT BOARD ASSY:LV REGULATOR 80009 670-58 A23 670-6259-00 B010116 CKT BOARD ASSY:LV REGULATOR 80009 670-58 A24 119-1048-00 DELAY LINE,ELEC:65NS,50 OHMS 80009 670-58 A25 670-5845-00 B010100 B010299 CKT BOARD ASSY:M.P.U. 80009 670-58 A27 670-5845-01 B010300 CKT BOARD ASSY:M.P.U. 80009 670-58 A28 670-5848-00 CKT BOARD ASSY:M.P.U. 80009 670-58 A28 670-5848-02 B010100 B010380 <td></td>	
A20 670-5841-00 B010100 B010180 CKT BOARD ASSY:HIGH VOLTAGE 80009 670-58 A20 670-5841-01 B010181 B010419 CKT BOARD ASSY:HIGH VOLTAGE 80009 670-58 A20 670-5841-02 B010420 CKT BOARD ASSY:HIGH VOLTAGE 80009 670-58 A21 670-5834-00 B010100 B010115 CKT BOARD ASSY:HIGH VOLTAGE 80009 670-58 A22 670-5960-00 B010100 B010115 CKT BOARD ASSY:LV REGULATOR 80009 670-59 A22 670-5960-01 B010116 CKT BOARD ASSY:LV REGULATOR 80009 670-59 A23 670-6259-00 CKT BOARD ASSY:P.S. INVERTER 80009 670-56 A24 119-1048-00 DELECTRICAL PARTS) 80009 670-58 A25 670-5845-00 B010100 B010299 CKT BOARD ASSY:CONTROL LOGIC 80009 670-58 A26 670-5845-01 B010100 B010299 CKT BOARD ASSY:M.P.U. 80009 670-58 A28 670-5848-00 B010100 B010299 CKT BOARD ASSY:M.P.U. 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:AK EXPANDED RAM <td></td>	
A20 670-5841-01 B010181 B010419 CKT B0ARD ASSY:HIGH VOLTAGE 80009 670-58 A20 670-5841-02 B010420 CKT B0ARD ASSY:HIGH VOLTAGE 80009 670-58 A21 670-5834-00 B010420 CKT BOARD ASSY:HIGH VOLTAGE 80009 670-58 A22 670-5960-00 B010100 B010115 CKT BOARD ASSY:LV REGULATOR 80009 670-59 A22 670-5960-01 B010116 CKT BOARD ASSY:LV REGULATOR 80009 670-59 A23 670-6259-00 B010116 CKT BOARD ASSY:P.S. INVERTER 80009 670-59 A24 119-1048-00 CKT BOARD ASSY:DIGITIZER 80009 670-58 A25 670-5845-00 B010100 B010299 CKT BOARD ASSY:CONTROL LOGIC 80009 670-58 A26 670-5845-01 B010300 CKT BOARD ASSY:M.P.U. 80009 670-58 A28 670-5848-00	
A20 670-5841-02 B010420 CKT BOARD ASSY:HIGH VOLTAGE 80009 670-58 A21 670-5834-00 CKT BOARD ASSY:Z-AXIS 80009 670-58 A22 670-5960-00 B010100 B010115 CKT BOARD ASSY:LV REGULATOR 80009 670-59 A22 670-5960-01 B010116 CKT BOARD ASSY:LV REGULATOR 80009 670-59 A23 670-6259-00 CKT BOARD ASSY:P.S. INVERTER 80009 670-59 A24 119-1048-00 DELAY LINE,ELEC:65NS,50 OHMS 80009 670-58 A25 670-5845-00 B010100 B010299 CKT BOARD ASSY:CONTROL LOGIC 80009 670-58 A26 670-5845-00 B010100 B010299 CKT BOARD ASSY:M.P.U. 80009 670-58 A27 670-5845-01 B010300 CKT BOARD ASSY:M.P.U. 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:RAM 80009 670-58 A28 670-5848-06 B010380 CKT BOARD ASSY:AK EXPANDED RAM 80009 670-58 <	
A21 670-5834-00 CKT BOARD ASSY:Z-AXIS 80009 670-58 A22 670-5960-00 B010100 B010115 CKT BOARD ASSY:LV REGULATOR 80009 670-59 A22 670-5960-01 B010116 CKT BOARD ASSY:LV REGULATOR 80009 670-59 A23 670-6259-00 CKT BOARD ASSY:P.S. INVERTER 80009 670-52 A24 119-1048-00 DELAY LINE,ELEC:65NS,50 OHMS 80009 119-10 A25 670-5850-00 CKT BOARD ASSY:DIGITIZER 80009 670-58 A26 670-5845-00 B010100 B010299 CKT BOARD ASSY:M.P.U. 80009 670-58 A27 670-5845-01 B010300 CKT BOARD ASSY:M.P.U. 80009 670-58 A28 670-5848-00 CKT BOARD ASSY:RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:AK 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:AK 80009 670-58 A28 670-5848-06 B010381	
A22 670-5960-01 B010116 CKT BOARD ASSY:LV REGULATOR 80009 670-59 A23 670-6259-00 CKT BOARD ASSY:P.S. INVERTER 80009 670-62 A24 119-1048-00 DELAY LINE,ELEC:65NS,50 OHMS 80009 119-10 A25 670-5850-00 CKT BOARD ASSY:DIGITIZER 80009 670-58 A25 670-5845-00 CKT BOARD ASSY:DIGITIZER 80009 670-58 A26 670-5845-00 B010100 B010299 CKT BOARD ASSY:M.P.U. 80009 670-58 A27 670-5845-01 B010300 CKT BOARD ASSY:M.P.U. 80009 670-58 A28 670-5848-00 CKT BOARD ASSY:M.P.U. 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:AM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:AM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:AK EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06	
A22 670-5960-01 B010116 CKT BOARD ASSY:LV REGULATOR 80009 670-59 A23 670-6259-00 CKT BOARD ASSY:P.S. INVERTER 80009 670-62 A24 119-1048-00 DELAY LINE, ELEC:65NS, 50 OHMS 80009 119-10 A25 670-5850-00 CKT BOARD ASSY:DIGITIZER 80009 670-58 A25 670-5850-00 CKT BOARD ASSY:DIGITIZER 80009 670-58 A26 670-5846-00 CKT BOARD ASSY:CONTROL LOGIC 80009 670-58 A27 670-5845-00 B010100 B010299 CKT BOARD ASSY:M.P.U. 80009 670-58 A28 670-5848-00 CKT BOARD ASSY:M.P.U. 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:AM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:AM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:AM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:AK EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381	960-00
A23 670-6259-00 CKT BOARD ASSY:P.S. INVERTER 80009 670-62 A24 119-1048-00 DELAY LINE, ELEC: 65NS, 50 OHMS 80009 119-10 A25 670-5850-00 CKT BOARD ASSY:DIGITIZER 80009 670-58 A26 670-5846-00 CKT BOARD ASSY:CONTROL LOGIC 80009 670-58 A27 670-5845-00 B010100 B010299 CKT BOARD ASSY:M.P.U. 80009 670-58 A27 670-5845-01 B010300 CKT BOARD ASSY:M.P.U. 80009 670-58 A28 670-5848-00 CKT BOARD ASSY:M.P.U. 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58	
A25 670-5850-00 (NO ELECTRICAL PARTS) A26 670-5846-00 CKT BOARD ASSY:DIGITIZER 80009 670-58 A27 670-5845-00 B010100 B010299 CKT BOARD ASSY:M.P.U. 80009 670-58 A27 670-5845-01 B010300 CKT BOARD ASSY:M.P.U. 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:KAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58	259-00
A25 670-5850-00 CKT BOARD ASSY:DIGITIZER 80009 670-58 A26 670-5846-00 CKT BOARD ASSY:CONTROL LOGIC 80009 670-58 A27 670-5845-00 B010100 B010299 CKT BOARD ASSY:M.P.U. 80009 670-58 A27 670-5845-01 B010300 CKT BOARD ASSY:M.P.U. 80009 670-58 A28 670-5848-00 CKT BOARD ASSY:RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58)48-00
A27 670-5845-00 B010100 B010299 CKT B0ARD ASSY:M.P.U. 80009 670-58 A27 670-5845-01 B010300 CKT B0ARD ASSY:M.P.U. 80009 670-58 A28 670-5848-00 CKT BOARD ASSY:RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM	350-00
A27 670-5845-00 B010100 B010299 CKT B0ARD ASSY:M.P.U. 80009 670-58 A27 670-5845-01 B010300 CKT B0ARD ASSY:M.P.U. 80009 670-58 A28 670-5848-00 CKT BOARD ASSY:RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM	346-00
A27 670-5845-01 B010300 CKT BOARD ASSY:M.P.U. 80009 670-58 A28 670-5848-00 CKT BOARD ASSY:RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58	845-00
A28 670-5848-00 CKT BOARD ASSY:RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-02 B010100 B010380 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58	
A28 670-5848-06 B010381 CKT BOARD ASSY:4K EXPANDED RAM 80009 670-58 (OPTION 2D ONLY) 80009 670-58	848-00
(OPTION 2D ONLY)	848-02
	348-06
	851-00
	851-00 849-00
	347-00
	847-00 855-00
A33 670-3959-01 B020671 CKT BOARD ASSY:X-Y COMPENSATION 80009 670-34	
A34 670-5860-00 CKT BOARD ASSY:DISPLAY FOLLOWER 80009 670-58 (NO ELECTRICAL PARTS) 80009 670-58	855-00 959-00

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Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Numb
A35	670-5860-00		CKT BOARD ASSY: DISPLAY FOLLOWER	80009	670-5860-00
			(NO ELECTRICAL PARTS)		
A36	670-5795-00		CKT BOARD ASSY:ELECTRONICS	80009	670-5795-00
A37	670-5796-00		CKT BOARD ASSY:BUTTON	80009	670-5796-00
A1	That for the same and the same and		CKT BOARD ASSY:GRATICULE LAMPS		
A1DS42	150-0029-00		LAMP, INCAND:6.3V,0.20A	08806	349
A1DS43	150-0029-00		LAMP, INCAND: 6.3V, 0.20A	08806	349
A1DS44	150-0029-00		LAMP, INCAND: 6.3V, 0.20A	08806	349
4.0			CHAR BOARD ACCU.NODE CUITCH		
A2	202 0111 00		CKT BOARD ASSY:MODE SWITCH	72082	8121-N088Z5U
A2C1	283-0111-00		CAP., FXD, CER DI:0.1UF, 20%, 50V		8121-N088250
A2C15	283-0111-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	80009	
A2C16	285-1006-00		CAP., FXD, PLSTC: 0.22UF, 2%, 50V		805-519-COFO
A2C22	283-0115-00		CAP., FXD, CER DI: 47PF, 5%, 200V	59660	805-519-COFO
A2C27	283-0115-00		CAP.,FXD,CER DI:47PF,5%,200V	19000	505 J19-0080
A2C61	283-0111-00		CAP.,FXD,CER DI:0.1UF,20%,50V		8121-N088Z5U
A2C62	283-0111-00		CAP., FXD, CER DI:0.1UF, 20%, 50V		8121-N088Z5U
A2C70	283-0111-00		CAP.,FXD,CER DI:0.1UF,20%,50V		8121-N088Z5U
A2C72	283-0111-00		CAP.,FXD,CER DI:0.1UF,20%,50V		8121-N088Z5U
A2CR26	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA		1N4152R
A2CR58	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A2CR89	152-0066-03		SEMICOND DEVICE:RECT,SI,400V,1A	80009	152-0066-03
A2CR90	152-0066-03		SEMICOND DEVICE: RECT, SI, 400V, 1A	80009	152-0066-03
A2CR91	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA	01295	1N4152R
A2CR92	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA		1N4152R
A2CR93	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA		1N4152R 1N4152R
A2CR94	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA		
A2CR95	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA		1N4152R
A2CR96	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA		1N4152R
A2CR97	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA		1N4152R
A2CR98	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA		1N4152R
A2CR99 A2CR100	152-0141-02 152-0141-02		SEMICOND DEVICE:SILICON,30V,150MA SEMICOND DEVICE:SILICON,30V,150MA		1N4152R 1N4152R
4000101			CENTCOND DEVICE. CITICON 201 150MA	01205	1N4152R
A2CR101	152-0141-02		SEMICOND DEVICE:SILICON,30V,150MA SEMICOND DEVICE:SILICON,30V,150MA		1N4152R
A2CR102	152-0141-02		SEMICOND DEVICE:SILICON, SOV, ISOMA		1N4152R
A2CR103 A2CR104	152-0141-02 152-0141-02		SEMICOND DEVICE:SILICON, SOV, ISOMA		1N4152R
	152-0141-02		SEMICOND DEVICE: SILICON, SOV, ISOMA		1N4152R
A2CR105 A2CR106	152-0075-00		SEMICOND DEVICE:GE,25V,40MA		G866
A2CR107	152-0075-00		SEMICOND DEVICE:GE,25V,40MA		G866
A2CR108	152-0075-00		SEMICOND DEVICE:GE,25V,40MA	14433	G866
A2CR109	152-0075-00		SEMICOND DEVICE:GE, 25V, 40MA	14433	G866
A2CR117	152-0075-00		SEMICOND DEVICE:GE,25V,40MA		G866
A2CR118	152-0075-00		SEMICOND DEVICE:GE,25V,40MA		G866
A2CR121	152-0242-00		SEMICOND DEVICE: SILICON, 225V, 200MA	07263	FDH5004
A2DS101	150-0057-01		LAMP, INCAND: 5V, 0.115A, WIRE LD, SEL	76854	17AS15
A2DS102	150-0057-01		LAMP, INCAND: 5V, 0.115A, WIRE LD, SEL	76854	17AS15
A2DS103	150-0057-01		LAMP, INCAND: 5V, 0.115A, WIRE LD, SEL	76854	17AS15
A2DS104	150-0057-01		LAMP, INCAND: 5V, 0.115A, WIRE LD, SEL	76854	17AS15
A2DS105	150-0057-01		LAMP, INCAND: 5V, 0.115A, WIRE LD, SEL		17AS15
A2DS106	150-0057-01		LAMP, INCAND: 5V, 0.115A, WIRE LD, SEL	76854	17AS15
A2DS107	150-0057-01		LAMP, INCAND: 5V, 0.115A, WIRE LD, SEL	76854	
A2DS108	150-0057-01		LAMP, INCAND: 5V, 0.115A, WIRE LD, SEL	76854	
A2DS109	150-0057-01		LAMP, INCAND: 5V, 0.115A, WIRE LD, SEL	76854	
A2L31	108-0440-00		COIL, RF: 8UH, TOROIDAL INDUCTOR		108-0440-00 151-0192-03
A2Q15	151-0192-03		TRANSISTOR: SILICON, NPN		151-0192-03
A2Q17	151-0192-03		TRANSISTOR: SILICON, NPN	00009	171-0124-03

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	Tektronix	Serial/Model No.		Mfr		
Component No.	Part No.	Eff Dscont	Name & Description	Code	Mfr Part Number	~
A2Q91	151-0190-05		TRANSISTOR: SILICON, NPN	80009	151-0190-05	
A2Q92	151-0190-05		TRANSISTOR: SILICON, NPN	80009	151-0190-05	
A2Q93	151-0190-05		TRANSISTOR: SILICON, NPN	80009	151-0190-05	
A2Q94	151-0190-05		TRANSISTOR: SILICON, NPN	80009	151-0190-05	,
A2Q95	151-0190-05		TRANSISTOR: SILICON, NPN	80009	151-0190-05	
A2Q96	151-0190-05		TRANSISTOR:SILICON, NPN	80009	151-0190-05	
A2Q97	151-0190-05		TRANSISTOR: SILICON, NPN	80009	151-0190-05	
A2Q98	151-0190-05		TRANSISTOR: SILICON, NPN	80009	151-0190-05	
A2Q99	151-0190-05		TRANSISTOR: SILICON, NPN	80009	151-0190-05	
A2Q114	151-0190-05		TRANSISTOR: SILICON, NPN		151-0190-05	
A2Q120	151-0190-05		TRANSISTOR: SILICON, NPN	80009		
A2Q121	151-0190-05		TRANSISTOR:SILICON, NPN	80009	151-0190-05	
A2R1	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725	
A2R2	315-0472-00		RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W		CB4725	
A2R3	315-0472-00		RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W		CB4725	
A2R4	315-0472-00		RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W		CB4725	*
A2R5	315-0472-00		RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W		CB4725	
A2R6	315-0472-00		RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W	01121	CB4725	
1007						
A2R7	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725	
A2R8	315-0472-00		RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W	01121	CB4725	
A2R9	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725	
A2R12 A2R13	321-0258-00		RES.,FXD,FILM:4.75K OHM,1%,0.125W	91637		
A2R13 A2R14	315-0823-00 321-0822-06		RES., FXD, CMPSN: 82K OHM, 5%, 0.25W	01121	CB8235	
A2R14	521-0822-08		RES.,FXD,FILM:1.76K OHM,0.25%,0.125W	91637	MFF1816C17600C	
A2R15	311-1223-00		RES.,VAR,NONWIR:TRMR,250 OHM,0.5W	02111	63M251T602	
A2R16	321-0321-07		RES., FXD, FILM: 21.5K OHM, 0.1%, 0.125W	91637	MFF1816C21501B	
A2R17	315-0362-00		RES., FXD, CMPSN: 3.6K OHM, 5%, 0.25W	01121	CB3625	
A2R19	321-0321-07		RES.,FXD,FILM:21.5K OHM,0.1%,0.125W	91637	MFF1816C21501B	
A2R22	308-0307-00		RES.,FXD,WW:5K OHM,1%,3W	91637	RS2B-B50000F	
A2R23	321-0166-00		RES.,FXD,FILM:523 OHM,1%,0.125W	91637	MFF1816G523R0F	
A2R24	315-0223-00		RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235	الود
A2R25	311-1225-00		RES., VAR, NONWIR: 1K OHM, 20%, 0.50W	32997	3386F-T04-102	
A2R26	315-0512-00		RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W	01121		
A2R27	321-1611-07		RES., FXD, FILM: 550 OHM, 0.1%, 0.125W		MFF1816C550R0B	
A2R31	321-1612-07		RES., FXD, FILM: 4.455K OHM, 0.1%, 0.125W		MFF1816C44550B	
A2R32	321-1611-07		RES., FXD, FILM: 550 OHM, 0.1%, 0.125W		MFF1816C550R0B	-
A2R33	321-1612-07		RES.,FXD,FILM:4.455K OHM,0.1%,0.125W	01637	MEE18166445500	
A2R34	321-1611-07		RES., FXD, FILM: 550 OHM, 0.1%, 0.125W	91637 91637	MFF1816C44550B MFF1816C550R0B	
A2R35	321-1612-07		RES., FXD, FILM: 4.455K OHM, 0.1%, 0.125W	91637	MFF1816C44550B	
A2R36	321-0813-07		RES., FXD, FILM: 495 OHM, 0.1%, 0.125W	91637	MFF1816C495R0B	
A2R54	315-0362-00		RES., FXD, CMPSN: 3.6K OHM, 5%, 0.25W	01121	CB3625	
A2R55	315-0102-00		RES., FXD, CMPSN: 1K OHM, 5%, 0.25W		CB1025	
A2R56	315-0511-00		BES EVE CHOCN-510 OTH EN O SET	01101	005115	~
A2R58	315-0302-00		RES.,FXD,CMPSN:510 OHM,5%,0.25W RES.,FXD,CMPSN:3K OHM,5%,0.25W		CB5115	
A2R72	315-0751-00		RES., FXD, CMPSN: 750 OHM, 5%, 0.25W	01121	CB3025	
A2R74	315-0682-00		RES., FXD, CMPSN: 6.8K OHM, 5%, 0.25W	01121	CB7515 CB6825	
A2R75	311-1373-00		RES., VAR, NONWIR: 5K OHM, 20%, 1W	01121	73U4G040L502M	
A2R81	315-0302-00		RES., FXD, CMPSN: 3K OHM, 5%, 0.25W	01121	CB3025	
A2R82	315-0/7/-00					
A2R82	315-0474-00 315-0362-00		RES., FXD, CMPSN: 470K OHM, 5%, 0.25W	01121	CB4745	
A2R84	315-0682-00		RES., FXD, CMPSN: 3.6K OHM, 5%, 0.25W		CB3625	a.'
A2R85	315-0682-00		RES., FXD, CMPSN: 6.8K OHM, 5%, 0.25W	01121	CB6825	
A2R86	315-0474-00		RES.,FXD,CMPSN:6.8K OHM,5%,0.25W RES.,FXD,CMPSN:470K OHM,5%,0.25W	01121	CB6825	
A2R87	315-0474-00		RES.,FXD,CMPSN:470K OHM,5%,0.25W RES.,FXD,CMPSN:470K OHM,5%,0.25W	01121	CB4745	
				01121	СВ4745	***
A2R88	315-0682-00		RES., FXD, CMPSN: 6.8K OHM, 5%, 0.25W	01121	CB6825	
A2R91 A2R92	315-0162-00		RES., FXD, CMPSN: 1.6K OHM, 5%, 0.25W	01121	CB1625	··· ·••.1.
n2R72	315-0302-00		RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	СВ3025	

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	Tektronix	Serial/N	lodel No.		Mfr	
Component No.	Part No.	Eff	Dscont	Name & Description		Mfr Part Number
A2R93	315-0302-00			RES., FXD, CMPSN: 3K OHM, 5%, 0.25W	01121	CB3025
A2R94	315-0302-00			RES., FXD, CMPSN: 3K OHM, 5%, 0.25W	01121	CB3025
A2R95	315-0162-00			RES., FXD, CMPSN: 1.6K OHM, 5%, 0.25W	01121	CB1625
A2R96	315-0162-00			RES., FXD, CMPSN: 1.6K OHM, 5%, 0.25W	01121	CB1625
A2R97	315-0302-00			RES., FXD, CMPSN: 3K OHM, 5%, 0.25W	01121	CB3025
A2R98	315-0302-00			RES., FXD, CMPSN: 3K OHM, 5%, 0.25W	01121	CB3025
A2R99	315-0162-00			RES.,FXD,CMPSN:1.6K OHM,5%,0.25W	01121	CB1625
A2R102	315-0153-00			RES., FXD, CMPSN: 15K OHM, 5%, 0.25W	01121	CB1535
A2R121	315-0512-00			RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W	01121	CB5125
A2S1	263-0035-00			SWITCH PB ASSY:1 CANCEL, 7.5MM,1 CONTACT	80009	263-0035-00
A252	263-0035-00			SWITCH PB ASSY:1 CANCEL, 7.5MM,1 CONTACT	80009	263-0035-00
A2S40	263-0013-08			ACTR ASSY, PB: 3 LATCH, 10MM, 5 CONT	80009	263-0013-08
A2S109	263-0013-09			ACTR ASSY, PB: 3 LATCH, 10MM, 3 CONT	80009	263-0013-09
A2S110	263-0013-09			ACTR ASSY, PB:3 LATCH, 10MM, 3 CONT	80009	263-0013-09
A2U1	156-1177-01			MICROCIRCUIT, DI: 10/4 LINE PRIORITY ENCODER	80009	156-1177-01
A2U51	156-0495-02			MICROCIRCUIT, LI: QUAD OPNL AMPL, SELECTED	01295	LM324J4
A2U52	156-0495-02			MICROCIRCUIT, LI:QUAD OPNL AMPL, SELECTED	01295	LM324J4
A2U61	156-0916-02			MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN	27014	DM81LS97
A2U62	156-0916-02			MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN	27014	DM81LS97
A2U70	156-0479-02			MICROCIRCUIT, DI:QUAD 2-INP ORGATE	01295	SN74LS32NP3
A2U71	156-0865-02			MICROCIRCUIT, DI:OCTAL D-TYPE FF W/CLEAR	01295	SN74LS32NP3 SN74LS273NP3
A2U72	156-0865-02			MICROCIRCUIT, DI:OCTAL D-TYPE FF W/CLEAR	01295	SN74LS273NP3
A2U73	156-0479-02			MICROCIRCUIT, DI:QUAD 2-INP ORGATE	01295	SN74LS273NP3 SN74LS32NP3

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	Tektronix	Serial/M		Name & Description	Mfr Code	Mfr Part Number	
Component No.	Part No.	Eff	Dscont	Name & Description	0000 1		
A3				CKT BOARD ASSY: FRONT PANEL			
A3C110	283-0111-00			CAP., FXD, CER DI:0.1UF, 20%, 50V		8121-N088Z5U104M	
A3C130	283-0111-00			CAP., FXD, CER DI:0.1UF, 20%, 50V	72982	8121-N088Z5U104M	
A3C131	283-0111-00			CAP., FXD, CER DI:0.1UF, 20%, 50V	72982	8121-N088Z5U104M	
A3C132	283-0111-00			CAP., FXD, CER DI:0.1UF, 20%, 50V	72982	8121-N088Z5U104M	
A3C230	283-0111-00			CAP., FXD, CER DI:0.1UF, 20%, 50V	72982	8121-N088Z5U104M	
1150250							
A3C231	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M	~
A3C430	283-0111-00	XB010151		CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M	
A3C510	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V		8121-N088Z5U104M	
A3C511	283-0268-00			CAP.,FXD,CER DI:0.015UF,10%,50V		8121N083X7R0153K	
A3C610	283-0111-00			CAP., FXD, CER DI:0.1UF, 20%, 50V	72982	8121-N088Z5U104M	94
A3LS520	119-0709-00			LOUDSPEAKER, PM: 2.25 IN, 45 OHM			
A3Q110	151-0190-05			TRANSISTOR: SILICON, NPN	80009	151-0190-05	
A3Q120	151-0190-05			TRANSISTOR: SILICON, NPN	80009	151-0190-05	
A3Q121	151-0190-05			TRANSISTOR: SILICON, NPN	80009	151-0190-05	-
A3Q220	151-0190-05			TRANSISTOR:SILICON, NPN	80009	151-0190-05	
A3Q221	151-0190-05			TRANSISTOR: SILICON, NPN	80009	151-0190-05	
A3Q330	151-0190-05			TRANSISTOR: SILICON, NPN	80009	151-0190-05	
ASUSSO	101-0190-00			,			***
A3R110	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	СВ2025	
A3R130	315-0512-00			RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125	
	315-0512-00			RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W	01121	CB5125	
A3R131	315-0512-00			RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W	01121	CB5125	
A3R132				RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W	01121	CB5125	***
A3R230	315-0512-00			RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W	01121	CB5125	
A3R231	315-0512-00						
A3R300	315-0223-00			RES., FXD, CMPSN: 22K OHM, 5%, 0.25W		CB2235	
A3R301	315-0223-00			RES., FXD, CMPSN: 22K OHM, 5%, 0.25W	01121	CB2235	_
A3R302	315-0223-00			RES., FXD, CMPSN: 22K OHM, 5%, 0.25W	01121	CB2235	
A3R303	315-0223-00			RES., FXD, CMPSN: 22K OHM, 5%, 0.25W	01121	CB2235	
A3R310	315-0223-00			RES., FXD, CMPSN: 22K OHM, 5%, 0.25W	01121	CB2235	
A3R311	315-0223-00			RES., FXD, CMPSN: 22K OHM, 5%, 0.25W	01121	CB2235	
AJAJII	515 0225 00						
A3R312	315-0223-00	1		RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235	
A3R313	315-0223-00			RES., FXD, CMPSN: 22K OHM, 5%, 0.25W	01121	CB2235	
A3R320	315-0221-00			RES., FXD, CMPSN: 220 OHM, 5%, 0.25W	01121	CB2215	
A3R321	315-0221-00			RES., FXD, CMPSN: 220 OHM, 5%, 0.25W	01121	CB2215	
	315-0221-00			RES., FXD, CMPSN: 220 OHM, 5%, 0.25W	01121	CB2215	
A3R322 A3R323	315-0221-00			RES., FXD, CMPSN: 220 OHM, 5%, 0.25W	01121	CB2215	
AJKJ2J	515-0221-00	,					
A3R324	315-0221-00)		RES.,FXD,CMPSN:220 OHM,5%,0.25W		CB2215	
A3R610	315-0223-00			RES., FXD, CMPSN: 22K OHM, 5%, 0.25W		CB2235	
	315-0132-00			RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W	01121	CB1325	
A3R611	156-0994-02			MICROCIRCUIT, DI:8 INPUT DATA SEL/MUX	01295	SN74LS151NP3	
A3U400				MICROCIRCUIT, DI:QUAD 2-INP NAND GATE	80009	156-0384-02	
A3U510	156-0384-02			MICROCIRCUIT, DI: 3/8 LINE DCDR	01295	SN74LS138NP3	
A3U520	156-0469-02						

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Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code Mfr Part Numb
			CKT BOARD ASSY:FR PANEL BUTTON	
A4				01295 TIL 209A
A4DS620	150-1036-00		LAMP, LED: RED, 3. OV, 40MA	01295 TIL 209A
A4DS621	150-1036-00		LAMP, LED: RED, 3.0V, 40MA	
A4DS700	150-1036-00		LAMP, LED: RED, 3.0V, 40MA	
A4DS720	150-1036-00		LAMP, LED: RED, 3.0V, 40MA	01295 TIL 209A
A4DS721	150-1036-00		LAMP, LED: RED, 3.0V, 40MA	01295 TIL 209A
A4S100	131-2202-00		CONTACT, ELEC: BERYLLIUM COPPER	52961 ENG#8000
A4S110	131-2202-00		CONTACT, ELEC: BERYLLIUM COPPER	52961 ENG#8000
A4S120	131-2202-00		CONTACT, ELEC: BERYLLIUM COPPER	52961 ENG#8000
A4S130	131-2202-00		CONTACT, ELEC: BERYLLIUM COPPER	52961 ENG#8000
A4S140	131-2202-00		CONTACT, ELEC: BERYLLIUM COPPER	52961 ENG#8000
A4S200	131-2202-00		CONTACT, ELEC: BERYLLIUM COPPER	52961 ENG#8000
A4S210	131-2202-00		CONTACT, ELEC: BERYLLIUM COPPER	52961 ENG#8000
A4S220	131-2202-00		CONTACT, ELEC: BERYLLIUM COPPER	52961 ENG#8000
A4S230	131-2202-00		CONTACT, ELEC: BERYLLIUM COPPER	52961 ENG#8000
A45240	131-2202-00		CONTACT, ELEC: BERYLLIUM COPPER	52961 ENG#8000
A4S300	131-2202-00		CONTACT, ELEC: BERYLLIUM COPPER	52961 ENG#8000
A4S310	131-2202-00		CONTACT, ELEC: BERYLLIUM COPPER	52961 ENG#8000
A4S320	131-2202-00		CONTACT, ELEC: BERYLLIUM COPPER	52961 ENG#8000
A4S330	131-2202-00		CONTACT, ELEC: BERYLLIUM COPPER	52961 ENG#8000
A45340	131-2202-00		CONTACT, ELEC: BERYLLIUM COPPER	52961 ENG#8000
A4S400	131-2202-00		CONTACT, ELEC: BERYLLIUM COPPER	52961 ENG#8000
A4S410	131-2202-00		CONTACT, ELEC: BERYLLIUM COPPER	52961 ENG#8000
A4S420	131-2202-00		CONTACT, ELEC: BERYLLIUM COPPER	52961 ENG#8000
<u>4/5///0</u>	131-2202-00		CONTACT.ELEC:BERYLLTHM COPPER	52961 ENG#8000

52961 ENG#8000 CONTACT, ELEC: BERYLLIUM COPPER 131-2202-00 A4S500 52961 ENG#8000 CONTACT, ELEC: BERYLLIUM COPPER A4S510 131-2202-00 CONTACT, ELEC: BERYLLIUM COPPER 52961 ENG#8000 A4S540 131-2202-00 ENG#8000 CONTACT, ELEC: BERYLLIUM COPPER 52961 A4S600 131-2202-00 ENG#8000 A4S610 131-2202-00 CONTACT, ELEC: BERYLLIUM COPPER 52961 ENG#8000 CONTACT, ELEC: BERYLLIUM COPPER 52961 A4S630 131-2202-00 131-2202-00 CONTACT, ELEC: BERYLLIUM COPPER 52961 ENG#8000 A4S640 CONTACT, ELEC: BERYLLIUM COPPER 52961 ENG#8000 A4S710 131-2202-00 CONTACT, ELEC: BERYLLIUM COPPER 52961 ENG#8000 A4S730 131-2202-00 52961 ENG#8000 CONTACT, ELEC: BERYLLIUM COPPER A4S740 131-2202-00

Tektronix	Serial/Model No.		Mfr	
Part No.	Eff Dscont	Name & Description	Code	Mfr Part Number
and and with the set of the set of the set of the		CKT BOARD ASSY: INTENSITY		
311-1195-00		RES.,VAR,NONWIR:PNL,5K X1M OHM,0.5W	01121	16M968
311 - 1195-00		RES.,VAR,NONWIR:PNL,5K X1M OHM,0.5W	01121	16M968
317-0472-00		RES., FXD, CMPSN: 4.7K OHM, 5%, 0.125W	01121	BB4725
317-0472-00	B010100 B010150	RES., FXD, CMPSN: 4.7K OHM, 5%, 0.125W	01121	BB4725
317-0432-00	B010151	RES., FXD, CMPSN: 4.3K OHM, 5%, 0.125W	01121	BB4325
311-1839-00		RES.,VAR,NONWIR:5K OHM,20%,0.50W,W/4PST SW	01121	14M083
311-2018-00		RES.,VAR,NONWIR:5K OHM,20%,0.5W	01121	19M107
ant far for use one - our car an an an		CKT BOARD ASSY: POT ADJUST		
311-1484-00	B010100 B010150		01121	11M110
				73A1G040L502M
				11M110
			73138	
311-1483-00		RES., VAR, NONWIR: 100K OHM, 20%, 1W	01121	73A1G040L104M
	Part No. 311-1195-00 311-1195-00 317-0472-00 317-0472-00 317-0432-00 311-1839-00 311-2018-00 311-1484-00 311-1484-00 311-1484-00 311-1238-00	Part No. Eff Dscont 311-1195-00 317-0472-00 317-0472-00 317-0472-00 B010100 B010150 317-0432-00 B010151 311-1839-00 311-2018-00 311-1368-00 B010151 311-1484-00 B010151 311-1238-00 B010151	Part No. Eff Dscont Name & Description CKT BOARD ASSY: INTENSITY CKT BOARD ASSY: INTENSITY 311-1195-00 RES., VAR, NONWIR: PNL, 5K XIM OHM, 0.5W 317-0472-00 RES., VAR, NONWIR: PNL, 5K XIM OHM, 0.5W 317-0472-00 B010100 B010150 317-0432-00 B010151 311-1839-00 RES., VAR, NONWIR: 5K OHM, 5%, 0.125W 311-2018-00 RES., VAR, NONWIR: 5K OHM, 20%, 0.50W, W/4PST SW 311-1368-00 B010151 311-1484-00 B010151 311-1484-00 B010151 RES., VAR, NONWIR: 5K OHM, 20%, 0.5W	Part No. Eff Dscont Name & Description Code CKT BOARD ASSY:INTENSITY CKT BOARD ASSY:INTENSITY 01121 311-1195-00 RES.,VAR,NONWIR:PNL,5K XIM OHM,0.5W 01121 311-1195-00 RES.,VAR,NONWIR:PNL,5K XIM OHM,0.5W 01121 317-0472-00 B010100 B010150 RES.,FXD,CMPSN:4.7K OHM,5%,0.125W 01121 317-0432-00 B010151 RES.,FXD,CMPSN:4.7K OHM,5%,0.125W 01121 311-1839-00 RES.,FXD,CMPSN:4.3K OHM,5%,0.125W 01121 311-2018-00 RES.,VAR,NONWIR:5K OHM,20%,0.50W,W/4PST SW 01121 311-1484-00 B010100 B010150 RES.,VAR,NONWIR:5K OHM,20%,0.5W 01121 311-1484-00 B010151 RES.,VAR,NONWIR:PNL,2.5K OHM,1W 01121 311-1238-00 RES.,VAR,NONWIR:PNL,2.5K OHM,1W 01121 311-1238-00 RES.,VAR,NONWIR:PNL,2.5K OHM,1W 01121

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Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A7			CKT BOARD ASSY:AUX REGULATOR		***************************************
A7C7	290-0782-00		CAP., FXD, ELCTLT: 4.70F, +75-10%, 35V	55680	35ULA4R7V-T
A7C11	281-0580-00		CAP., FXD, CER DI:470PF, 10%, 500V	04222	
A7C40	283-0212-00				
A7C41			CAP., FXD, CER DI: 2UF, 20%, 50V		8141N064Z5U205M
A7C41	283-0177-00 290-0770-00		CAP., FXD, CER DI: 1UF, +80-20%, 25V CAP., FXD, ELCTLT: 100UF, +50-10%, 25V	56289 56289	273C5 502D230
				50207	5025250
A7C61 A7C62	290-0770-00		CAP., FXD, ELCTLT: 100UF, +50-10%, 25V	56289	502D230
	290-0745-00		CAP., FXD, ELCTLT: 22UF, +50-10%, 25V	56289	502D225
A7C63	290-0770-00		CAP., FXD, ELCTLT: 100UF, +50-10%, 25V	56289	
A7C64	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V		273C5
A7C68	290-0771-00		CAP.,FXD,ELCTLT:220UF,+50-10%,10VDC	54473	ECE-A10V220L
A7C74	283-0128-00	B010100 B010150	CAP.,FXD,CER DI:100PF,5%,500V	72982	871-536T2H101J
A7C74	283-0094-00	B010151	CAP., FXD, CER DI: 27PF, 10%, 200V	59660	835-583-C0G0270K
A7C84	290-0745-00		CAP., FXD, ELCTLT: 22UF, +50-10%, 25V	56289	
A7C85	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	91418	
A7C86	290-0782-00		CAP., FXD, ELCTLT: 4.7UF, +75-10%, 35V		35ULA4R7V-T
A7C91	283-0198-00		CAP., FXD, CER DI:0.22UF, 20%, 50V		8121N083Z5U0224M
A7C92	290-0773-00		CAP., FXD, ELCTLT: 1000UF, +50-10%, 10V		ECE-B10Z1000
	290 0779 00		GRI, , FRD, ELCILI: 10000F, +30-10%, 10V	OOODL	ECE-B1021000
A7C95	290-0778-00		CAP., FXD, ELCTLT: 1UF, +50-10%, 50V		ECE-A50N1
A7C98	283-0111-00		CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
A7CR3	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A7CR4	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA	01295	1N4152R
A7CR11	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA	01295	1N4152R
A7CR51	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A7CR52	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A7CR53	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A7CR66	152-0582-00		SEMICOND DEVICE:SILICON, 20V, 3A	80009	152-0582-00
A7CR88	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA		
A7CR92	152-0066-03			01295	1N4152R
A7CR95	152-0141-02		SEMICOND DEVICE:RECT,SI,400V,1A SEMICOND DEVICE:SILICON,30V,150MA		152-0066-03 1N4152R
170000	150 01/1 00				
A7CR96	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A7L61	108-0473-00		COIL, RF: 150UH	80009	108-0473-00
A7L62	108-0473-00		COIL, RF: 150UH	80009	108-0473-00
A7L68	108-0337-00		COIL, RF: 25UH	80009	108-0337-00
A7L84	108-0337-00		COIL, RF: 25UH	80009	108-0337-00
A7Q13	151-0302-01		TRANSISTOR: SILICON, NPN, SEL	80009	151-0302-01
A7Q14	151-0349-00		TRANSISTOR:SILICON, NPN, SEL FROM MJE2801	04713	SJE924
A7Q15	151-0477-00		TRANSISTOR: SILICON, NPN	04713	
A7Q58	151-0188-03		TRANSISTOR: SILICON, NPP, SEL		151-0188-03
A7Q66	151-0352-00		TRANSISTOR: SILICON, NPN		X44C282
A7Q76	151-0220-00		TRANSISTOR: SILICON, PNP		\$036228
A7Q77	151-0220-00		TRANSISTOR: SILICON, PNP		S036228
A7Q79	151-0303-01		TOANCICTOD, CILLON NEW CON		
•	151-0302-01		TRANSISTOR: SILICON, NPN, SEL		151-0302-01
A7R2	315-0202-00		RES., FXD, CMPSN: 2K OHM, 5%, 0.25W		CB2025
A7R3	315-0331-00		RES.,FXD,CMPSN:330 OHM,5%,0.25W		CB3315
A7R4	315-0331-00		RES.,FXD,CMPSN:330 OHM,5%,0.25W		CB3315
A7R5	315-0821-00		RES.,FXD,CMPSN:820 OHM,5%,0.25W		CB8215
A7R7	315-0432-00		RES., FXD, CMPSN: 4.3K OHM, 5%, 0.25W	01121	CB4325
A7R8	315-0432-00		RES.,FXD,CMPSN:4.3K OHM,5%,0.25W	01121	CB4325
A7R13	315-0512-00		RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W	01121	CB5125
A7R15	315-0101-00		RES., FXD, CMPSN: 100 OHM, 5%, 0.25W		CB1015
A7R21	315-0131-00		RES., FXD, CMPSN: 130 OHM, 5%, 0.25W		CB1315
A7R22	315-0123-00		RES., FXD, CMPSN: 12K OHM, 5%, 0.25W		CB1235
A7R23	315-0623-00		RES., FXD, CMPSN: 62K OHM, 5%, 0.25W		CB6235
A7R26	308-0804-00				
A7R26	308-0804-00		RES., FXD, NONWIR: 0.025 OHM, 5%, 0.5W	80009	308-0804-00
A7R26 A7R27 A7R29	308-0804-00 308-0804-00 315-0432-00		RES., FXD, NONWIR: 0.025 OHM, 5%, 0.5W RES., FXD, NONWIR: 0.025 OHM, 5%, 0.5W RES., FXD, CMPSN: 4.3K OHM, 5%, 0.25W	80009	308-0804-00 308-0804-00 CB4325

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Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number	~
A7R31	315-0912-00		RES.,FXD,CMPSN:9.1K OHM,5%,0.25W	01121	CB9125	
A7R32	315-0151-00		RES., FXD, CMPSN: 150 OHM, 5%, 0.25W	01121	CB1515	
A7R51	321-0313-00		RES., FXD, FILM: 17.8K OHM, 1%, 0.125W	91637	MFF1816G17801F	~*
A7R52	321-0277-00		RES., FXD, FILM: 7.5K OHM, 1%, 0.125W	91637	MFF1816G75000F	
A7R53	321-0322-00		RES., FXD, FILM: 22.1K OHM, 1%, 0.125W	91637	MFF1816G22101F	
A7R54	321-0317-00		RES., FXD, FILM: 19.6K OHM, 1%, 0.125W	91637	MFF1816G19601F	
A7R55	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025	~
A7R57	315-0431-00		RES.,FXD,CMPSN:430 OHM,5%,0.25W	01121	CB4315	
A7R58	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025	
A7R64	315-0470-00		RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705	
A7R71	321-0232-00		RES.,FXD,FILM:2.55K OHM,1%,0.125W	91637	MFF1816G25500F	
A7R72	321-0260-00		RES.,FXD,FILM:4.99K OHM,1%,0.125W	91637	MFF1816G49900F	
A7R74	315-0272-00		RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121		
A7R75	315-0184-00		RES.,FXD,CMPSN:180K OHM,5%,0.25W	01121	CB1845	
A7R76	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025	
A7R79	315-0271-00		RES.,FXD,CMPSN:270 OHM,5%,0.25W	01121	CB2715	
A7R81	315-0333-00		RES.,FXD,CMPSN:33K OHM,5%,0.25W	01121	CB3335	
A7R82	315-0151-00		RES.,FXD,CMPSN:150 OHM,5%,0.25W	01121	CB1515	
A7R85	315-0274-00		RES.,FXD,CMPSN:270K OHM,5%,0.25W	01121		97
A7R86	315-0104-00		RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045	
A7R87	315-0103-00		RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035	
A7R88	315-0564-00		RES.,FXD,CMPSN:560K OHM,5%,0.25W	01121	CB5645	
A7R95	315-0124-00		RES.,FXD,CMPSN:120K OHM,5%,0.25W	01121	CB1245	-0-
A7R96	315-0122-00		RES.,FXD,CMPSN:1.2K OHM,5%,0.25W	01121	CB1225	
A7R98	315-0273-00		RES., FXD, CMPSN: 27K OHM, 5%, 0.25W	01121	CB2735	
A7T66	120-0784-00		TRANSFORMER, PLS: SWITCHING RGLTR	80009	120-0784-00	
A7U10	156-0158-03		MICROCIRCUIT, LI: DUAL OPNL AMPL, CHK	80009	156-0158-03	
A7U40	156-0285-01		MICROCIRCUIT, LI: VOLTAGE REGULATOR, CHK	80009	156-0285-01	
A7U86	156-0158-03		MICROCIRCUIT, LI: DUAL OPNL AMPL, CHK	80009	156-0158-03	
A7VR55	152-0195-00		SEMICOND DEVICE:ZENER,0.4W,5.1V,5%	04713	SZ11755	6×5

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A9		an a sea an	CKT BOARD ASSY:HORIZ CHANNEL SW	a 1 an an an Anna - a' an an an Anna Anna Anna Anna Anna An	
A9C9	283-0195-00		CAP., FXD, CER DI:680PF, 5%, 50V	72082	8121N0750000681T
A9C11	283-0111-00		CAP., FXD, CER DI:0.10F, 20%, 50V	72982	8121N075C0G0681J 8121-N088Z5U104M
A9C14	283-0195-00				
A9C33			CAP., FXD, CER DI:680PF, 5%, 50V		8121N075C0G0681J
A9C40	283-0067-00 283-0111-00		CAP., FXD, CER DI:0.001UF, 10%, 200V		835-515B102K
A9040	283-0111-00		CAP.,FXD,CER DI:0.1UF,20%,50V	12982	8121-N088Z5U104M
A9C41	281-0123-00		CAP., VAR, CER DI: 5-25PF, 100V	72982	518-000A5-25
A9C44	283-0076-00	XB010325	CAP.,FXD,CER DI:27PF,10%,500V (NOMINAL VALUE,SELECTED)	56289	40C287A2
A9C49	283-0111-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	72982	8121-N088Z5U104M
A9C63	283-0067-00		CAP., FXD, CER DI:0.001UF, 10%, 200V		835-515B102K
A9C65	281-0123-00		CAP., VAR, CER DI: 5-25PF, 100V	72982	518-000A5-25
A9C81	200-0778 00			56673	FOR AFONI
A9C82	290-0778-00		CAP., FXD, ELCTLT: 1UF, +50-10%, 50V	54473	
	290-0778-00		CAP., FXD, ELCTLT: 1UF, +50-10%, 50V		ECE-A50N1
A9C83	290-0745-00		CAP., FXD, ELCTLT: 22UF, +50-10%, 25V	56289	502D225
A9C84	290-0778-00		CAP., FXD, ELCTLT: 1UF, +50-10%, 50V	54473	
A9CR36	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA	01295	1N4152R
A9L41	108-0578-00		COIL, RF: FIXED, 45NH	80009	108-0578-00
A9L81	108-0245-00		COIL, RF: 3.9UH		B6310-1
A9L82	108-0245-00		COIL, RF: 3.9UH		B6310-1
A91.83	108-0598-00		COIL, RF: 200UH	80009	108-0598-00
A9L84	108-0245-00		COIL, RF: 3.9UH	76493	B6310-1
A9Q32	151-0221-00		TRANSISTOR: SILICON, PNP	04713	SPS246
A9Q35	151-0220-00		TRANSISTOR: SILICON, PNP	07263	S036228
A9Q37	151-0223-03		TRANSISTOR:NPN,SI,PRESTRESSED & TESTED	80009	151-0223-03
A9Q62	151-0221-00		TRANSISTOR: SILICON, PNP	04713	SPS246
A9Q65	151-0220-00		TRANSISTOR: SILICON, PNP	07263	
A9Q66	151-0223-03		TRANSISTOR: NPN, SI, PRESTRESSED & TESTED	80009	151-0223-03
A9Q67	151-0223-03		TRANSISTOR: NPN, SI, PRESTRESSED & TESTED		151-0223-03
A9R1	321-1068-01		RES., FXD, FILM: 50.5 OHM, 0.5%, 0.125W		MFF1816G50R50D
A9R2	221-1069-01		DEC TWD ETTW-ED E DIW D EV D 1251	01627	WEE19160500500
	321-1068-01		RES., FXD, FILM: 50.5 OHM, 0.5%, 0.125W	91637	
A9R3	321-1068-01		RES.,FXD,FILM:50.5 OHM,0.5%,0.125W	91637	
A9R4	321-1068-01		RES.,FXD,FILM:50.5 OHM,0.5%,0.125W	91637	MFF1816G50R50D
A9R6	323-0187-00		RES.,FXD,FILM:866 OHM,1%,0.50W	75042	
A9R7	321-0074-00		RES.,FXD,FILM:57.6 OHM,1%,0.125W	91637	
A9R8	321-0074-00		RES.,FXD,FILM:57.6 OHM,1%,0.125W	91637	MFF1816G57R60F
A9R9	317-0363-00		RES.,FXD,CMPSN:36K OHM,5%,0.125W	01121	BB3635
A9R11	323-0187-00		RES., FXD, FILM:866 OHM, 1%, 0.50W	75042	CECTO-8660F
A9R12	321-0074-00		RES.,FXD,FILM:57.6 OHM,1%,0.125W	91637	MFF1816G57R60F
A9R13	321-0074-00		RES., FXD, FILM: 57.6 OHM, 1%, 0.125W	91637	MFF1816G57R60F
A9R14	317-0363-00		RES., FXD, CMPSN: 36K OHM, 5%, 0.125W		BB3635
A9R21	321-0218-00		RES., FXD, FILM: 1.82K OHM, 1%, 0.125W	91637	MFF1816G18200F
A9R31	323-0173-00		RES.,FXD,FILM:619 OHM,1%,0.50W	75042	CECTO-6190F
A9R32	317-0510-00		RES., FXD, CMPSN: 51 OHM, 5%, 0.125W	01121	BB5105
A9R33	321-0095-00		RES., FXD, FILM: 95.3 OHM, 1%, 0.125W	91637	
A9R35	321-0111-00		RES., FXD, FILM: 195.5 OHM, 1%, 0.125W RES., FXD, FILM: 140 OHM, 1%, 0.125W	91637	MFF1816G140R0F
A9R37	321-0065-00		RES., FXD, FILM: 140 OHM, 1%, 0.125W RES., FXD, FILM: 46.4 OHM, 1%, 0.125W	91637	
A9R41	311-0978-00		RES., VAR, NONWIR: 250 OHM, 10%, 0.50W		82-4-2
100/0	211 1007 65			70100	00.00.1
A9R42	311-1007-00 321-0026-00		RES., VAR, NONWIR: 20 OHM, 20%, 0.50W		82-38-1 MFF1816G18R20F
A9R43		WD010205	RES., FXD, FILM: 18.2 OHM, 1%, 0.125W		
A9R44	315-0241-00	XB010325	RES.,FXD,CMPSN:240 OHM,5%,0.25W (NOMINAL VALUE,SELECTED)	01121	CB2415
A9R45	311-1268-00		RES., VAR, NONWIR: 10K OHM, 10%, 0.50W	32997	3329P-L58-103
A9R46	321-0270-00		RES., FXD, FILM: 6.34K OHM, 1%, 0.125W	91637	MFF1816G63400F
A9R47	321-0162-00		DEC 270 211 M-675 AUX 19 A 1950	01627	MEE1916047580P
A9R48			RES., FXD, FILM: 475 OHM, 1%, 0.125W	91637	MFF1816G475R0F
	321-0136-00 321-0053-00		RES., FXD, FILM: 255 OHM, 1%, 0.125W	91637	MFF1816G255R0F
A G D S 1	コス エーロロ つうきしし		RES.,FXD,FILM:34.8 OHM,1%,0.125W	91637	MFF1816G34R80F
A9R51			DEC BYD ETTM. (10 OUM 19 O FOU	75010	CECTO_ 4100P
A9R51 A9R61 A9R62	323-0173-00 317-0510-00		RES.,FXD,FILM:619 OHM,1%,0.50W RES.,FXD,CMPSN:51 OHM,5%,0.125W	75042	CECTO-6190F BB5105

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	Tektronix	Serial/	Model No.		Mfr	
Component No.	Part No.	Eff	Dscont	Name & Description	Code	Mfr Part Number
A9R63	321-0095-00			RES., FXD, FILM: 95.3 OHM, 1%, 0.125W	91637	MFF1816G95R30F
A9R65	311-0635-00			RES., VAR, NONWIR: 1K OHM, 10%, 0.50W	73138	82-32-0
A9R67	321-0065-00			RES., FXD, FILM: 46.4 OHM, 1%, 0.125W	91637	MFF1816G46R40F
A9R83	307-0103-00			RES., FXD, CMPSN: 2.7 OHM, 5%, 0.25W	01121	CB27G5
A9RT52	307-0124-00			RES., THERMAL: 5K OHM, 10%	50157	1D1618
A9U20	155-0022-00			MICROCIRCUIT, DI:ML, CHANNEL SWITCH	80009	155-0022-00

	Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
	A11				0000	
				CKT BOARD ASSY:MAIN INTERFACE		
	A11C3	283-0203-00		CAP.,FXD,CER DI:0.47UF,20%,50V	72982	8131N075E474M
	A11C4	283-0203-00		CAP., FXD, CER DI:0.47UF, 20%, 50V	72982	8131N075E474M
	A11C7	283-0111-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	72982	8121-N088Z5U104M
	A11C14	281-0524-00	B010100 B010189	CAP., FXD, CER DI: 150PF, +/-30PF, 500V	04222	
	A11C14	281-0538-00	B010190	CAP., FXD, CER DI: 1PF, 20%, 500V	80009	
	A11C21	281-0524-00	B010100 B010189	CAP.,FXD,CER DI:150PF,+/-30PF,500V	04222	7001-1381
~	Al1C21	281-0536-00	B010190	CAP., FXD, CER DI: 1000PF, 10%, 500V	72982	301000 X 5P0102K
	A11C77	281-0547-00		CAP., FXD, CER DI: 2.7PF, 10%, 500V	04222	
	A11C86	283-0080-00		CAP., FXD, CER DI:0.022UF, +80-20%, 25V	56289	19C611
	A11C87	283-0080-00		CAP., FXD, CER DI:0.022UF, +80-20%, 25V		19C611
n.	A11C112	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	91418	SP103Z151-4R9
	A11C116	283-0111-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	72982	8121-N08825U104M
	A11C119	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	72982	8005D9AABZ5U104M
	A11C120	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	72982	
	A11C121	290-0747-00		CAP., FXD, ELCTLT: 100UF, +50-10%, 25V	56289	500D148
	A11C122	290-0747-00		CAP., FXD, ELCTLT: 100UF, +50-10%, 25V	56289	
	A11C123	290-0769-00		CAP., FXD, ELCTLT: 10UF, +50-10%, 100V	0000W	
				CRI., FRD, ELGIEI. 100F, + 50-10%, 100V	0000	100T10
	A11C124	290-0769-00		CAP.,FXD,ELCTLT:10UF,+50-10%,100V	W0000	100T10
	AllC125	290-0747-00		CAP., FXD, ELCTLT: 100UF, +50-10%, 25V	56289	500D148
	A11C126	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	72982	8005D9AABZ5U104M
	A11C127	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	72982	
	A11C128	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	72982	8005D9AABZ5U104M
•	A11C129	281-0783-00		CAP., FXD, CER DI:0.1UF, 20%, 100V	72982	8045-D-Z5U104M
	A11C130	281-0783-00		CAP.,FXD,CER DI:0.1UF,20%,100V	72982	8045-D-Z5U104M
	A11C131	281-0783-00		CAP., FXD, CER DI:0.1UF, 20%, 100V	72982	8045-D-Z5U104M
	A11C132	281-0783-00		CAP., FXD, CER DI:0.1UF, 20%, 100V	72982	8045-D-Z5U104M
· · · · · · · · ·	A11C133	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	72982	8005D9AABZ5U104M
	A11C134	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	72982	
	A11C143	283-0203-00		CAP., FXD, CER DI:0.47UF, 20%, 50V	72982	8005D9AABZ5U104M 8131N075E474M
~	A11C160	283-0203-00		CAP.,FXD,CER DI:0.47UF,20%,50V	72982	9121N075E/7/M
	AllCR19	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA		8131N075E474M
	AllCR49	152-0141-02		SEMICOND DEVICE: SILICON, SUV, ISUMA	01295	1N4152R
	AllCR63			SEMICOND DEVICE: SILICON, 30V, 150MA	01295	1N4152R
	AllCR77	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA	01295	
		152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA	01295	1N4152R
	A11CR79	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA	01295	1N4152R
	AllCR82	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA		1N4152R
	AllCR84	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA		1N4152R
	AllCR113	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA		1N4152R
	AllCR116	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA	01295	1N4152R
	AllCR117	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA	01295	1N4152R
	A11CR136	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
	A11Q17	151-0223-03		TRANSISTOR:NPN,SI,PRESTRESSED & TESTED	80009	151-0223-03
	A11Q19	151-0223-03		TRANSISTOR:NPN,SI,PRESTRESSED & TESTED	80009	151-0223-03
	A11Q27	151-0190-05		TRANSISTOR: SILICON, NPN	80009	151-0190-05
	A11Q36	151-0190-05		TRANSISTOR: SILICON, NPN	80009	151-0190-05
	A11Q61	151-0190-05		TRANSISTOR: SILICON, NPN	80009	151-0190-05
	A11Q64	151-0190-05		TRANSISTOR: SILICON, NPN	80009	151-0190-05
	A11Q139	151 - 0190-05		TRANSISTOR: SILLICON, NPN	80009	151-0190-05
	A11Q147	151-0190-05		TRANSISTOR: SILICON, NPN	80009	151-0190-05
	A11R2	315-0510-00		RES., FXD, CMPSN: 51 OHM, 5%, 0.25W		CB5105
	A11R3	307-0106-00		RES., FXD, CMPSN: 4.7 OHM, 5%, 0.25W		CB47G5
	A11R4	307-0106-00		RES., FXD, CMPSN: 4.7 OHM, 5%, 0.25W		CB47G5
	A11R7	315-0471-00		RES.,FXD,CMPSN:47/ OHM,5%,0.25W RES.,FXD,CMPSN:470 OHM,5%,0.25W		CB4705
	A11R8	321-0260-00		RES.,FXD,FILM:4.99K OHM,1%,0.125W		
	A11R9	321-0260-00		RES.,FXD,FILM:4.99K OHM,1%,0.125W		MFF1816G49900F
	A11R13	315-0562-00	B010100 B010189			MFF1816G49900F
			2010100 0010109	RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	600020

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Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number		
411012	315-0332-00	P010100	RES., FXD, CMPSN: 3.3K OHM, 5%, 0.25W	01121	CB3325		
A11R13 A11R14	315-0332-00	B010100 B010189	RES., FXD, CMPSN: 2.2K OHM, 5%, 0.25W		CB2225		
A11R14			RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W		CB1525		
A11R14 A11R15	315-0133-00		RES., FXD, CMPSN: 13K OHM, 5%, 0.25W		CB1335		. 19780.
A11R15	315-0912-00	B010100 B010109	RES., FXD, CMPSN: 9.1K OHM, 5%, 0.25W		CB9125		
AllR16	315-0241-00	5010190	RES., FXD, CMPSN: 240 OHM, 5%, 0.25W	01121	CB2415		
A11R17	321-0151-00		RES.,FXD,FILM:365 OHM,1%,0.125W		MFF1816G365R0F		••••**
A11R18	315-0162-00		RES., FXD, CMPSN: 1.6K OHM, 5%, 0.25W		CB1625		
A11R19	321-0151-00		RES., FXD, FILM: 365 OHM, 1%, 0.125W		MFF1816G365R0F BB4705		
A11R20	317-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.125W		CB1325		
A11R21	315-0132-00		RES.,FXD,CMPSN:1.3K OHM,5%,0.25W RES.,FXD,CMPSN:430 OHM,5%,0.25W		CB4315		
A11R21	315-0431-00	B010190	KES., FAD, CHPSN: 450 OHH, 5%, 0.25W	01121	004313		
A11R22	315-0103-00	B010100 B010189	RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035		
A11R22	315-0302-00		RES., FXD, CMPSN: 3K OHM, 5%, 0.25W	01121	CB3025		
A11R23	317-0101-00		RES., FXD, CMPSN: 100 OHM, 5%, 0.125W	01121	BB1015		and the second s
A11R26	315-0562-00		RES., FXD, CMPSN: 5.6K OHM, 5%, 0.25W		CB5625		
A11R27	315-0202-00		RES.,FXD,CMPSN:2K OHM,5%,0.25W		CB2025		
A11R28	315-0202-00		RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025		
				01101	00(005		
A11R29	315-0622-00		RES., FXD, CMPSN: 6.2K OHM, 5%, 0.25W		CB6225		
A11R34	315-0303-00		RES., FXD, CMPSN: 30K OHM, 5%, 0.25W		CB3035		
A11R36	315-0202-00		RES., FXD, CMPSN: 2K OHM, 5%, 0.25W		CB2025 CB4725		
A11R37	315-0472-00		RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W		MFF1816G953R0F		
A11R42	321-0191-00		RES.,FXD,FILM:953 OHM,1%,0.125W RES.,FXD,CMPSN:51 OHM,5%,0.25W		CB5105		******
A11R44	315-0510-00		RES., FKD, OHF SN. 91 OHF, 5%, 0.25%	01121	023203		
A11R46	315-0510-00		RES., FXD, CMPSN: 51 OHM, 5%, 0.25W	01121	CB5105		
A11R47	315-0510-00		RES., FXD, CMPSN:51 OHM, 5%, 0.25W	01121	CB5105		
A11R52	321-0260-00		RES., FXD, FILM: 4.99K OHM, 1%, 0.125W	91637		·****	1. N. M.
A11R53	321-0260-00		RES.,FXD,FILM:4.99K OHM,1%,0.125W		MFF1816G49900F		
A11R61	315-0303-00		RES.,FXD,CMPSN:30K OHM,5%,0.25W		CB3035		
A11R62	315-0302-00		RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025		
4110/0	215 0/72 00		RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735		-ercap2
A11R63	315-0473-00		RES.,FXD,CMPSN:47K OHM,5%,0.25W		CB4735		
AllR64	315-0473-00		RES., FXD, CMPSN: 7.5K OHM, 5%, 0.25W		CB7525		
A11R65 A11R66	315-0752-00 315-0153-00		RES., FXD, CMPSN: 15K OHM, 5%, 0.25W		CB1535		
A11R67	315-0153-00		RES., FXD, CMPSN: 15K OHM, 5%, 0.25W		CB1535		anne.
A11R68	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725		
A11R74	315-0510-00		RES.,FXD,CMPSN:51 OHM,5%,0.25W		CB5105		
A11R77	315-0202-00		RES., FXD, CMPSN: 2K OHM, 5%, 0.25W		CB2025		••••
A11R81	315-0473-00		RES., FXD, CMPSN:47K OHM, 5%, 0.25W		CB4735 MFF1816G30100F		
A11R83	321-0239-00		RES., FXD, FILM: 3.01K OHM, 1%, 0.125W		CB2025		
A11R89	315-0202-00		RES., FXD, CMPSN: 2K OHM, 5%, 0.25W RES., FXD, CMPSN: 2K OHM, 5%, 0.25W	01121	CB2025		
A11R90	315-0202-00		(LD., FAD, OHF 3N. 2K OHR, 3%, 0.23m	01121			anag:
A11R102	321-0191-00		RES., FXD, FILM: 953 OHM, 1%, 0.125W	91637	MFF1816G953R0F		
A11R104	315-0510-00		RES., FXD, CMPSN: 51 OHM, 5%, 0.25W		CB5105		
A11R104	315-0303-00		RES., FXD, CMPSN: 30K OHM, 5%, 0.25W	01121	CB3035		
A11R106	315-0510-00		RES., FXD, CMPSN:51 OHM, 5%, 0.25W	01121	CB5105		
A11R107	315-0510-00		RES., FXD, CMPSN:51 OHM, 5%, 0.25W	01121			
A11R108	315-0623-00		RES.,FXD,CMPSN:62K OHM,5%,0.25W	01121	CB6235		
				01101	CB2435		
A11R111	315-0243-00		RES., FXD, CMPSN: 24K OHM, 5%, 0.25W	01121 01121			
A11R112	315-0105-00		RES., FXD, CMPSN: 1M OHM, 5%, 0.25W	01121			· ***=***
A11R113	315-0152-00		RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W	01121			
A11R116	315-0104-00		RES.,FXD,CMPSN:100K OHM,5%,0.25W RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121			
A11R117 A11R135	315-0152-00 315-0623-00		RES.,FXD,CMPSN:115K OHM,5%,0.25W	01121			
UTIVID	JIJ-002J-00	,					~~~
A11R136	315-0472-00)	RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121			
A11R137	315-0102-00		RES., FXD, CMPSN: 1K OHM, 5%, 0.25W		CB1025		
A11R138	315-0202-00		RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025		
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A11R145 315-0562-00 RES., FXD, CMPSN: 5.6K OHM, 5%, 0.25W 01121 CB5625 A11R146 315-0911-00 RES., FXD, CMPSN: 910 OHM, 5%, 0.25W 01121 CB9115 A11R147 315-0911-00 RES., FXD, CMPSN: 910 OHM, 5%, 0.25W 01121 CB9115 A11R148 315-0752-00 RES., FXD, CMPSN: 7.5K OHM, 5%, 0.25W 01121 CB7525 A11R156 315-0561-00 RES., FXD, CMPSN: 7.5K OHM, 5%, 0.25W 01121 CB5615 A11R158 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R159 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R160 307-0108-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R161 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R162 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R162 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R163 321-0231-00 RES., FX	Component No.	Tektronix Part No.	Serial/I Eff	Model No. Dscont	Name & Description	Mfr Code	Mfr Part Number
AllR140 315-0622-00 RES., FXD, CMPSN: 6.2K OHM, 5%, 0.25W 01121 CB6225 AllR143 307-0108-00 RES., FXD, CMPSN: 6.8 OHM, 5%, 0.25W 80009 307-0108-0 AllR145 315-0562-00 RES., FXD, CMPSN: 5.6K OHM, 5%, 0.25W 01121 CB5625 AllR146 315-0911-00 RES., FXD, CMPSN: 910 0HM, 5%, 0.25W 01121 CB9115 AllR147 315-0911-00 RES., FXD, CMPSN: 910 0HM, 5%, 0.25W 01121 CB9115 AllR148 315-0752-00 RES., FXD, CMPSN: 910 0HM, 5%, 0.25W 01121 CB5615 AllR156 315-0561-00 RES., FXD, CMPSN: 560 0HM, 5%, 0.25W 01121 CB5615 AllR158 315-0561-00 RES., FXD, CMPSN: 560 0HM, 5%, 0.25W 01121 CB5615 AllR160 307-0108-00 RES., FXD, CMPSN: 560 0HM, 5%, 0.25W 01121 CB5615 AllR161 315-0561-00 RES., FXD, CMPSN: 560 0HM, 5%, 0.25W 01121 CB5615 AllR162 315-0561-00 RES., FXD, CMPSN: 560 0HM, 5%, 0.25W 01121 CB5615 AllR163 321-0231-00 RES., FXD, CMPSN: 1560 <	A11R139	315-0202-00			RES., FXD, CMPSN: 2K OHM, 5%, 0.25W	01121	CB2025
A11R145 315-0562-00 RES., FXD, CMPSN: 5. 6K OHM, 5%, 0. 25W 01121 CB5625 A11R146 315-0911-00 RES., FXD, CMPSN: 910 OHM, 5%, 0. 25W 01121 CB9115 A11R147 315-0911-00 RES., FXD, CMPSN: 910 OHM, 5%, 0. 25W 01121 CB9115 A11R148 315-0911-00 RES., FXD, CMPSN: 910 OHM, 5%, 0. 25W 01121 CB515 A11R148 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0. 25W 01121 CB5615 A11R158 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0. 25W 01121 CB5615 A11R160 307-0108-00 RES., FXD, CMPSN: 560 OHM, 5%, 0. 25W 01121 CB5615 A11R161 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0. 25W 01121 CB5615 A11R163 321-0231-00 RES., FXD, CMPSN: 560 OHM, 5%, 0. 25W 01121 CB5615 A11R163 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0. 25W 01121 CB5615 A11R163 321-0231-00 RES., FXD, CMPSN: 1560 OHM, 5%, 0. 25W 01121 CB1325 A11R164 315-0132-00 <t< td=""><td>A11R140</td><td>315-0622-00</td><td></td><td></td><td></td><td>01121</td><td>CB6225</td></t<>	A11R140	315-0622-00				01121	CB6225
A11R145 315-0562-00 RES., FXD, CMPSN: 5.6K OHM, 5%, 0.25W 01121 CB5625 A11R146 315-0911-00 RES., FXD, CMPSN: 910 OHM, 5%, 0.25W 01121 CB9115 A11R147 315-0911-00 RES., FXD, CMPSN: 910 OHM, 5%, 0.25W 01121 CB9115 A11R148 315-0752-00 RES., FXD, CMPSN: 7.5K OHM, 5%, 0.25W 01121 CB5615 A11R156 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R158 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R160 307-0108-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R161 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R163 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R163 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R163 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R164 321-0231-00 RES., FXD	AllR143	307-0108-00			RES., FXD, CMPSN: 6.8 OHM, 5%, 0.25W	80009	307-0108-00
A11R147 315-0911-00 RES., FXD, CMPSN: 910 OHN, 5%, 0.25W 01121 CB9115 A11R148 315-0752-00 RES., FXD, CMPSN: 7.5K OHN, 5%, 0.25W 01121 CB5615 A11R156 315-0561-00 RES., FXD, CMPSN: 560 OHN, 5%, 0.25W 01121 CB5615 A11R158 315-0561-00 RES., FXD, CMPSN: 560 OHN, 5%, 0.25W 01121 CB5615 A11R159 315-0561-00 RES., FXD, CMPSN: 560 OHN, 5%, 0.25W 01121 CB5615 A11R160 307-0108-00 RES., FXD, CMPSN: 560 OHN, 5%, 0.25W 01121 CB5615 A11R161 315-0561-00 RES., FXD, CMPSN: 560 OHN, 5%, 0.25W 01121 CB5615 A11R161 315-0561-00 RES., FXD, CMPSN: 560 OHN, 5%, 0.25W 01121 CB5615 A11R163 321-0231-00 RES., FXD, CMPSN: 560 OHN, 5%, 0.25W 01121 CB5615 A11R163 321-0231-00 RES., FXD, CMPSN: 1.3K OHN, 1%, 0.125W 91637 MFF1816G24 A11R164 321-0231-00 RES., FXD, CMPSN: 1.3K OHN, 5%, 0.25W 01121 CB1325 A11R165 315-0132-00 RES., FXD, CMPSN: 1.3K OHN, 5%, 0.25W 01121 CB1325 A11R166 315-0132-00 RES., FXD, CMPSN: 1.3K OHN, 5%, 0.25W 01121 CB1325 A11R167 315-0153-00 RES., FXD, CMPSN:	A11R145	315-0562-00			RES., FXD, CMPSN: 5.6K OHM, 5%, 0.25W	01121	
AllR148 315-0752-00 RES., FXD, CMPSN: 7.5K OHM, 5%, 0.25W Oll21 CB5615 AllR156 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W Oll21 CB5615 AllR158 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W Oll21 CB5615 AllR159 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W Oll21 CB5615 AllR160 307-0108-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W Oll21 CB5615 AllR161 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W Oll21 CB5615 AllR161 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W Oll21 CB5615 AllR162 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W Oll21 CB5615 AllR163 321-0231-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W Oll21 CB5615 AllR164 321-0231-00 RES., FXD, CMPSN: 1.3K OHM, 1%, 0.125W 91637 MFF1816G24 AllR165 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W Oll21 CB1325 AllR166 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W Oll21 CB1325 AllR167 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W Oll21 CB1325 AllR167 315-0153-00 RES., FXD, CMPSN:	A11R146	315-0911-00			RES., FXD, CMPSN: 910 OHM, 5%, 0.25W	01121	CB9115
A11R156 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R158 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R159 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R160 307-0108-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R161 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R161 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R162 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R163 321-0231-00 RES., FXD, FILM: 2.49K OHM, 1%, 0.125W 91637 MFF1816G24 A11R164 321-0231-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1325 A11R165 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1325 A11R167 315-0153-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1325 A11R178 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R179 315-0153-00 <td>A11R147</td> <td>315-0911-00</td> <td></td> <td></td> <td>RES.,FXD,CMPSN:910 OHM,5%,0.25W</td> <td>01121</td> <td>CB9115</td>	A11R147	315-0911-00			RES.,FXD,CMPSN:910 OHM,5%,0.25W	01121	CB9115
AllR156 315-0561-00 RES.,FXD,CMPSN:560 OHM,5%,0.25W 01121 CB5615 AllR158 315-0561-00 RES.,FXD,CMPSN:560 OHM,5%,0.25W 01121 CB5615 AllR159 315-0561-00 RES.,FXD,CMPSN:560 OHM,5%,0.25W 01121 CB5615 AllR160 307-0108-00 RES.,FXD,CMPSN:560 OHM,5%,0.25W 01121 CB5615 AllR161 315-0561-00 RES.,FXD,CMPSN:560 OHM,5%,0.25W 01121 CB5615 AllR161 315-0561-00 RES.,FXD,CMPSN:560 OHM,5%,0.25W 01121 CB5615 AllR163 321-0231-00 RES.,FXD,CMPSN:560 OHM,5%,0.25W 01121 CB5615 AllR164 321-0231-00 RES.,FXD,FILM:2.49K OHM,1%,0.125W 91637 MFF1816624 AllR165 315-0132-00 RES.,FXD,CMPSN:1.3K OHM,5%,0.25W 01121 CB1325 AllR166 315-0132-00 RES.,FXD,CMPSN:1.3K OHM,5%,0.25W 01121 CB1325 AllR167 315-0132-00 RES.,FXD,CMPSN:1.3K OHM,5%,0.25W 01121 CB1325 AllR167 315-0153-00 RES.,FXD,CMPSN:1.5K OHM,5%,0.25W 01121 CB1535 AllR178 315-0153-00 RES.,FXD,CMPSN:15K OHM,5%,0.25W	A11R148	315-0752-00			RES.,FXD,CMPSN:7.5K OHM,5%,0.25W	01121	CB7525
A11R159 315-0561-00 RES., FXD, CMPSN:560 OHM, 5%, 0.25W 01121 CB5615 A11R160 307-0108-00 RES., FXD, CMPSN:560 OHM, 5%, 0.25W 80009 307-0108-0 A11R161 315-0561-00 RES., FXD, CMPSN:560 OHM, 5%, 0.25W 01121 CB5615 A11R162 315-0561-00 RES., FXD, CMPSN:560 OHM, 5%, 0.25W 01121 CB5615 A11R163 321-0231-00 RES., FXD, CMPSN:560 OHM, 5%, 0.25W 01121 CB5615 A11R163 321-0231-00 RES., FXD, CMPSN:560 OHM, 1%, 0.125W 91637 MFF1816G24 A11R164 321-0231-00 RES., FXD, CMPSN:1.3K OHM, 1%, 0.125W 91637 MFF1816G24 A11R165 315-0132-00 RES., FXD, CMPSN:1.3K OHM, 5%, 0.25W 01121 CB1325 A11R166 315-0132-00 RES., FXD, CMPSN:1.3K OHM, 5%, 0.25W 01121 CB1325 A11R176 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R178 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R179 315-0153-00	AllR156	315-0561-00				01121	CB5615
A11R160 307-0108-00 RES., FXD, CMPSN:6.8 OHM, 5%, 0.25W 80009 307-0108-0 A11R161 315-0561-00 RES., FXD, CMPSN:560 OHM, 5%, 0.25W 01121 CB5615 A11R162 315-0561-00 RES., FXD, CMPSN:560 OHM, 5%, 0.25W 01121 CB5615 A11R163 321-0231-00 RES., FXD, FILM:2.49K OHM, 1%, 0.125W 91637 MFF1816G24 A11R164 321-0231-00 RES., FXD, FILM:2.49K OHM, 1%, 0.125W 91637 MFF1816G24 A11R165 315-0132-00 RES., FXD, CMPSN:1.3K OHM, 5%, 0.25W 01121 CB1325 A11R166 315-0132-00 RES., FXD, CMPSN:1.3K OHM, 5%, 0.25W 01121 CB1325 A11R167 315-0132-00 RES., FXD, CMPSN:1.3K OHM, 5%, 0.25W 01121 CB1325 A11R167 315-0132-00 RES., FXD, CMPSN:1.3K OHM, 5%, 0.25W 01121 CB1325 A11R176 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R178 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R179 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R181 315-0153-00	A11R158	315-0561-00			RES., FXD, CMPSN: 560 OHM, 5%, 0.25W	01121	CB5615
A11R161 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R162 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R163 321-0231-00 RES., FXD, FILM: 2.49K OHM, 1%, 0.125W 91637 MFF1816G24 A11R164 321-0231-00 RES., FXD, FILM: 2.49K OHM, 1%, 0.125W 91637 MFF1816G24 A11R165 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1325 A11R166 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1325 A11R166 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1325 A11R167 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1325 A11R167 315-0153-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1535 A11R178 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R179 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R179 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R181 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R181 315-0153-00 RES., FXD,	A11R159	315-0561-00			RES., FXD, CMPSN: 560 OHM, 5%, 0.25W	01121	CB5615
A11R162 315-0561-00 RES., FXD, CMPSN: 560 OHM, 5%, 0.25W 01121 CB5615 A11R163 321-0231-00 RES., FXD, FILM: 2.49K OHM, 1%, 0.125W 91637 MFF1816G24 A11R164 321-0231-00 RES., FXD, FILM: 2.49K OHM, 1%, 0.125W 91637 MFF1816G24 A11R165 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1325 A11R166 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1325 A11R166 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1325 A11R167 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1325 A11R167 315-0153-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1535 A11R178 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R179 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R179 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R181 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R181 315-015	A11R160	307-0108-00			RES., FXD, CMPSN: 6.8 OHM, 5%, 0.25W	80009	307-0108-00
A11R163 321-0231-00 RES., FXD, FILM: 2.49K OHM, 12, 0.125W 91637 MFF1816G24 A11R164 321-0231-00 RES., FXD, FILM: 2.49K OHM, 12, 0.125W 91637 MFF1816G24 A11R165 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1325 A11R166 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1325 A11R167 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1325 A11R167 315-0153-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1335 A11R176 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R178 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R179 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R181 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R182 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R182 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535	A11R161	315-0561-00			RES.,FXD,CMPSN:560 OHM,5%,0.25W	01121	CB5615
A11R164 321-0231-00 RES., FXD, FILM: 2.49K OHM, 1%, 0.125W 91637 MFF1816G24 A11R165 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1325 A11R166 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1325 A11R166 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1325 A11R167 315-0132-00 RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W 01121 CB1325 A11R176 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R178 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R179 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R181 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R181 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R182 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535	A11R162	315-0561-00			RES.,FXD,CMPSN:560 OHM,5%,0.25W	01121	CB5615
A11R165 315-0132-00 RES., FXD, CMPSN:1.3K OHM, 5%, 0.25W 01121 CB1325 A11R166 315-0132-00 RES., FXD, CMPSN:1.3K OHM, 5%, 0.25W 01121 CB1325 A11R167 315-0132-00 RES., FXD, CMPSN:1.3K OHM, 5%, 0.25W 01121 CB1325 A11R176 315-0153-00 RES., FXD, CMPSN:1.3K OHM, 5%, 0.25W 01121 CB1535 A11R178 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R179 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R179 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R181 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R182 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R182 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535	A11R163	321-0231-00			RES., FXD, FILM: 2.49K OHM, 1%, 0.125W	91637	MFF1816G24900F
A11R166 315-0132-00 RES., FXD, CMPSN:1.3K OHM, 5%, 0.25W 01121 CB1325 A11R167 315-0132-00 RES., FXD, CMPSN:1.3K OHM, 5%, 0.25W 01121 CB1325 A11R167 315-0153-00 RES., FXD, CMPSN:1.3K OHM, 5%, 0.25W 01121 CB1325 A11R178 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R179 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R181 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R181 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R182 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R182 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535	AllR164	321-0231-00			RES., FXD, FILM: 2.49K OHM, 1%, 0.125W	91637	MFF1816G24900F
A11R167 315-0132-00 RES.,FXD,CMPSN:1.3K OHM,5%,0.25W 01121 CB1325 A11R176 315-0153-00 RES.,FXD,CMPSN:15K OHM,5%,0.25W 01121 CB1535 A11R178 315-0153-00 RES.,FXD,CMPSN:15K OHM,5%,0.25W 01121 CB1535 A11R179 315-0153-00 RES.,FXD,CMPSN:15K OHM,5%,0.25W 01121 CB1535 A11R181 315-0153-00 RES.,FXD,CMPSN:15K OHM,5%,0.25W 01121 CB1535 A11R181 315-0153-00 RES.,FXD,CMPSN:15K OHM,5%,0.25W 01121 CB1535 A11R182 315-0153-00 RES.,FXD,CMPSN:15K OHM,5%,0.25W 01121 CB1535	A11R165	315-0132-00			RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W	01121	CB1325
A11R176 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R178 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R179 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R181 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R182 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535 A11R182 315-0153-00 RES., FXD, CMPSN:15K OHM, 5%, 0.25W 01121 CB1535	A11R166	315-0132-00			RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W	01121	CB1325
A11R178 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W O1121 CB1535 A11R179 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W O1121 CB1535 A11R181 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W O1121 CB1535 A11R181 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W O1121 CB1535 A11R182 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W O1121 CB1535	AllR167	315-0132-00			RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W	01121	CB1325
A11R179 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W O1121 CB1535 A11R181 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W O1121 CB1535 A11R182 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W O1121 CB1535 A11R182 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W O1121 CB1535	A11R176	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
A11R181 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535 A11R182 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535	A11R178	315-0153-00			RES., FXD, CMPSN: 15K OHM, 5%, 0.25W	01121	CB1535
A11R182 315-0153-00 RES., FXD, CMPSN: 15K OHM, 5%, 0.25W 01121 CB1535	A11R179	315-0153-00			RES., FXD, CMPSN: 15K OHM, 5%, 0.25W	01121	CB1535
	AllR181	315-0153-00			RES., FXD, CMPSN: 15K OHM, 5%, 0.25W	01121	CB1535
A11U32 156-0381-02 MICROCIRCUIT, DI:QUAD 2-INP EXCL OR GATE 01295 SN74LS86	A11R182	315-0153-00			RES., FXD, CMPSN: 15K OHM, 5%, 0.25W	01121	CB1535
	A11U32	156-0381-02			MICROCIRCUIT, DI:QUAD 2-INP EXCL OR GATE	01295	SN74LS86
A11U33 156-0798-02 MICROCIRCUIT, DI: DUAL 14 TO 1 LINE SEL/MUX 01295 SN74LS153	A11U33	156-0798-02			MICROCIRCUIT, DI: DUAL 14 TO 1 LINE SEL/MUX	01295	SN74LS153
A11060 156-0383-02 MICROCIRCUIT, DI:QUAD 2-INP NOR GATE 01295 SN74LS02	A11U60	156-0383-02			MICROCIRCUIT, DI:QUAD 2-INP NOR GATE	01295	SN74LS02
A11065 156-0259-00 MICROCIRCUIT, LI:5 TRANSISTOR ARRAY 80009 156-0259-0	A11U65	156-0259-00			MICROCIRCUIT, LI:5 TRANSISTOR ARRAY	80009	156-0259-00
Allul43 156-0798-02 MICROCIRCUIT, DI:DUAL 14 TO 1 LINE SEL/MUX 01295 SN74LS153	A11U143	156-0798-02			MICROCIRCUIT, DI: DUAL 14 TO 1 LINE SEL/MUX	01295	SN74LS153
A11U161 156-0852-02 MICROCIRCUIT, DI:HEX DRVR W/3 STATE INP 80009 156-0852-0	A11U161	156-0852-02			MICROCIRCUIT, DI: HEX DRVR W/3 STATE INP	80009	156-0852-02

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number	, starte
A12	and the set of the state of the state of the set of the	анан такиралар канарык алар такиралар канар кан	CKT BOARD ASSY: CONTROL RECT	1899 - Millin Ballyn, Jan yn ywrain yn y R		
A12C52	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	91418	SP103Z151-4R9	
A12C54	290-0573-00		CAP., FXD, ELCTLT: 2.7UF, 20%, 50V			
A12C55	283-0028-00				196D275X0050JA1	
A12C64	290-0263-00		CAP., FXD, CER DI:0.0022UF, 20%, 50V		19C606	
A12C66			CAP., FXD, ELCTLT: 2.7UF, 15V	56289	162D275X9015CD2	
A12000	283-0003-00		CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9	
A12C67	290-0523-00		CAP., FXD, ELCTLT: 2.2UF, 20%, 20V	56289	196D225X0020HA1	
A12C70	290-0534-00		CAP., FXD, ELCTLT: 1UF, 20%, 35V	56289	196D105X0035HA1	
A12C71	290-0534-00		CAP., FXD, ELCTLT: 1UF, 20%, 35V	56289	196D105X0035HA1	
A12C74	283-0594-00		CAP., FXD, MICA D:0.001UF, 1%, 100V		D151F102F0	
A12077	283-0060-00		CAP., FXD, CER DI: 100PF, 5%, 200V		855-53502J101J	
A12C78	283-0060-00		CAP., FXD, CER DI: 100PF, 5%, 200V		855-53502J101J	
A12C80	183 0000 00					
	283-0080-00		CAP., FXD, CER DI:0.022UF, +80-20%, 25V		19C611	
A12C86	290-0580-00		CAP.,FXD,ELCTLT:0.27UF,20%,50V	56289		
A12C90	290-0778-00		CAP., FXD, ELCTLT: 1UF, +50-10%, 50V	54473	ECE-A50N1	
A12C92	285-1123-00		CAP.,FXD,PLSTC:1UF,20%,200V	50558	ME2-2190	
A12C94	285-0543-00	B010100 B010150	CAP.,FXD,PLSTC:0.0022UF,20%,400V	56289	410P22204	
A12C94	285-0695-00	B010151	CAP.,FXD,PLSTC:0.01UF,10%,200V	56289	292P10392	
A12C121	285-0892-00		CAP., FXD, PLSTC: 0, 22UF, 10%, 200V	56289	LP66A1C224K002	
A12C124	290-0758-00		CAP., FXD, ELCTLT: 2.2UF, +50-10%, 160V	56289		
A12C125	290-0758-00		CAP., FXD, ELCTLT: 2.20F, +50-10%, 160V		502D227	
A12C132	290-0768-00		CAD EXD ELOUID 12.20F, +30-10%, 100V	56289		
A12C133			CAP., FXD, ELCTLT: 10UF, +50-10%, 100V	54473		
	290-0768-00		CAP., FXD, ELCTLT: 10UF, +50-10%, 100V		ECE-A100V10L	
A12C134	290-0768-00		CAP.,FXD,ELCTLT:10UF,+50-10%,100V	54473	ECE-A100V10L	
A12C135	290-0768-00		CAP., FXD, ELCTLT: 10UF, +50-10%, 100V	54473	ECE-A100V10L	
A12C142	290-0772-00		CAP., FXD, ELCTLT: 330UF, +50-10%, 25V	0000L	ECE-B25Z330	
A12C143	290-0770-00		CAP., FXD, ELCTLT: 100UF, +50-10%, 25V	56289	502D230	
A12C144	290-0772-00		CAP., FXD, ELCTLT: 330UF, +50-10%, 25V	0000L		an eveningen
A12C145	290-0770-00		CAP., FXD, ELCTLT: 100UF, +50-10%, 25V	56289		
A12C152	290-0771-00		CAP., FXD, ELCTLT: 220UF, +50-10%, 10VDC	54473		
A12C153	290-0771-00		CAP.,FXD,ELCTLT:220UF,+50-10%,10VDC	51170		
A12C154	290-0754-00		CAP., FAD, ELCILI: 2200F, +50-10%, 10VDC		ECE-A10V220L	
A12C155			CAP., FXD, ELCTLT: 2200UF, +75%-10%, 10VDC		432D222010AA2	
A12C155	290-0773-00		CAP., FXD, ELCTLT: 1000UF, +50-10%, 10V		ECE-B10Z1000	
	290-0771-00		CAP., FXD, ELCTLT: 220UF, +50-10%, 10VDC	54473	ECE-A10V220L	
A12C172	290-0746-00		CAP.,FXD,ELCTLT:47UF,+50-10%,16V	55680	16U-47V-T	
A12C179	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	56289	273C5	
A12C183	283-0111-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	72982	8121-N088Z5U104M	
A12CR52	152-0333-00		SEMICOND DEVICE: SILICON, 55V, 200MA	07263		
A12CR59	152-0333-00		SEMICOND DEVICE: SILICON, 55V, 200MA		FDH-6012	
Al2CR65	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA		1N4152R	
A12CR66	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA		1N4152R	
A12CR73	152-0333-00		SEMICOND DEVICE:SILICON,55V,200MA		FDH-6012	
A12CR74	152-0333-00		CENTCOND DEVICE. STL LOON FEW COONS	070/0	NNN (010	
A12CR75			SEMICOND DEVICE: SILICON, 55V, 200MA	07263		
	152-0333-00		SEMICOND DEVICE:SILICON, 55V, 200MA		FDH-6012	
A12CR76	152-0333-00		SEMICOND DEVICE:SILICON, 55V, 200MA	07263	FDH-6012	
A12CR81	152-0333-00		SEMICOND DEVICE:SILICON, 55V, 200MA	07263	FDH-6012	
Al2CR82	152-0333-00		SEMICOND DEVICE:SILICON, 55V, 200MA	07263	FDH-6012	
A12CR83	152-0333-00		SEMICOND DEVICE:SILICON, 55V, 200MA	07263	FDH-6012	
A12CR84	152-0333-00		SEMICOND DEVICE:SILICON, 55V, 200MA	07263	FDH-6012	
A12CR90	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R	
A12CR120	152-0242-00		SEMICOND DEVICE:SILICON, 30V, 150MA			
A12CR121	152-0242-00			07263		
A12CR122	152-0242-00		SEMICOND DEVICE: SILICON, 225V, 200MA	07263		
A12CR123			SEMICOND DEVICE:SILICON,225V,200MA		FDH5004	
A120R123	152-0242-00		SEMICOND DEVICE:SILICON, 225V, 200MA	07263	FDH5004	
A12CR124	152-0242-00		SEMICOND DEVICE:SILICON, 225V, 200MA	07263	FDH5004	
A12CR125	152-0242-00		SEMICOND DEVICE: SILICON, 225V, 200MA	07263	FDH5004	
A12CR127	152-0242-00		SEMICOND DEVICE:SILICON, 225V, 200MA		FDH5004	1. January 1. Sala

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(Melona)	Component No.	Tektronix Part No.	Serial/Mo Eff	odel No. Dscont	Name & Description	Mfr Code	Mfr Part Number
	A12CR130	152-0586-00			SEMICOND DEVICE: SILICON, 600V, 500MA	14936	RGP10J
	A12CR131	152-0586-00			SEMICOND DEVICE: SILICON, 600V, 500MA	14936	RGP10J
	A12CR132	152-0586-00			SEMICOND DEVICE: SILICON, 600V, 500MA	14936	RGP10J
	A12CR133	152-0586-00			SEMICOND DEVICE: SILICON, 600V, 500MA	14936	RGP10J
	A12CR140	152-0397-00			SEMICOND DEVICE: SILICON, 50V, 12A	80009	152-0397-00
	A12CR141	152-0397-00			SEMICOND DEVICE:SILICON, 50V, 12A	80009	152-0397-00
	A12CR142	152-0397-00			SEMICOND DEVICE:SILICON, 50V, 12A	80009	152-0397-00
v Nort and	A12CR143	152-0397-00			SEMICOND DEVICE: SILICON, 50V, 12A	80009	152-0397-00
	A12CR150	152-0586-00			SEMICOND DEVICE: SILICON, 600V, 500MA	14936	RGP10J
	A12CR151	152-0692-00			SEMICOND DEVICE: DUAL RECT, SI, 30A, 20V	83003	SKS017
	A12CR153	152-0586-00			SEMICOND DEVICE: SILICON, 600V, 500MA	14936	RGP10J
NAMES IN	A12CR161	152-0008-00			SEMICOND DEVICE:GERMANIUM,75V,60MA	14433	G1409
	A12CR171	152-0141-02			SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
	A12CR183	152-0141-02			SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
	A12L132	108-0473-00			COIL, RF: 150UH	80009	108-0473-00
10.000 To	A12L134	108-0473-00			COIL, RF: 150UH	80009	108-0473-00
	A12L142	108-0680-00			COIL, RF: 27UH	80009	108-0680-00
	A12L144	108-0680-00			COIL, RF: 27UH	80009	108-0680-00
1,000 0 10	A12L152	108-0473-00			COIL, RF:150UH	80009	108-0473-00
	A12L154	108-0556-00			COIL, RF: 12UH	80009	108-0556-00
	A12L156	108-0337-00			COIL, RF: 25UH	80009	108-0337-00
	A12Q52	151-0302-00			TRANSISTOR: SILICON, NPN	07263	5038487
	A12Q54	151-0273-00			TRANSISTOR: SILICON, NPN	80009	151-0273-00
, - N. 1999).	A12Q162	151-0190-05			TRANSISTOR: SILICON, NPN	80009	151-0190-05
	A120171	151-0190-05			TRANGISTOR OT TOOL NEW		
	A12Q173	151-0188-00			TRANSISTOR: SILICON, NPN	80009	151-0190-05
	A12Q175	151-0188-00 151-0188-00			TRANSISTOR: SILICON, PNP	04713	SPS6868K
~	······································	151-0100-00			TRANSISTOR . SILLON, PNP	06.712	ene4040v
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Component No.	Tektronix Part No.	Serial/M Eff	odel No. Dscont	Name & Description	Mfr Code	Mfr Part Number
			000011			
A12R161	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
A12R162	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A12R170	315-0100-00	XB010151		RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
A12R171	315-0274-00			RES.,FXD,CMPSN:270K OHM,5%,0.25W	01121	CB2745
A12R172	315-0474-00			RES., FXD, CMPSN: 470K OHM, 5%, 0.25W	01121	CB4745
A12R173	315-0272-00			RES., FXD, CMPSN: 2.7K OHM, 5%, 0.25W	01121	CB2725
A12R174	315-0182-00			RES.,FXD,CMPSN:1.8K OHM,5%,0.25W	01121	CB1825
A12R176	315-0203-00			RES., FXD, CMPSN: 20K OHM, 5%, 0.25W	01121	СВ2035
A12R177	315-0203-00			RES., FXD, CMPSN: 20K OHM, 5%, 0.25W	01121	CB2035
A12R179	315-0472-00			RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W	01121	CB4725
A12R181	315-0334-00			RES., FXD, CMPSN: 330K OHM, 5%, 0.25W	01121	CB3345
A12R182	315-0754-00			RES., FXD, CMPSN: 750K OHM, 5%, 0.25W	01121	CB7545
A12TP126	214-0579-00			TERM, TEST POINT: BRS CD PL	80009	214-0579-00
A12U75	155-0067-02			MICROCIRCUIT, DI:ML, POWER SUPPLY REGULATOR	80009	155-0067-02
A12U179	156-0481-02			MICROCIRCUIT, DI:TRIPLE 3 INP & GATE	27014	DM74LS11NA+
A12VR52	152-0590-00			SEMICOND DEVICE:ZENER, 18V, 5% AT 7MA	80009	152-0590-00
A12VR72	152-0243-00			SEMICOND DEVICE:ZENER, 10V, 5% AT 711A SEMICOND DEVICE:ZENER, 0.4W, 15V, 5%	14552	TD3810983
A12VR72	152-0212-00			SEMICOND DEVICE:ZENER,0.4W,19V,5%	04713	SZ50646RL
AIZVKOO	152-0212-00			SEMICOND DEVICE: ZENER, U. JW, 9V, J%	04/15	0200040AL

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		Tektronix	Serial/Model No.		Mfr	
1.000000	Component No.	Part No.	Eff Dscont	Name & Description	Code	Mfr Part Number
	A13	NOT BOT & U. O. K. STA		CKT BOARD ASSY:TRIGGER SELECT		
	A13C509	283-0176-00		CAP., FXD, CER D1:0.0022UF, 20%, 50V	72982	8121B058X7R0222M
	A13C513	283-0176-00		CAP., FXD, CER D1:0.0022UF, 20%, 50V	72982	8121B058X7R0222M
	A13C566	283-0191-00		CAP., FXD, CER DI:0.022UF, 20%, 50V	72982	8121N075Z5U0223M
	A13C567	283-0176-00		CAP., FXD, CER D1:0.0022UF, 20%, 50V	72982	8121B058X7R0222M
	A13C569	283-0176-00		CAP.,FXD,CER D1:0.0022UF,20%,50V	72982	8121B058X7R0222M
	A13C573	283-0176-00			70000	010100500700000
10-10-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	A13C588	283-0114-00		CAP.,FXD,CER D1:0.0022UF,20%,50V CAP.,FXD,CER D1:0.0015UF,5%,200V		8121B058X7R0222M 805-509B152J
	A13C593	283-0157-00		CAP.,FXD,CER DI:0000150F,5%,200V		8111B064C0H0709J
	A13C596	281-0611-00		CAP., FXD, CER DI:2.7PF, +/-0.25PF, 200V	04222	
				(NOMINAL VALUE, SELECTED)	04222	7040 003 2K/C
	A13C598	283-0114-00		CAP., FXD, CER DI:0.0015UF, 5%, 200V	72982	805-509B152J
	A13C609	283-0176-00		CAP.,FXD,CER D1:0.0022UF,20%,50V	72982	8121B058X7R0222M
	A13C613	283-0176-00		CAP., FXD, CER D1:0.0022UF, 20%, 50V		8121B058X7R0222M
	A13C648	283-0051-00		CAP., FXD, CER DI:0.0033UF, 5%, 100V		8131N145C0G0332J
	A13C669	283-0176-00		CAP., FXD, CER D1:0.0022UF, 20%, 50V		8121B058X7R0222M
	A13C671 A13C673	283-0176-00		CAP., FXD, CER D1:0.0022UF, 20%, 50V		8121B058X7R0222M
	A130073	283-0176-00		CAP., FXD, CER D1:0.0022UF, 20%, 50V	72982	8121B058X7R0222M
	A13C688	283-0114-00		CAP., FXD, CER DI:0.0015UF, 5%, 200V	77987	805-509B152J
	A13C693	283-0157-00		CAP., FXD, CER DI: 7PF, 5%, 500V		8111B064C0H0709J
	A13C696	281-0618-00		CAP., FXD, CER DI:4.7PF, +/-0.5PF, 200V		374001СОН0479D
				(NOMINAL VALUE, SELECTED)		
	A13C698	283-0114-00		CAP., FXD, CER DI:0.0015UF, 5%, 200V	72982	805-509B152J
an Printer	A13CR521	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
	A 1 2 OD 5 2 2	150 01/1 00				
	A13CR522 A13CR526	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA		1N4152R
	A13CR548	152-0141-02 152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA		1N4152R
Analysis and a second second	A13CR549	152-0141-02		SEMICOND DEVICE:SILICON,30V,150MA SEMICOND DEVICE:SILICON,30V,150MA		1N4152R 1N4152R
	A13CR621	152-0141-02		SEMICOND DEVICE:SILICON, SOV, ISOMA		1N4152R
	A13CR622	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA		1N4152R
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anj 5 mil. *	A13CR626	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
	A13LR531	108-0729-00		COIL, RF: 195NH	80009	108-0729-00
	A13LR534	108-0729-00		COIL, RF: 195NH	80009	108-0729-00
	A13LR536	108-0729-00		COIL, RF: 195NH	80009	108-0729-00
(743.64*)	A13LR539	108-0729-00		COIL, RF: 195NH	80009	108-0729-00
	A13LR631	108-0729-00		COIL, RF: 195NH	80009	108-0729-00
	A13LR634	108-0729-00		COIL, RF: 195NH	80009	108-0729-00
	A13LR636	108-0729-00		COIL, RF: 195NH	80009	108-0729-00
	A13LR639	108-0729-00		COIL, RF: 195NH	80009	108-0729-00
	A13Q524	151-0341-00		TRANSISTOR: SILICON, NPN	07263	
	A13Q548	151-0434-00		TRANSISTOR: SILICON, PNP	04713	SS7144
	A13Q558	151-0434-00		TRANSISTOR:SILICON, PNP	04713	SS7144
and the second sec	A13Q588	151-0004 00		PDANCIOTOD, CILIZON DNY	00000	151 0207 00
	A13Q598	151-0294-00		TRANSISTOR: SILICON, PNP	80009	151-0294-00
	A13Q624	151-0294-00 151-0341-00		TRANSISTOR: SILICON, PNP	80009	151-0294-00
	A13Q688	151-0294-00		TRANSISTOR:SILICON,NPN TRANSISTOR:SILICON,PNP	07263 80009	S040065 151-0294-00
	A13Q698	151-0294-00		TRANSISTOR: SILICON, PNP	80009	151-0294-00
	A13R502	321-0022-00		RES., FXD, FILM: 16.5 OHM, 1%, 0.125W	91637	MFF1816G16R50F
	A13R503	321-0022-00		RES.,FXD,FILM:16.5 OHM,1%,0.125W	91637	MFF1816G16R50F
******	A13R505	321-0070-00		RES.,FXD,FILM:52.3 OHM,1%,0.125W	16299	NA55D52R3F
	A13R506	321-0138-00		RES.,FXD,FILM:267 OHM,1%,0.125W	91637	MFF1816G267R0F
	A13R507	321-0064-00		RES., FXD, FILM: 45.3 OHM, 1%, 0.125W	91637	MFF1816G45R30F
	A13R509 A13R511	323-0138-00		RES., FXD, FILM: 267 OHM, 1%, 0.50W	75042	CECTO-2670F
	413KJ11	317-0103-00		RES., FXD, CMPSN: 10K OHM, 5%, 0.125W	01121	BB1035
	A13R512	321-0022-00		RES.,FXD,FILM:16.5 OHM,1%,0.125W	91637	MFF1816G16R50F
	A13R513	321-0022-00		RES., FXD, FILM: 16.5 OHM, 1%, 0.125W	91637	MFF1816G16R50F
1.1. marks	A13R515	321-0070-00		RES., FXD, FILM: 52.3 OHM, 1%, 0.125W	16299	NA55D52R3F

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number	vir
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A13R516	321-0138-00		RES., FXD, FILM: 267 OHM, 1%, 0.125W		MFF1816G267R0F	
A13R517	321-0064-00		RES., FXD, FILM: 45.3 OHM, 1%, 0.125W		MFF1816G45R30F	
A13R521	315-0511-00		RES.,FXD,CMPSN:510 OHM,5%,0.25W		CB5115	-0.0
A13R522	315-0272-00		RES., FXD, CMPSN: 2.7K OHM, 5%, 0.25W		CB2725	
A13R523	315-0273-00		RES., FXD, CMPSN: 27K OHM, 5%, 0.25W		CB2735	
A13R524	315-0512-00		RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125	
A13R526	321-0241-00		RES.,FXD,FILM:3.16K OHM,1%,0.125W	91637		- 0
A13R527	315-0912-00		RES.,FXD,CMPSN:9.1K OHM,5%,0.25W	01121		
A13R532	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725	
A13R533	321-0296-00		RES.,FXD,FILM:11.8K OHM,1%,0.125W		MFF1816G11801F	
A13R537	321-0296-00		RES.,FXD,FILM:11.8K OHM,1%,0.125W	91637	MFF1816G11801F	
A13R538	321-0296-00		RES.,FXD,FILM:11.8K OHM,1%,0.125W	91637	MFF1816G11801F	- 1949 -
A13R541	321-0144-00		RES.,FXD,F1LM:309 OHM,1%,0.125W	91637	MFF1816G309R0F	
A13R542	321-0135-00		RES.,FXD,FILM:249 OHM,1%,0.125W	91637	MFF1816G249ROF	
A13R543	317-0820-00		RES.,FXD,CMPSN:82 OHM,5%,0.125W	01121	BB8205	
A13R544	317-0820-00		RES.,FXD,CMPSN:82 OHM,5%,0.125W	01121	BB8205	
A13R545	321-0065-00		RES.,FXD,F1LM:46.4 OHM,1%,0.125W	91637	MFF1816G46R40F	
A13R546	323-0119-00		RES.,FXD,FILM:169 OHM,1%,0.50W	75042	CECT0-1690F	
A13R547	311-1007-00		RES.,VAR,NONWIR:20 OHM,20%,0.50W	73138	82-38-1	
A13R548	321-0221-00		RES., FXD, FILM: 1.96K OHM, 1%, 0.125W	91637	MFF1816G19600F	
A13R549	322-0219-00		RES., FXD, FILM: 1.87K OHM, 1%, 0.25W	75042	CEBT0-1871F	
A13R552	315-0472-00		RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W	01121	CB4725	
A13R553	315-0511-00		RES., FXD, CMPSN: 510 OHM, 5%, 0.25W		CB5115	
A13R555	321-0065-00		RES., FXD, FILM: 46.4 OHM, 1%, 0.125W	91637	MFF1816G46R40F	~
A13R556	323-0119-00		RES., FXD, FILM: 169 OHM, 1%, 0.50W	75042	CECT0-1690F	
A13R558	315-0151-00		RES., FXD, CMPSN: 150 OHM, 5%, 0.25W	01121		
A13R562	321-0022-00		RES., FXD, FILM: 16.5 OHM, 1%, 0.125W	91637		
A13R563	321-0022-00		RES., FXD, FILM:16.5 OHM, 1%, 0.125W	91637		
A13R565	321-0070-00		RES., FXD, FILM:52.3 OHM, 1%, 0.125W	16299		
A13R566	321-0138-00		RES., FXD, FILM: 267 OHM, 1%, 0.125W	91637		
A13R567	321-0064-00		RES., FXD, FILM: 45.3 OHM, 1%, 0.125W	91637	MFF1816G45R30F	
A13R569	323-0138-00		RES., FXD, FILM: 267 OHM, 1%, 0.50W	75042		
A13R571	317-0103-00		RES., FXD, CMPSN: 10K OHM, 5%, 0.125W	01121		
A13R572	321-0022-00		RES., FXD, FILM: 16.5 OHM, 1%, 0.125W	91637		
A13R573	321-0022-00		RES., FXD, FILM:16.5 OHM, 1%, 0.125W	91637		-
A13R575	321-0070-00		RES., FXD, FILM: 52.3 OHM, 1%, 0.125W	16299		
A13R576	321-0138-00		RES., FXD, FILM: 267 OHM, 1%, 0.125W	91637	MFF1816G267R0F	
A13R577	321-0064-00		RES., FXD, FILM: 45.3 OHM, 1%, 0.125W	91637		
A13R579	315-0103-00		RES., FXD, CMPSN: 10K OHM, 5%, 0.25W	01121		****
A13R581	323-0165-00		RES., FXD, FILM:511 OHM, 1%, 0.5W	24546		
A13R582	317-0150-00		RES., FXD, CMPSN:15 OHM, 5%, 0.125W	01121		
A13R583	321-0066-00		RES., FXD, FILM: 47.5 OHM, 1%, 0.125W		MFF1816G47R50F	
A13R584	321-0075-00		RES., FXD, FILM: 59 OHM, 1%, 0.125W	91637	MFF1816G59R00F	ر م
A13R585	323-0193-00		RES., FXD, FILM: 1K OHM, 1%, 0.50W		CECTO-1001F	
A13R586	311-0605-00		RES., VAR, NONWIR: TRMR, 200 OHM, 0.5W	73138		
A13R587	315-0510-00		RES., FXD, CMPSN: 51 OHM, 5%, 0.25W	01121		
A13R588	317-0151-00		RES., FXD, CMPSN: 150 OHM, 5%, 0.125W	01121		
A13R589	311-1261-00		RES., VAR, NONWIR: 500 OHM, 10%, 0.50W	32997		
1 3 9 5 0 1			סור בעה בזוא. כוו הטא ול ה בנו	24546	NA65D5110F	
A13R591	323-0165-00		RES., FXD, FILM: 511 OHM, 1%, 0.5W			
A13R592	317-0150-00		RES., FXD, CMPSN: 15 OHM, 5%, 0.125W	01121		•**
A13R593	321-0066-00		RES., FXD, FILM: 47.5 OHM, 1%, 0.125W	91637		
A13R594	321-0075-00		RES., FXD, FILM: 59 OHM, 1%, 0.125W	91637		
A13R595	323~0193-00		RES., FXD, FILM: 1K OHM, 1%, 0.50W	75042		
A13R596	317-0241-00		RES.,FXD,CMPSN:240 OHM,5%,0.125W (NOMINAL VALUE, SELECTED)	01121	BB2415	
A13R597	315-0510-00		RES.,FXD,CMPSN:51 OHM,5%,0.25W	01121		-1.000 Mag
A13R598	317-0151-00		RES.,FXD,CMPSN:150 OHM,5%,0.125W	01121	BB1515	

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Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Numb
A13R603	321-0022-00		RES.,FXD,FILM:16.5 OHM,1%,0.125W	91637	MFF1816G16R50
A13R605	321-0070-00		RES.,FXD,FILM:52.3 OHM,1%,0.125W	16299	NA55D52R3F
A13R606	321-0138-00		RES.,FXD,FILM:267 OHM,1%,0.125W	91637	MFF1816G267R(
A13R607	321-0064-00		RES., FXD, FILM: 45.3 OHM, 1%, 0.125W	91637	MFF1816G45R30
A13R609	323-0138-00		RES., FXD, FILM: 267 OHM, 1%, 0.50W	75042	CECTO-2670F
A13R611	317-0103-00		RES., FXD, CMPSN: 10K OHM, 5%, 0.125W	01121	BB1035
A13R613	321-0022-00		RES.,FXD,FILM:16.5 OHM,1%,0.125W	91637	MFF1816G16R50
A13R615	321-0070-00		RES.,FXD,FILM:52.3 OHM,1%,0.125W	16299	
A13R616	321-0138-00		RES.,FXD,FILM:267 OHM,1%,0.125W		MFF1816G267R0
A13R617	321-0064-00		RES.,FXD,F1LM:45.3 OHM,1%,0.125W		MFF1816G45R30
A13R621	315-0511-00		RES.,FXD,CMPSN:510 OHM,5%,0.25W		CB5115
A13R622	315-0272-00		RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
A13R623	315-0273-00		RES.,FXD,CMPSN:27K OHM,5%,0.25W		CB2735
A13R624	315-0512-00		RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125
A13R626	321-0241-00		RES.,FXD,FILM:3.16K OHM,1%,0.125W	91637	MFF1816G31600
A13R627	315-0912-00		RES.,FXD,CMPSN:9.1K OHM,5%,0.25W	01121	CB9125
A13R632	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A13R633	321-0296-00		RES.,FXD,FILM:11.8K OHM,1%,0.125W	91637	MFF1816G1180
A13R637	321-0296-00		RES.,FXD,FILM:11.8K OHM,1%,0.125W	91637	MFF1816G1180
A13R638	321-0296-00		RES.,FXD,FILM:11.8K OHM,1%,0.125W	91637	MFF1816G1180
A13R641	321-0144-00		RES., FXD, FILM: 309 OHM, 1%, 0.125W	91637	MFF1816G309R
A13R642	321-0135-00		RES., FXD, FILM: 249 OHM, 1%, 0.125W	91637	MFF1816G249R
A13R643	317-0510-00		RES., FXD, CMPSN: 51 OHM, 5%, 0.125W	01121	BB5105
A13R644	317-0510-00		RES., FXD, CMPSN:51 OHM, 5%, 0.125W	01121	BB5105
A13R645	317-0510-00		RES., FXD, CMPSN: 51 OHM, 5%, 0.125W	01121	BB5105
A13R646	301-0620-00		RES.,FXD,CMPSN:62 OHM,5%,0.50W	01121	EB6205
A13R647	301-0510-00		RES., FXD, CMPSN: 51 OHM, 5%, 0.50W	01121	
A13R648	317-0510-00		RES., FXD, CMPSN: 51 OHM, 5%, 0.125W	01121	
A13R663	321-0022-00		RES., FXD, FILM: 16.5 OHM, 1%, 0.125W	91637	
A13R665	321-0070-00		RES.,FXD,FILM:52.3 OHM,1%,0.125W	16299	
A13R666	321-0138-00		RES.,FXD,F1LM:267 OHM,1%,0.125W	91637	MFF1816G267R0
A13R667	321-0064-00		RES., FXD, FILM: 45.3 OHM, 1%, 0.125W		MFF1816G45R30
A13R669	323-0138-00		RES., FXD, FILM: 267 OHM, 1%, 0.50W	75042	
A13R671	317-0103-00		RES., FXD, CMPSN: 10K OHM, 5%, 0.125W	01121	
A13R673	321-0022-00		RES., FXD, FILM: 16.5 OHM, 1%, 0.125W	91637	
A13R675	321-0070-00		RES., FXD, FILM: 52.3 OHM, 1%, 0.125W	16299	NA55D52R3F
A13R676	321-0138-00		RES., FXD, FILM: 267 OHM, 1%, 0.125W	91637	MFF1816G267R0
A13R677	321-0064-00		RES., FXD, FILM: 45.3 OHM, 1%, 0.125W	91637	
A13R681	323-0165-00		RES., FXD, FILM: 511 OHM, 1%, 0.5W		NA65D5110F
A13R683	321-0043-00		RES., FXD, FILM: 27.4 OHM, 1%, 0.125W	91637	
A13R684	321-0075-00		RES., FXD, FILM: 59 OHM, 1%, 0.125W		MFF1816G59R00
A13R685	323-0193-00		RES.,FXD,FILM:1K OHM,1%,0.50W		CECTO-1001F
A13R686	311-0605-00		RES., VAR, NONWIR: TRMR, 200 OHM, 0.5W	73138	82-23-2
A13R687	315-0510-00		RES., FXD, CMPSN: 51 OHM, 5%, 0.25W		CB5105
A13R688	317-0151-00		RES., FXD, CMPSN: 150 OHM, 5%, 0.125W	01121	BB1515
A13R689	311-1261-00		RES., VAR, NONWIR: 500 OHM, 10%, 0.50W	32997	3329P-L58-501
A13R691	323-0165-00		RES.,FXD,FILM:511 OHM,1%,0.5W	24546	NA65D5110F
A13R693	321-0043-00		RES., FXD, FILM: 27.4 OHM, 1%, 0.125W	91637	MFF1816G27R4(
A13R694	321-0075-00		RES., FXD, F1LM: 59 OHM, 1%, 0.125W	91637	MFF1816G59R00
A13R695	323-0193-00		RES., FXD, FILM: 1K OHM, 1%, 0.50W	75042	
A13R696	317-0750-00		RES., FXD, CMPSN: 75 OHM, 5%, 0.125W	01121	BB7505
A13R697	315-0510-00		(NOMINAL VALUE, SELECTED) RES.,FXD,CMPSN:51 OHM,5%,0.25W	01121	CB5105
A13R698	317-0151-00		RES., FXD, CMPSN:150 OHM, 5%, 0.125W	01121	BB1515
A13U520	155-0078-10		MICROCIRCUIT, LI: ML, VERTICAL AMPLIFIER	80009	155-0078-10
			MICROCIRCUIT, DI:QUAD 2-INPUT POS NOR GATE	80009	
A13U526	156-0043-00		MICROCIRCUII, DI CUAD Z-INFUI FUS NUR GAIN	00004	156-0043-00

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Component No.	Tektronix Part No.	Serial/ Eff	Model No. Dscont	Name & Description	Mfr Code	Mfr Part Number
A13U580 A13U620 A13U680	155-0078-10 155-0078-10 155-0078-10			MICROCIRCUIT,LI:ML,VERTICAL AMPLIFIER MICROCIRCUIT,LI:ML,VERTICAL AMPLIFIER MICROCIRCUIT,LI:ML,VERTICAL AMPLIFIER	80009 80009 80009	155-0078-10 155-0078-10 155-0078-10

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A14			CKT BOARD ASSY:LOGIC	Andrews Chi, and a first the set of a dark for the state of a	and an interaction of the second s
A14C8	283-0672-00		CAP., FXD, MICA D:200PF, 1%, 500V	00853	D155F2010F0
A14C12	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	91418	SP103Z151-4R9
A14C13					
	281-0603-00		CAP., FXD, CER DI: 39PF, 5%, 500V	72982	
A14C27 A14C30	281-0523-00 281-0629-00		CAP., FXD, CER DI: 100PF, +/-20PF, 500V	72982 04222	
A14030	281-0029-00		CAP.,FXD,CER DI:33PF,5%,600V	04222	/02/-0280
A14C32	281-0525-00		CAP., FXD, CER DI:470PF, +/-94PF, 500V	04222	
A14C33	283-0638-00		CAP., FXD, MICA D: 130PF, 1%, 100V	00853	
A14C36	281-0603-00		CAP.,FXD,CER DI:39PF,5%,500V	72982	
A14C37	281-0525-00		CAP.,FXD,CER DI:470PF,+/-94PF,500V	04222	7001-1364
A14C109	281-0603-00		CAP.,FXD,CER DI:39PF,5%,500V	72982	308-000C0G0390J
A14C112	281-0603-00		CAP.,FXD,CER DI:39PF,5%,500V	72982	308-000C0G0390J
A14C122	281-0523-00		CAP.,FXD,CER DI:100PF,+/-20PF,500V	72982	301-000U2M0101M
A14C124	283-0604-00		CAP., FXD, MICA D: 304PF, 2%, 300V	00853	
A14C129	283-0604-00		CAP., FXD, MICA D: 304PF, 2%, 300V	00853	
A14C139	281-0603-00		CAP., FXD, CER DI: 39PF, 5%, 500V	72982	308-000C0G0390J
A14C146	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V		SP103Z151-4R9
A14C152	283-0000-00		CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-250-102
A14C171	283-0000-00		CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-Z5U-102
A14C176	283-0177-00		CAP., FXD, CER DI: 1UF, +80-20%, 25V	56289	273C5
A14C190	283-0177-00		CAP., FXD, CER DI: 1UF, +80-20%, 25V		27305
A14C201	290-0778-00		CAP., FXD, ELCTLT: 1UF, +50-10%, 50V		ECE-A50N1
A14C202	290-0755-00		CAP., FXD, ELCTLT: 100UF, +50-10%, 10V	56289	502D223
A14C2O2	290-0778-00		CAP., FXD, ELCTLT: 1000F, +50-10%, 10V	54473	
				51175	202 115002
A14C206	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	56289	27305
A14C207	290-0778-00		CAP., FXD, ELCTLT: 1UF, +50-10%, 50V	54473	ECE-A50N1
A14C208	283-0177-00		CAP., FXD, CER DI: 1UF, +80-20%, 25V	56289	273C5
A14CR16	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA		1N4152R
A14CR17	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA		1N4152R
A14CR44	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA		1N4152R
11/07/f	150 01/1 00			01005	111/1500
A14CR45	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA		1N4152R
A14CR61	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A14CR62	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A14CR109	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA	01295	1N4152R
A14CR112	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA	01295	1N4152R
A14CR124	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA		1N4152R
A14CR129	152-0141-02		SEMICOND DEVICE STITCON 201 150MA	01205	1841520
			SEMICOND DEVICE: SILICON, 30V, 150MA		1N4152R
A14CR137	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA		1N4152R
A14CR139	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA		1N4152R
A14CR143	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA		1N4152R
A14CR146	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA		1N4152R
A14CR156	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A14CR159	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A14CR161	152-0153-00		SEMICOND DEVICE:SILICON, 15V, 50MA		FD7003
A14CR162	152-0153-00		SEMICOND DEVICE:SILICON, 15V, 50MA		FD7003
A14CR176	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA		1N4152R
A14CR177	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA	01295	
A14L12	108-0245-00		COIL, RF: 3.9UH	/6493	B6310-1
A14L26	108-0245-00		COIL,RF:3.9UH	76493	B6310-1
A14L29	108-0245-00		COIL, RF: 3.9UH	76493	B6310-1
A14L201	108-0245-00		COIL, RF: 3.9UH	76493	B6310-1
A14L202	108-0245-00		CO1L, RF: 3.90H	76493	
A14L202 A14L203			-	76493	
	108-0245-00 108-0245-00		COIL, RF: 3.90H		
	1000007450011		COIL,RF:3.9UH	76493	B6310-1
A14L205	100 0249 00				
	108-0543-00		COIL, RF: FIXED, 1.1UH	80009	108-0543-00
A14L207			COIL, RF: FIXED, 1. 1UH COIL, RF: FIXED, 1. 1UH	80009 80009	108-0543-00 108-0543-00

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Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number	
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A14LR84	108-0543-00		COIL, RF: FIXED, 1.1UH	80009	108-0543-00	
A14Q41 A14Q49	151-0198-00 151-0198-00		TRANSISTOR: SILICON, NPN, SEL FROM MPS918	04713		
A14Q63	151-0198-00		TRANSISTOR: SILICON, NPN, SEL FROM MPS918	04713	SPS8802-1	
A14Q67	151-0190-00		TRANSISTOR:SILICON,PNP TRANSISTOR:SILICON,NPN	07263	SPS6868K S032677	
A14Q77	151-0192-00		TRANSISTOR: SILICON, NPN TRANSISTOR: SILICON, NPN, SEL FROM MPS6521		SPS8801	
	191 0192 00		IMMOISTOR. STETCON, MIN, SEE FROM MISSION	04/13	51 50001	
A14Q79	151-0192-00		TRANSISTOR: SILICON, NPN, SEL FROM MPS6521	04713	SPS8801	
A14Q103	151-0223-03		TRANSISTOR:NPN,SI,PRESTRESSED & TESTED	80009	151-0223-03	
A14Q119	151-0223-03		TRANSISTOR:NPN, SI, PRESTRESSED & TESTED	80009	151-0223-03	
A14Q127	151-0192-00		TRANSISTOR: SILICON, NPN, SEL FROM MPS6521	04713	SPS8801	
A14Q132	151-0192-00		TRANSISTOR: SILICON, NPN, SEL FROM MPS6521	04713	SPS8801	
A14Q136	151-0192-00		TRANSISTOR: SILICON, NPN, SEL FROM MPS6521	04713	SPS8801	
A14Q141	151-0192-00		TRANSISTOR:SILICON, NPN, SEL FROM MPS6521		SPS8801	
A14Q142	151-0216-00		TRANSISTOR: SILICON, PNP		SPS8803	
A14Q146	151-1022-00		TERM.COAXIAL:SILICON, JFE, SEL FROM 2N4392		T198CS	
A14Q150	151-0190-00		TRANSISTOR: SILICON, NPN		S032677	
A14Q157	151-0192-00		TRANSISTOR: SILICON, NPN, SEL FROM MPS6521		SPS8801	
A14R1	315-0223-00		RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235	
A14R2	321-0193-00		RES., FXD, FILM: 1K OHM, 1%, 0.125W	01637	MFF1816G10000F	
A14R3	315-0223-00		RES., FXD, CMPSN: 22K OHM, 5%, 0.25W		CB2235	
A14R4	321-0193-00		RES., FXD, FILM: 1K OHM, 1%, 0.125W		MFF1816G10000F	
A14R8	321-0147-00		RES., FXD, FILM: 332 OHM, 1%, 0.125W		MFF1816G332R0F	
A14R9	321-0239-00		RES., FXD, FILM: 3.01K OHM, 1%, 0.125W		MFF1816G30100F	
A14R11	315-0912-00		RES., FXD, CMPSN: 9.1K OHM, 5%, 0.25W		CB9125	
				01121	00/125	
A14R12	315-0101-00		RES., FXD, CMPSN: 100 OHM, 5%, 0.25W	01121	CB1015	
A14R13	315-0512-00		RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W		CB5125	
A14R16	315-0332-00		RES., FXD, CMPSN: 3.3K OHM, 5%, 0.25W		CB3325	
A14R17	315-0202-00		RES., FXD, CMPSN: 2K OHM, 5%, 0.25W	01121	CB2025	
A14R21	321-0304-00		RES., FXD, FILM: 14.3K OHM, 1%, 0.125W	91637	MFF1816G14301F	
A14R22	315-0101-00		RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015	
.1/222						
A14R23	315-0512-00		RES.,FXD,CMPSN:5.1K OHM,5%,0.25W		CB5125	
A14R26	315-0101-00		RES., FXD, CMPSN: 100 OHM, 5%, 0.25W		CB1015	
A14R27	315-0332-00		RES., FXD, CMPSN: 3.3K OHM, 5%, 0.25W		CB3325	
A14R29	315-0271-00		RES., FXD, CMPSN: 270 OHM, 5%, 0.25W		CB2715	
A14R30 A14R36	315-0332-00 315-0752-00		RES., FXD, CMPSN: 3.3K OHM, 5%, 0.25W		CB3325	
AI4K50	515-0752-00		RES.,FXD,CMPSN:7.5K OHM,5%,0.25W	01121	CB7525	
A14R39	315-0202-00		RES., FXD, CMPSN: 2K OHM, 5%, 0.25W	01121	CB2025	
A14R40	315-0202-00		RES., FXD, CMPSN: 2K OHM, 5%, 0.25W		CB2025	
A14R41	315-0512-00		RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W		CB5125	
A14R45	315-0332-00		RES., FXD, CMPSN: 3.3K OHM, 5%, 0.25W		CB3325	
A14R48	315-0152-00	B010100 B010150	RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W		CB1525	
A14R48	315-0101-00	B010151	RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015	
A14R49	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W		CB1025	
A14R51	315-0222-00		RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121		
A14R53	315-0751-00	B010100 B010150	RES.,FXD,CMPSN:750 OHM,5%,0.25W		CB7515	
A14R53	315-0101-00	B010151	RES., FXD, CMPSN: 100 OHM, 5%, 0.25W	01121	CB1015	
A14R58	315-0222-00		RES., FXD, CMPSN: 2.2K OHM, 5%, 0.25W	01121		
A14R62	315-0202-00		RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025	
A14R63	315-0103-00		DES EVE CHOCN. 100 AUN 59 0 250	01121	CB1035	
A14R66	315-0202-00		RES.,FXD,CMPSN:10K OHM,5%,0.25W RES.,FXD,CMPSN:2K OHM,5%,0.25W		CB2025	
A14R67	315-0202-00		RES., FXD, CMPSN: 2K OHM, 5%, 0.25W RES., FXD, CMPSN: 2K OHM, 5%, 0.25W	01121		
A14R68	315-0622-00		RES., FXD, CMPSN:2K OHM, 5%, 0.25W RES., FXD, CMPSN:6.2K OHM, 5%, 0.25W		CB2025 CB6225	
A14R76	315-0302-00		RES., FXD, CMPSN: 0.2K OHM, 5%, 0.25W RES., FXD, CMPSN: 3K OHM, 5%, 0.25W	01121		
A14R77	315-0303-00		RES., FXD, CMPSN: 30K OHM, 5%, 0.25W	01121		
				01121	000000	
A14R78	315-0222-00		RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225	

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	Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
	A14R79	315-0332-00		RES., FXD CMPSN 3.3K OHM, 5%, 0.25W	01121	CB3325
	A14R80	315-0301-00		RES., FXD, CMPSN: 300 OHM, 5%, 0.25W		CB3015
	A14R81	315-0102-00		RES., FXD, CMPSN: 1K OHM, 5%, 0.25W		CB1025
	A14R86	315-0332-00		RES., FXD, CMPSN 3.3K OHM, 5%, 0.25W		CB3325
	A14R87	315-0100-00		RES., FXD, CMPSN: 10 OHM, 5%, 0 25W		CB1005
	A14R101	315-0203-00		RES., FXD, CMPSN: 20K OHM, 5%, 0.25W		CB2035
	11/2100				01101	020025
·m.	A14R102	315-0303-00		RES FXD, CMPSN: 30K OHM 5%, 0.25W		CB3035
	A14R103	315-0512-00		RES., FXD, CMPSN: 5.1K OHM, 5%, 0 25W		CB5125
	A14R106	315-0102-00		RES., FXD, CMPSN: 1K OHM 5% 0.25W		CB1025
	A14R107	315-0153-00		RES., FXD, CMPSN: 15K OHM, 5%, 0.25W		CB1535
	A14R109	315-0201-00	B010100 B010199	RES., FXD, CMPSN: 200 OHM, 5%, 0.25W		CB2015
	A14R113	315-0102-00	PO10100 P010199	RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	A14R113	315-0391-00	B010200	RES.,FXD,CMPSN:390 OHM.5%,0.25W	01121	CB3915
	A14R121	315-0201-00		RES FXD, CMPSN: 200 OHM 5%, 0.25W	01121	CB2015
	A14R122	315-0152-00		RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
	A14R126	321-0288-00		RES.,FXD,FILM:9.76K OHM,1%,0.125W	91637	MFF1816G97600F
	A14R127	321-0246-00		RES.,FXD,F1LM:3.57K OHM,1%,0.125W	91637	MFF1816G35700F
	A14R131	321-0288-00		RES FXD,FILM:9.76K OHM,1%,0.125W	91637	MFF1816G97600F
10m),	A14R132	321-0246-00		RES. FXD, F1LM: 3.57K OHM, 1%, 0.125W	91637	MFF1816G35700F
	A14R136	315-0103-00		RES. FXD, CMPSN: 10K OHM, 5%, 0 25W	01121	CB1035
	A14R137	315-0821-00		RES., FXD, CMPSN: 820 OHM, 5%, 0.25W		CB8215
	A14R138	315-0152-00		RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W	01121	
	A14R139	315-0822-00		RES., FXD, CMPSN: 8.2K OHM 5%, 0.25W		CB8225
	A14R141	315-0132-00		RES.,FXD,CMPSN:1.3K OHM 5%,0.25W	01121	CB1325
	A14R142	315-0271-00		RES., FXD, CMPSN: 270 OHM, 5%, 0.25W	01121	CB2715
	A14R143	315 0302-00		RES., FXD, CMPSN: 3K OHM, 5%, 0.25W		CB3025
an	A14R146	315-0332-00		RES., FXD, CMPSN: 3.3K OHM, 5%, 0.25W	01121	
	A14R147	321-0237-00		RES., FXD, FILM: 2.87K OHM, 1%, 0.125W		MFF1816G28700F
	A14R150	315-0561-00		RES., FXD, CMPSN: 560 OHM, 5%, 0.25W	01121	
	A14R152	315-0103-00		RES., FXD, CMPSN: 10K OHM, 5%, 0.25W		CB1035
* -	A14R153	315-0103-00		RES., FXD, CMPSN: 10K OHM, 5%, 0.25W	01121	CB1035
	A14R154	315-0302-00		RES., FXD, CMPSN: 3K OHM, 5%, 0.25W		CB3025
	A14R154	315-0182-00		RES. FXD,CMPSN:1.8K OHM,5%,0.25W		CB1825
	A14R156	315-0361-00		RES., FXD, CMPSN: 360 OHM, 5%, 0.25W		CB3615
**	A14R157	322-0210-00		RES.,FXD,FILM:1.5K OHM,1%,0.25W		CEBTO-1501F
	A14R158	315-0221-00		RES., FXD, CMPSN: 220 OHM, 5%, 0.25W		CB2215
	A14R159	315-0242-00		RES., FXD CMPSN: 2.4K OHM, 5%, 0.25W	01121	CB2425
	A14R162	321-0312-00		RES. FXD FILM:17.4K OHM, 1%, 0.125W		MFF1816G17401F
· *	A14R163	321-0237-00		RES., FXD, FILM 2.87K OHM, 1%, 0.125W		MFF1816G28700F
	A14R165	311-1269-00		RES., VAR, NONWIR: 20K OHM, 10%, 0.50W	32997	
	A14R166	321-0289-00		RES. FXD, FILM: 10K OHM, 1%, 0.125W		MFF1816G10001F
	A14R167	321-0240-00		RES., FXD FILM: 3.09K OHM, 1%, 0.125W		MFF1816G30900F
~	A14R169	321-0215-00		RES., FXD, FILM: 1.69K OHM, 1%, 0.125W	91637	MFF1816G16900F
	A14R174	301-0471-00		RES., FXD, CMPSN: 470 OHM, 5%, 0.50W		EB4715
	A14R176	321-0245-00		RES., FXD, FILM: 3.48K OHM 1%, 0.125W	91637	MFF1816G34800F
	A14R177	315 0151-00		RES., FXD, CMPSN: 150 OHM, 5%, 0.25W		CB1515
	A14R184	315-0683-00		RES., FXD, CMPSN:68K OHM, 5%, 0.25W		CB6835
	A14R186	315-0622-00		RES., FXD, CMPSN: 6.2K OHM, 5%, 0.25W		CB6225
	A14R187	315-0622-00		RES.,FXD,CMPSN:6.2K OHM,5%,0.25W	01121	CB6225
	A14R191	315-0242-00		RES., FXD, CMPSN:2 4K OHM, 5%, 0.25W		CB2425
	A14R191	321-0242-00		RES. FXD, FILM: 3.24K OHM, 1%, 0.125W		MFF1816G32400F
	A14R192 A14R193	315-0223-00	B010100 B010199	RES., FXD, CMPSN 22K OHM, 5%, 0.25W		CB2235
	A14R193	315-0203-00	B010200	RES., FXD, CMPSN 22K OHM, 5%, 0.25W RES., FXD, CMPSN: 20K OHM, 5%, 0.25W		CB2235 CB2035
	A14R195	321-0243-00	2010200	RES., FXD, FILM: 3.32K OHM, 1%, 0.125W	91637	MFF1816G33200F
		521 0275 00			/103/	
	A14R197	315-0303-00		RES. FXD,CMPSN:30K OHM,5%,0.25W	01121	CB3035
$_{m} \mapsto h_{m_{m_{m}}}$	A14R207	315-0100-00		RES., FXD, CMPSN: 10 OHM, 5%, 0.25W		СВ1005

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	Tektronix	Serial/I	Model No.		Mfr	
Component No.	Part No.	Eff	Dscont	Name & Description	Code	Mfr Part Number
A14TP21	214-0579-00			TERM, TEST POINT: BRS CD PL	80009	214-0579-00
A14TP79	214-0579-00			TERM, TEST POINT: BRS CD PL	80009	214-0579-00
A14TP83	214-0579-00			TERM, TEST POINT: BRS CD PL	80009	214-0579-00
A14TP84	214-0579-00			TERM, TEST POINT: BRS CD PL	80009	214-0579-00
A14TP124	214-0579-00			TERM, TEST POINT: BRS CD PL	80009	214-0579-00
A14TP129	214-0579-00			TERM, TEST POINT: BRS CD PL	80009	214-0579-00
14TP130	214-0579-00			TERM, TEST POINT: BRS CD PL	80009	214-0579-00
14TP152	214-0579-00			TERM, TEST POINT: BRS CD PL	80009	214-0579-00
A14TP162	214-0579-00			TERM, TEST POINT: BRS CD PL	80009	214-0579-00
A14TP201	214-0579-00			TERM, TEST POINT: BRS CD PL	80009	214-0579-00
A14TP202	214-0579-00			TERM, TEST POINT: BRS CD PL	80009	214-0579-00
A14U12	155-0011-00			MICROCIRCUIT, DI:ML, CLOCK AND CHOP BLANKING	80009	155-0011-00
14022	155-0010-00			MICROCIRCUIT, DI:ML, CHOP DIVIDER/BLANKING	80009	155-0010-00
A14U42	155-0013-00			MICROCIRCUIT, DI:ML, DC BINARY	80009	155-0013-00
A14U52	155-0013-00			MICROCIRCUIT, DI:ML, DC BINARY	80009	155-0013-00
A14U72	156-0798-02			MICROCIRCUIT, DI: DUAL 14 TO 1 LINE SEL/MUX	01295	SN74LS153
A14U82	155-0013-00			MICROCIRCUIT, DI:ML, DC BINARY	80009	155-0013-00
A14U116	155-0009-00			MICROCIRCUIT, DI:ML, HORIZ LOCKOUT LOGIC	80009	155-0009-00
A14U190	155-0012-00			MICROCIRCUIT, LI:ML, Z-AXIS AND AMPLIFIER	80009	155-0012-00

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la Lou	Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
	A15			CKT BOARD ASSY:SIGNAL OUT		and notes a president destruction of the series of the data product of the series of the se
	A15C13	283-0081-00		CAP. FXD, CER D1:0.1UF, +80-20%, 25V	56289	36C600
	A15C17	281-0510-00		CAP., FXD, CER DI:22PF, +/-4.4PF, 500V	72982	
y 1844 y	A15C79	281-0603-00		CAP., FXD, CER D1:39PF, 5%, 500V	72982	
	A15C91	290-0745-00		CAP ,FXD,ELCTLT:22UF,+50-10%,25V	56289	
	A15C95	290-0745-00		CAP. FXD,ELCTLT:22UF +50-10%,25V	56289	
	ALJOYJ	290-0745-00		GRI: FXD, ELGIEI. 220F +30-10%, 23V	50209)02022)
	A15CR12	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
	A15CR19	152-0141-02		SEMICOND DEVICE:SILICON, 30V 150MA	01295	1N4152R
	A15CR76	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
	A15CR77	152-0141-02		SEMICOND DEVICE:SILICON, 30V 150MA	01295	1N4152R
	A15CR78	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA	01295	
	A15Q10	151-0223-03		TRANSISTOR:NPN,SI,PRESTRESSED & TESTED	80009	151-0223-03
	A15Q11	151-0223-03		TRANSISTOR:NPN,SI,PRESTRESSED & TESTED	80009	151-0223-03
	A15Q17	151-0220-00		TRANSISTOR:SILICON, PNP	07263	
	A15Q49	151-0223-03		TRANSISTOR:SIDICON, INI TRANSISTOR:NPN, SI, PRESTRESSED & TESTED		151-0223-03
	A15Q62	151-0223-03		TRANSISTOR:NPN,SI,PRESTRESSED & TESTED		151-0223-03
	A15Q77	151-0220-00		TRANSISTOR:SILICON, PNP		S036228
	A15R3	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W		CB4705
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e	A15R9	315-0101-00		RES., FXD, CMPSN: 100 OHM, 5%, 0.25W		CB1015
	A15R11	315-0222-00		RES FXD, CMPSN: 2.2K OHM, 5%, 0.25W		CB2225
	A15R12	315-0241-00		RES., FXD, CMPSN: 240 OHM 5%, 0.25W		CB2415
	A15R13	315-0101-00		RES.,FXD,CMPSN:100 OHM,5%,0.25W		CB1015
-	A15R16	321-0262-00		RES., FXD, FILM 5.23K OHM, 1%, 0.125W		MFF1816G52300F
	A15R17	315-0152-00		RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
	A15R18	315-0272-00		RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
	A15R19	321-0190-00		RES.,FXD,FILM 931 OHM,1%,0.125W	91637	MFF1816G931ROF
(W) where	A15R45	315-0201-00		RES.,FXD,CMPSN:200 OHM,5%,0.25W	01121	CB2015
	A15R46	315-0752-00		RES.,FXD,CMPSN:7.5K OHM,5%,0.25W	01121	CB7525
	A15R47	315-0101-00		RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	A15R49	321-0143-00		RES.,FXD,F1LM:301 OHM,1%,0.125W	91637	MFF1816G301R0F
90a	A15R56	315-0181-00		RES., FXD, CMPSN: 180 OHM, 5%, 0.25W	01121	CB1815
	A15R57	315-0123-00		RES., FXD, CMPSN: 12K OHM, 5%, 0.25W		CB1235
	A15R59	315-0101-00		RES., FXD, CMPSN: 100 OHM, 5%, 0.25W		CB1015
	A15R61	315-0560-00		RES., FXD, CMPSN: 56 OHM, 5%, 0.25W		CB5605
10 ·	A15R62	323-0193-00		RES., FXD, FILM: 1K OHM, 1%, 0.50W		CECT0-1001F
	A15R67	315-0181-00		RES., FXD, CMPSN: 180 OHM, 5%, 0.25W		CB1815
	A15R68	315-0133-00		DEC EVE ONDEN. 192 OUM 59 O 950	01121	CB1025
		315-0123-00		RES., FXD, CMPSN: 12K OHM, 5%, 0.25W		CB1235
	A15R76	321-0180-00		RES., FXD, FILM. 732 OHM, 1%, 0.125W		MFF1816G732R0F
	A15R77	321-0226-00		RES., FXD, FILM: 2.21K OHM, 1%, 0.125W		MFF1816G22100F
	A15R78	322-0189-00		RES., FXD, F1LM:909 OHM, 1%, 0.25W		CEBT0-9090F
	A15R79	315-0390-00		RES., FXD, CMPSN: 39 OHM 5%, 0.25W		CB3905
	A1583	260-1811-00		SWITCH,SLIDE:DPDT,0.5A,125VAC DC	82389	C56206L2
4/4 -	A15S46	260-0984-00		SWITCH SLIDE:DP3T,0.5A,125V	79727	G-128-S-0012

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	Tektronix	Serial/Model No.		Mfr	Mén Davit Number
Component No.	Part No.	Eff Dscont	Name & Description	Code	Mfr Part Number
A16			CKT BOARD ASSY:FAN		
A16B20	147-0035-00		MOTOR, DC: BRUSHLESS, 10-15VDC, 145MA	25088	1AD3001-0A
A16C10	290-0778-00		CAP., FXD, ELCTLT: 1UF, +50-10%, 50V	54473	ECE-A50N1
A16C13	290-0768-00		CAP. FXD, ELCTLT: 10UF, +50-10%, 100V	54473	ECE-A100V10L
A16CR10	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A16CR13	152-0141-02		SEMICOND DEVICE:SILICON.30V,150MA	01295	1N4152R
A16CR21	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A16CR22	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A16CR23	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A16CR24	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A16Q10	151-0301-00		TRANSISTOR: SILICON, PNP	27014	2N2907A
A16Q20	156-0281-00		MICROCIRCUIT, LI:4 TRANSISTOR ARRAY	02735	CA3725
A16R10	301-0271-00		RES.,FXD,CMPSN:270 OHM,5%,0.50W	01121	EB2715
A16R11	315-0470-00		RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
A16R13	301-0271-00		RES.,FXD,CMPSN:270 OHM,5%,0.50W	01121	EB2715
A16R20	307-0059-00		RES.,FXD,CMPSN:6.2 OHM,5%,0.50W	01121	EB62G5
A16R24	321-0201-00		RES.,FXD,FILM:1.21K OHM,1%,0.125W	91637	MFF1816G12100F
A16R25	321-0239-00		RES.,FXD,FILM:3.01K OHM,1%,0.125W	91637	MFF1816G30100F
A16R27	321-0022-00		RES.,FXD,FILM:16.5 OHM,1%,0.125W	91637	MFF1816G16R50F

****9	Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
	417					ana ang ang ang ang ang ang ang ang ang
	A17			CKT BOARD ASSY:HORIZ OUTPUT AMP		
	A17C22	283-0604-00		CAP.,FXD,MICA D:304PF,2%,300V	00853	D153F3040G0
	A17C32	281-0184-00		CAP., VAR, PLSTC: 2-18PF, 500VDC	80031	2805D00218BN02F0
	A17C33	283-0359-00		CAP., FXD, CER DI: 1000PF, 10%, 200V	72982	
	A17C52	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V		SP103Z151-4R9
	A17C54	283-0647-00		CAP., FXD, MICA D: 70PF, 1%, 100V	00853	D151E700F0
	A17C55	281-0166-00		CAP.,VAR,AIR DI:1.9-15.7PF.250V	74970	187-0109-005
	A17C63	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	91418	SP103Z151-4R9
	A17C66	281-0659-00		CAP., FXD, CER DI:4.3PF, +/-0.25PF, 500V		
	A17C69	283-0003-00			59660	301-000C0H0439C
	A17C71	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	91418	SP103Z151-4R9
•				CAP., FXD, CER DI:0.01UF, +80-20%, 150V	91418	SP103Z151-4R9
	A17C79	283-0003-00		CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	A17C111	281-0792-00		CAP.,FXD,CER DI:82PF,10%,100V	72982	8035D2AADCOG820K
~~	A17C122	283-0604-00		CAP.,FXD,MICA D:304PF,2%,300V	00853	D153F3040G0
	A17C154	283-0647-00		CAP.,FXD,MICA D:70PF,1%,100V	00853	D151E700F0
	A17C155	281-0166-00		CAP., VAR, AIR DI: 1.9-15.7PF, 250V	74970	187-0109-005
	A17C166	281-0659-00		CAP., FXD, CER DI: 4.3PF, +/-0.25PF, 500V	59660	301-000соно439с
	A17C169	283-0003-00		CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
~	A17C171	283-0003-00		CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	A17C201	290-0745-00		CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	
	A17C202	290-0745-00				502D225
	A17C203			CAP., FXD, ELCTLT: 22UF, +50-10%, 25V	56289	502D225
		283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	91418	SP103Z151-4R9
	A17C204	283-0003-00		CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	A17C206	283-0005-00		CAP.,FXD,CER DI:0.01UF,+100-0%,250V	72982	8131N30025U0103P
	A17C207	290-0776-00		CAP.,FXD,ELCTLT:22UF,+50-10%,10V	55680	10ULA22V-T
6	A17CR44	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA	01295	1N4152R
.,	A17CR45	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA	01295	1N4152R
	A17CR51	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
	A17CR151	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA		1N4152R
	A17CR159	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01295	1N4152R
	A17CR160	152-0141-02		SEMICOND DEVICE:SILICON, 30V, 150MA	01005	111/1600
	A17E52	276-0507-00			01295	1N4152R
	A17L15			SHIELDING BEAD, : FERRITE	78488	57-3443
		108-0578-00		COIL, RF: FIXED, 45NH	80009	108-0578-00
	A17L115	108-0578-00		COIL,RF:FIXED,45NH	80009	108-0578-00
	A17L201	108-0245-00		COIL, RF: 3.9UH	76493	B6310-1
	A17L202	108-0245-00		COIL, RF: 3.9UH	76493	B6310-1
	A17L207	108-0800-00		COIL, RF:820MH	71279	550-3399-48
à	A17Q3	151-0190-00		TRANSISTOR: SILICON, NPN	07263	S032677
	A17Q21	151-0221-00		TRANSISTOR: SILICON, PNP	04713	SPS246
	A17Q41	151-0220-00		TRANSISTOR: SILICON, PNP		S036228
	A17Q51	151-0442-00		TRANSISTOR: SILICON, NPN		151-0442-00
	A17Q61	151-0190-00		TRANSISTOR: SILICON, NPN	07263	S032677
	A17Q62	151-0190-00		TRANSISTOR STITCON NON	07262	0000677
	A17Q69	151-0274-00		TRANSISTOR: SILICON, NPN	07263	S032677
	A17Q73			TRANSISTOR: SILICON, NPN	80009	151-0274-00
	•	151-0270-00		TRANSISTOR: SILICON, PNP	04713	OBD
	A17Q103	151-0190-00		TRANSISTOR: SILICON, NPN	07263	S032677
	A17Q121	151-0221-00		TRANSISTOR: SILICON, PNP	04713	SPS246
	A17Q134	151-0220-00		TRANSISTOR: SILICON, PNP		S036228
	A17Q141	151-0220-00		TRANSISTOR: SILICON, PNP	07263	S036228
	A17Q151	151-0434-00	B010100 B010150	TRANSISTOR: SILICON, PNP		SS7144
	A17Q151	151-0434-01	B010151	TRANSISTOR: SILICON, PNP	80009	
	A17Q161	151-0220-00		TRANSISTOR: SILICON, PNP		151-0434-01
	A170162	151-0220-00		-		S036228
	A17Q169			TRANSISTOR: SILICON, PNP		S036228
		151-0274-00		TRANSISTOR: SILICON, NPN	80009	151-0274-00
	A17Q173	151-0270-00		TRANSISTOR: SILICON, PNP	04713	OBD
	A17Q197	151-0220-00		TRANSISTOR: SILICON, PNP		S036228

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| Component No. | Tektronix<br>Part No. | Serial/Model No.<br>Eff Dscont | Name & Description                      | Mfr<br>Code | Mfr Part Number |
|---------------|-----------------------|--------------------------------|-----------------------------------------|-------------|-----------------|
| A17R1         | 321-0191-00           |                                |                                         | 91637       | MFF1816G953R0F  |
|               |                       |                                | RES., FXD, FILM: 953 OHM, 1%, 0.125W    | 91637       |                 |
| A17R2         | 321-0251-00           |                                | RES., FXD, FILM: 4.02K OHM, 1%, 0.125W  |             | MFF1816G40200F  |
| A17R3         | 321-0255-00           |                                | RES., FXD, FILM: 4.42K OHM, 1%, 0.125W  | 91637       |                 |
| A17R4         | 321-0175-00           |                                | RES., FXD, FILM: 649 OHM, 1%, 0.125W    | 91637       |                 |
| A17R6         | 315-0511-00           |                                | RES., FXD, CMPSN: 510 OHM, 5%, 0.25W    |             | CB5115          |
| A17R8         | 323-0177-00           |                                | RES.,FXD,FILM:680 OHM,1%,0.50W          | 91637       | MFF1226G681R0F  |
| A17R9         | 321-0074-00           |                                | RES., FXD, FILM: 57.6 OHM, 1%, 0.125W   | 91637       | MFF1816G57R60F  |
| A17R1         | 315-0153-00           |                                | RES., FXD, CMPSN: 15K OHM, 5%, 0.25W    | 01121       |                 |
| A17R12        | 315-0243-00           |                                | RES., FXD, CMPSN: 24K OHM, 5%, 0.25W    | 01121       |                 |
| A17R12        | 315-0822-00           |                                | RES., FXD, CMPSN: 8.2K OHM, 5%, 0.25W   | 01121       | CB8225          |
| A17R15        | 311-1466-00           |                                | RES., VAR, NONWIR: 2K OHM, 20%, 0.50W   |             | 72-39-0         |
| A17R21        | 317-0300-00           |                                | RES., FXD, CMPSN: 30 OHM, 5%, 0.125W    | 01121       | BB3005          |
| A17 A21       | 517 0500 00           |                                |                                         | 01121       | 020000          |
| A17R22        | 315-0270-00           |                                | RES.,FXD,CMPSN:27 OHM,5%,0.25W          | 01121       | CB2705          |
| A17R23        | 315-0271-00           |                                | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W    | 01121       | CB2715          |
| A17R29        | 321-0159-00           | B010100 B010150                | RES., FXD, FILM: 442 OHM, 1%, 0.125W    | 91637       | MFF1816G442R0F  |
| A17R29        | 321-0175-00           | B010151                        | RES., FXD, FILM: 649 OHM, 1%, 0.125W    | 91637       | MFF1816G649R0F  |
| A17R30        | 311-1222-00           |                                | RES., VAR, NONWIR: 100 OHM, 20%, 0.50W  | 32997       | 3386F-T04-101   |
| A17R31        | 321-0125-00           | B010100 B010150                | RES., FXD, FILM: 196 OHM, 1%, 0.125W    | 91637       | MFF1816G196R0F  |
|               |                       |                                |                                         |             |                 |
| A17R31        | 321-0115-00           | B010151                        | RES.,FXD,FILM:154 OHM,1%,0.125W         | 91637       | CMF55116G154R0F |
| A17R32        | 315-0820-00           |                                | RES.,FXD,CMPSN:82 OHM,5%,0.25W          | 01121       | CB8205          |
|               |                       |                                | (NOMINAL VALUE, SELECTED)               |             |                 |
| A17R33        | 311-0613-00           |                                | RES.,VAR,NONWIR:100K OHM,10%,0.50W      | 73138       | 82-27-2         |
| A17R37        | 321-0184-00           |                                | RES.,FXD,FILM:806 OHM,1%,0.125W         | 91637       | MFF1816G806R0F  |
| A17R41        | 323-0706-01           |                                | RES.,FXD,FILM:800 OHM,0.5%,0.50W        | 91637       | MFF1226G800R0D  |
| 170/0         | 200 0204 00           |                                |                                         | 91637       | DCOD BISOCOF    |
| A17R42        | 308-0304-00           |                                | RES., FXD, WW: 1.5K OHM, 1%, 3W         | 91637       | RS2B-B15000F    |
| A17R43        | 321-0205-00           |                                | RES., FXD, FILM: 1.33K OHM, 1%, 0.125W  |             | MFF1816G13300F  |
| A17R44        | 315-0123-00           |                                | RES., FXD, CMPSN: 12K OHM, 5%, 0.25W    | 01121       |                 |
| A17R51        | 315-0102-00           |                                | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W     | 01121       |                 |
| A17R52        | 315-0220-00           |                                | RES., FXD, CMPSN: 22 OHM, 5%, 0.25W     |             | CB2205          |
| A17R54        | 321-0066-00           |                                | RES.,FXD,FILM:47.5 OHM,1%,0.125W        | 91637       | MFF1816G47R50F  |
| A17R59        | 321-0258-00           |                                | RES.,FXD,F1LM:4.75K OHM,1%,0.125W       | 91637       | MFF1816G47500F  |
| A17R62        | 303-0222-00           |                                | RES., FXD, CMPSN: 2.2K OHM, 5%, 1W      | 01121       | GB2225          |
| A17R66        | 323-0327-00           |                                | RES., FXD, FILM: 24.9K OHM, 1%, 0.50W   | 91637       | MFF1226G24901F  |
| A17R67        | 303-0272-00           |                                | RES., FXD, CMPSN: 2.7K OHM, 5%, 1W      | 01121       | GB2725          |
| A17R69        | 315-0100-00           |                                | RES., FXD, CMPSN:10 OHM, 5%, 0.25W      | 01121       | CB1005          |
| A17R71        | 315-0270-00           |                                | RES.,FXD,CMPSN:27 OHM,5%,0.25W          | 01121       | CB2705          |
|               |                       |                                |                                         | 01/07       | VER101(01000E   |
| A17R72        | 321-0205-00           |                                | RES., FXD, FILM: 1.33K OHM, 1%, 0.125W  | 91637       |                 |
| A17R73        | 303-0273-00           |                                | RES., FXD, CMPSN: 27K OHM, 5%, 1W       | 01121       |                 |
| A17R74        | 315-0680-00           |                                | RES.,FXD,CMPSN:68 OHM,5%,0.25W          | 01121       | CB6805          |
| A17R79        | 301-0333-00           |                                | RES., FXD, CMPSN: 33K OHM, 5%, 0.50W    |             | EB3335          |
| A17R101       | 321-0191-00           |                                | RES., FXD, FILM: 953 OHM, 1%, 0.125W    | 91637       |                 |
| A17R102       | 321-0251-00           |                                | RES.,FXD,FILM:4.02K OHM,1%,0.125W       | 91637       | MFF1816G40200F  |
| A17R103       | 321-0255-00           |                                | RES., FXD, FILM: 4.42K OHM, 1%, 0.125W  | 91637       | MFF1816G44200F  |
| A17R105       | 315-0821-00           |                                | RES., FXD, CMPSN: 820 OHM, 5%, 0.25W    | 01121       | CB8215          |
| A17R108       | 321-0177-00           |                                | RES., FXD, FILM: 681 OHM, 1%, 0.125W    | 91637       | MFF1816G681R0F  |
| A17R100       | 321-0074-00           |                                | RES., FXD, FILM: 57.6 OHM, 1%, 0.125W   | 91637       | MFF1816G57R60F  |
| A17R103       | 315-0563-00           |                                | RES., FXD, CMPSN: 56K OHM, 5%, 0.25W    | 01121       | СВ5635          |
|               | 317-0300-00           |                                | RES., FXD, CMPSN: 30 OHM, 5%, 0.125W    | 01121       | BB3005          |
| A17R121       | 711-0200-00           |                                | NEG. JEAD, OHE DR. JO OHE, JA, U. 12 JW | VI 1 2 1    | 555005          |
| A17R122       | 315-0270-00           |                                | RES.,FXD,CMPSN:27 OHM,5%,0.25W          | 01121       | CB2705          |
| A17R123       | 315-0271-00           |                                | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W    | 01121       | CB2715          |
| A17R131       | 321-0188-00           |                                | RES.,FXD,FILM:887 OHM,1%,0.125W         | 91637       | MFF1816G887R0F  |
| A17R132       | 321-0188-00           |                                | RES.,FXD,FILM:887 OHM,1%,0.125W         | 91637       | MFF1816G887R0F  |
| A17R133       | 315-0432-00           | x                              | RES., FXD, CMPSN: 4.3K OHM, 5%, 0.25W   | 01121       | CB4325          |
| A17R134       | 315-0431-00           |                                | RES., FXD, CMPSN: 430 OHM, 5%, 0.25W    | 01121       | CB4315          |
|               |                       |                                |                                         |             | VIDD101/000/00- |
| A17R137       | 321-0184-00           |                                | RES., FXD, FILM: 806 OHM, 1%, 0.125W    | 91637       | MFF1816G806R0F  |
| A17R141       | 323-0706-01           |                                | RES.,FXD,FILM:800 OHM,0.5%,0.50W        | 91637       | MFF1226G800R0D  |

|                 |               | Tektronix   | Serial/Model No. |                                         | Mfr   |                 |
|-----------------|---------------|-------------|------------------|-----------------------------------------|-------|-----------------|
| akar ninginga   | Component No. | Part No.    | Eff Dscont       | Name & Description                      | Code  | Mfr Part Number |
|                 | A17R142       | 308-0304-00 |                  | RES.,FXD,WW:1.5K OHM,1%,3W              | 91637 | RS2B-B15000F    |
|                 | A17R143       | 321-0205-00 |                  | RES., FXD, FILM: 1, 33K OHM, 1%, 0.125W | 91637 | MFF1816G13300F  |
|                 | A17R151       | 315-0220-00 |                  | RES., FXD, CMPSN: 22 OHM, 5%, 0.25W     | 01121 | CB2205          |
| ga un effere,   | A17R152       | 315-0102-00 |                  | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W     | 01121 | CB1025          |
|                 | A17R154       | 321-0066-00 |                  | RES., FXD, FILM: 47.5 OHM, 1%, 0.125W   | 91637 |                 |
|                 | A17R159       | 321-0260-00 |                  | RES.,FXD,FILM:4.99K OHM,1%,0.125W       | 91637 | MFF1816G49900F  |
|                 | A17R160       | 311-1225-00 |                  | RES., VAR, NONWIR: 1K OHM, 20%, 0.50W   | 32997 | 3386F-T04-102   |
|                 | A17R165       | 315-0271-00 |                  | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W    | 01121 | CB2715          |
|                 | A17R166       | 323-0327-00 |                  | RES., FXD, FILM: 24.9K OHM, 1%, 0.50W   | 91637 | MFF1226G24901F  |
|                 | A17R167       | 303-0332-00 |                  | RES.,FXD,CMPSN:3.3K OHM,5%,1W           |       | GB3325          |
| -dimension      | A17R169       | 315-0100-00 |                  | RES., FXD, CMPSN: 10 OHM, 5%, 0.25W     | 01121 | СВ1005          |
|                 | A17R171       | 315-0150-00 |                  | RES., FXD, CMPSN:15 OHM, 5%, 0.25W      | 01121 | CB1505          |
|                 | A17R172       | 321-0218-00 |                  | RES., FXD, FILM: 1.82K OHM, 1%, 0.125W  | 91637 | MFF1816G18200F  |
|                 | A17R173       | 301-0563-00 |                  | RES., FXD, CMPSN: 56K OHM, 5%, 0.50W    | 01121 | EB5635          |
| 0.9 <b>0%</b> e | A17R174       | 315-0680-00 |                  | RES.,FXD,CMPSN:68 OHM,5%,0.25W          | 01121 | СВ6805          |
|                 | A17R193       | 307-0106-00 |                  | RES.,FXD,CMPSN:4.7 OHM,5%,0.25W         | 01121 | CB47G5          |
|                 | A17R196       | 315-0302-00 |                  | RES., FXD, CMPSN: 3K OHM, 5%, 0.25W     | 01121 | CB3025          |
|                 | A17R197       | 315-0302-00 |                  | RES., FXD, CMPSN: 3K OHM, 5%, 0.25W     | 01121 | CB3025          |
| No. 89. V       | A17R203       | 307-0106-00 |                  | RES., FXD, CMPSN: 4.7 OHM, 5%, 0.25W    | 01121 | CB47G5          |
|                 | A17R204       | 307-0106-00 |                  | RES.,FXD,CMPSN:4.7 OHM,5%,0.25W         | 01121 | CB47G5          |
|                 | A17R206       | 307-0106-00 |                  | RES.,FXD,CMPSN:4.7 OHM,5%,0.25W         | 01121 | CB47G5          |
| - tarretar      | A17VR63       | 152-0282-00 |                  | SEMICOND DEVICE:ZENER,0.4W,30V,5%       | 04713 | 1N972B          |
|                 | A17VR79       | 152-0149-00 |                  | SEMICOND DEVICE:ZENER, 0.4W, 10V, 5%    | 04713 | SZG35009K3      |
|                 | A17VR196      | 152-0217-00 |                  | SEMICOND DEVICE: ZENER, 0.4W, 8.2V, 5%  | 04713 | SZG20           |
|                 |               |             |                  |                                         |       |                 |

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| Component No.      | Tektronix<br>Part No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Serial/Model No.<br>Eff Dscont                                                       | Name & Description                                                        | Mfr<br>Code                                                                                                     | Mfr Part Number                                                                                                | 1 10 <sup>1</sup> 10 kel |
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| A18                | <ul> <li>Market State Stat</li></ul> | του ματική το ποληγοριστική το πορογοριστική του του το το του του του του του του τ | CKT BOARD ASSY:VERTICAL OUTPUT                                            | an 1996 de la companya de la constante de la co | gygneregangangangan peranti den ngan ngangan peranta ang manyan peranta ngan peranta ang mananakan peranta ang |                          |
| A18C6              | 283-0185-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., FXD, CER DI:2.5PF, 5%, 50V                                          | 72982                                                                                                           | 8101B057000005B                                                                                                |                          |
| A18C8              | 281-0603-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., FXD, CER DI: 39PF, 5%, 500V                                         |                                                                                                                 | 8101B057C0K0295B                                                                                               |                          |
| A18C9              | 281-0543-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., FXD, CER DI: 270PF, 10%, 500V                                       | 72982                                                                                                           | 308-000C0G0390J                                                                                                | *****                    |
| A18C12             | 283-0181-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B010100 B010199                                                                      |                                                                           | 72982                                                                                                           | 301055X5P271K                                                                                                  |                          |
| A10012             | 203-0101-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B010100 B010199                                                                      | CAP.,FXD,CER DI:1.8PF,10%,100V                                            | 72982                                                                                                           | 8101B121C0K0189B                                                                                               |                          |
| A18C12             | 283-0160-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B010200                                                                              | CAP., FXD, CER DI:1.5PF, 10%, 50V                                         | 72982                                                                                                           | 8101A058C0K159B                                                                                                |                          |
| A18C13             | 283-0160-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., FXD, CER DI:1.5PF, 10%, 50V                                         | 72982                                                                                                           |                                                                                                                |                          |
| A18C18             | 281-0151-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., VAR, CER DI:1-3PF, 100V                                             | 72982                                                                                                           | 518~600A1-3                                                                                                    |                          |
| A18C26             | 283-0185-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., FXD, CER DI:2.5PF, 5%, 50V                                          | 72982                                                                                                           |                                                                                                                |                          |
| A18C28             | 281-0603-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., FXD, CER DI: 39PF, 5%, 500V                                         | 72982                                                                                                           | 308-000C0G0390J                                                                                                |                          |
|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                      |                                                                           | 72902                                                                                                           | 300 000000033003                                                                                               |                          |
| A18C29             | 281-0543-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP.,FXD,CER DI:270PF,10%,500V                                            | 72982                                                                                                           | 301055X5P271K                                                                                                  | -4-2944                  |
| A18C32             | 283-0181-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B010100 B010199                                                                      | CAP., FXD, CER DI:1.8PF, 10%, 100V                                        | 72982                                                                                                           | 8101B121C0K0189B                                                                                               |                          |
| A18C32             | 283-0160-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B010200                                                                              | CAP., FXD, CER DI:1.5PF, 10%, 50V                                         | 72982                                                                                                           | 8101A058C0K159B                                                                                                |                          |
| A18C33             | 283-0160-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., FXD, CER DI:1.5PF, 10%, 50V                                         | 72982                                                                                                           | 8101A058C0K159B                                                                                                |                          |
| A18C42             | 281-0791-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., FXD, CER DI: 270PF, 10%, 100V                                       | 72982                                                                                                           | 8035D2AADX5R271K                                                                                               | ******                   |
| 1100/7             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                      |                                                                           |                                                                                                                 |                                                                                                                |                          |
| A18C46             | 281-0791-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP.,FXD,CER DI:270PF,10%,100V                                            | 72982                                                                                                           | 8035D2AADX5R271K                                                                                               |                          |
| A18C139            | 283-0212-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP.,FXD,CER DI:2UF,20%,50V                                               | 72982                                                                                                           | 8141N064Z5U205M                                                                                                |                          |
| A18C140            | 283-0211-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP.,FXD,CER DI:0.1UF,10%,200V                                            | 72982                                                                                                           | 8141N210X7R0104K                                                                                               |                          |
| A18C141            | 283-0180-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP.,FXD,CER DI:5600PF,20%,200V                                           | 72982                                                                                                           |                                                                                                                |                          |
| A18C142            | 283-0108-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B010100 B030919                                                                      | CAP.,FXD,CER DI:220PF,10%,200V                                            | 56289                                                                                                           | 272C13                                                                                                         |                          |
| A18C142            | 283-0108-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B030920                                                                              | CAP., FXD, CER DI: 220PF, 10%, 200V                                       | 56289                                                                                                           | 272C13                                                                                                         |                          |
| 4190147            | 000 0101 00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | (NOMINAL VALUE, SELECTED)                                                 |                                                                                                                 |                                                                                                                | , and the part           |
| A18C147            | 283-0181-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B010100 B010199                                                                      | CAP., FXD, CER DI:1.8PF, 10%, 100V                                        | 72982                                                                                                           | 8101B121C0K0189B                                                                                               |                          |
| A18C147            | 283-0160-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B010200                                                                              | CAP., FXD, CER DI:1.5PF, 10%, 50V                                         | 72982                                                                                                           | 8101A058C0K159B                                                                                                |                          |
| A18C148            | 283-0160-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP.,FXD,CER DI:1.5PF,10%,50V                                             | 72982                                                                                                           | 8101A058C0K159B                                                                                                |                          |
| A18C161            | 283-0001-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., FXD, CER DI:0.005UF, +100-0%, 500V                                  | 72982                                                                                                           | 921-550#5020                                                                                                   | <br>                     |
| A18C168            | 283-0348-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., FXD, CER DI:0.5PF, +/-0.1PF, 100V                                   | 51642                                                                                                           |                                                                                                                |                          |
|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                      | (NOMINAL VALUE, SELECTED)                                                 | 51042                                                                                                           | 100-100-NP0-508B                                                                                               |                          |
| A18C169            | 283-0203-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., FXD, CER DI:0.47UF, 20%, 50V                                        | 72982                                                                                                           | 8131N075E474M                                                                                                  |                          |
| A18C170            | 283-0239-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., FXD, CER DI:0.470F, 20%, 50V<br>CAP., FXD, CER DI:0.022UF, 10%, 50V | 72982                                                                                                           |                                                                                                                |                          |
|                    | 203 0237 00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAT., FAD, CER D1.0.0220F, 10%, 50V                                       | 12902                                                                                                           | 0121NU03X/RU223K                                                                                               | En-Models                |
| A18C171            | 283-0114-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., FXD, CER DI:0.0015UF, 5%, 200V                                      | 72982                                                                                                           | 805-509B152J                                                                                                   |                          |
| A18C172            | 283-0128-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., FXD, CER DI: 100PF, 5%, 500V                                        | 72982                                                                                                           | 871-536T2H101J                                                                                                 |                          |
| A18C177            | 283-0181-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B010100 B010199                                                                      | CAP., FXD, CER DI:1.8PF, 10%, 100V                                        | 72982                                                                                                           |                                                                                                                |                          |
| A18C177            | 283-0160-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B010200                                                                              | CAP., FXD, CER DI:1.5PF, 10%, 50V                                         | 72982                                                                                                           |                                                                                                                | ****                     |
| A18C178            | 283-0160-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., FXD, CER DI:1.5PF, 10%, 50V                                         | 72982                                                                                                           | 8101A058C0K159B                                                                                                |                          |
|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                      | , ,                                                                       |                                                                                                                 |                                                                                                                |                          |
| A18C206            | 290-0745-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP.,FXD,ELCTLT:22UF,+50-10%,25V                                          | 56289                                                                                                           | 502D225                                                                                                        |                          |
| A18C207            | 283-0001-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., FXD, CER DI:0.005UF, +100-0%, 500V                                  | 72982                                                                                                           | 831-559E502P                                                                                                   |                          |
| A18C208            | 283-0001-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP.,FXD,CER DI:0.005UF,+100-0%,500V                                      | 72982                                                                                                           | 831-559E502P                                                                                                   |                          |
| A18C209            | 283-0001-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP.,FXD,CER DI:0.005UF,+100-0%,500V                                      | 72982                                                                                                           | 831-559E502P                                                                                                   |                          |
| A18C210            | 283-0001-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP.,FXD,CER DI:0.005UF,+100-0%,500V                                      | 72982                                                                                                           | 831-559E502P                                                                                                   |                          |
| A18C211            | 290-0745-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      |                                                                           |                                                                                                                 | 500-045                                                                                                        |                          |
| A180211<br>A180213 | 290-0745-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., FXD, ELCTLT: 22UF, +50-10%, 25V                                     | 56289                                                                                                           | 502D225                                                                                                        | (19.49));                |
| A18C226            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                      | CAP., FXD, ELCTLT: 22UF, +50-10%, 25V                                     | 56289                                                                                                           | 502D225                                                                                                        |                          |
| A18C229            | 283-0001-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | CAP., FXD, CER DI:0.005UF, +100-0%, 500V                                  | 72982                                                                                                           | 831-559E502P                                                                                                   |                          |
| A180229            | 283-0001-00<br>SELECTED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                      | CAP.,FXD,CER DI:0.005UF,+100-0%,500V                                      | 72982                                                                                                           | 831-559E502P                                                                                                   |                          |
| *** 000            | 00000160                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                      |                                                                           |                                                                                                                 |                                                                                                                | and they                 |
| A18L7              | 108-0369-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | COIL, RF:0,12UH                                                           | 80009                                                                                                           | 108-0369-00                                                                                                    |                          |
| A18L20             | 114-0222-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | COIL, RF: 2-6UH, CORE 276-0568-00                                         | 80009                                                                                                           | 114-0222-00                                                                                                    |                          |
| A18L26             | SELECTED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                      | , ,                                                                       |                                                                                                                 |                                                                                                                |                          |
| A18L27             | 108-0369-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | COIL, RF:0.12UH                                                           | 80009                                                                                                           | 108-0369-00                                                                                                    |                          |
| A18L201            | 108-0245-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | COIL, RF: 3.9UH                                                           | 76493                                                                                                           |                                                                                                                |                          |
| 4187.000           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                      |                                                                           |                                                                                                                 |                                                                                                                |                          |
| A18L203            | 108-0245-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | COIL, RF: 3.9UH                                                           | 76493                                                                                                           | B6310-1                                                                                                        |                          |
| A18L213            | 108-0245-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | COIL,RF:3.9UH                                                             | 76493                                                                                                           | B6310-1                                                                                                        | an the second            |
| A18LR207           | 108-0330-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | COIL,RF:0.4UH                                                             | 80009                                                                                                           | 108-0330-00                                                                                                    |                          |
| A18LR208           | 108-0325-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | COIL,RF:0.5UH                                                             | 80009                                                                                                           | 108-0325-00                                                                                                    |                          |
| A18LR209           | 108-0325-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | COIL,RF:0.5UH                                                             | 80009                                                                                                           | 108-0325-00                                                                                                    |                          |
| A18LR210           | 108-0325-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      |                                                                           | 80000                                                                                                           | 108-0335-00                                                                                                    |                          |
| A18LR229           | 108-0325-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | COIL, RF:0.5UH                                                            | 80009                                                                                                           | 108-0325-00                                                                                                    | -900 BA                  |
| A18Q63             | 151-0190-05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      | COIL, RF:0.50H<br>TRANSISTOR:SILLCON NRN                                  | 80009                                                                                                           | 108-0325-00                                                                                                    |                          |
|                    | 101-01-01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                      | TRANSISTOR:SILICON, NPN                                                   | 80009                                                                                                           | 151-0190-05                                                                                                    |                          |
|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                      |                                                                           |                                                                                                                 |                                                                                                                |                          |

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| Component No.                                           | Tektronix<br>Part No.      | Serial/Model No.<br>Eff Dscont | Name & Description                                                   | Mfr                                                    | Mfr Part Number    |
|---------------------------------------------------------|----------------------------|--------------------------------|----------------------------------------------------------------------|--------------------------------------------------------|--------------------|
| "Sensible body to consider any considered and the sense |                            |                                |                                                                      | CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR | WIII Falt Nulliver |
| A18Q71                                                  | 151-0190-05                |                                | TRANSISTOR: SILICON, NPN                                             | 80009                                                  | 151-0190-05        |
| A18Q77                                                  | 151-0188-03                |                                | TRANSISTOR: SILICON, PNP, SEL                                        | 80009                                                  | 151-0188-03        |
| A18Q79                                                  | 151-0302-01                |                                | TRANSISTOR: SILICON, NPN, SEL                                        | 80009                                                  | 151-0302-01        |
| A18Q93                                                  | 151-0190-05                |                                | TRANSISTOR: SILICON, NPN                                             | 80009                                                  |                    |
| A18097                                                  | 151-0188-03                |                                | TRANSISTOR: SILICON, PNP, SEL                                        |                                                        | 151-0188-03        |
| A18099                                                  | 151-0302-01                |                                | TRANSISTOR: SILICON, NPN, SEL                                        | 80009                                                  |                    |
| A18Q123                                                 | 151-0190-05                |                                | TRANSISTOR: SILICON, NPN                                             | 80009                                                  | 151-0190-05        |
| A18Q124                                                 | 151-0190-05                |                                | TRANSISTOR: SILICON, NPN                                             | 80009                                                  |                    |
| A18Q125                                                 |                            |                                |                                                                      |                                                        |                    |
| •                                                       | 151-0302-01                |                                | TRANSISTOR: SILICON, NPN, SEL                                        | 80009                                                  |                    |
| A18Q192                                                 | 151-0126-01                |                                | TRANSISTOR: SILICON, NPN, PRESTRESSED                                |                                                        | 151-0126-01        |
| A18Q196<br>A18R6                                        | 151-0390-00<br>317-0270-00 |                                | TRANSISTOR:SILICON,NPN<br>RES.,FXD,CMPSN:27 OHM,5%.0.125W            | 04713<br>01121                                         |                    |
|                                                         |                            |                                |                                                                      | 01121                                                  | BB2705             |
| A18R7                                                   | 322-0114-00                |                                | RES.,FXD,FILM:150 OHM,1%,0.25W                                       | 75042                                                  | CEBT0-1500F        |
| A18R8                                                   | 321-0039-00                |                                | RES., FXD, FILM: 24.9 OHM, 1%, 0.125W                                | 91637                                                  | MFF1816G24R90F     |
| A18R9                                                   | 317-0047-00                |                                | RES., FXD, CMPSN: 4.7 OHM, 5%, 0.125W                                |                                                        | BB47G5             |
| A18R11                                                  | 323-0069-00                |                                | RES., FXD, FILM: 51.1 OHM, 1%, 0.50W                                 | 91637                                                  |                    |
| A18R12                                                  | 317-0101-00                |                                | RES., FXD, CMPSN: 100 OHM, 5%, 0.125W                                |                                                        |                    |
| A18R14                                                  | 317-0360-00                |                                |                                                                      |                                                        | BB1015             |
| ATORIA                                                  | 317-0380-00                |                                | RES.,FXD,CMPSN:36 OHM,5%,0.125W                                      | 01121                                                  | BB3605             |
| A18R18                                                  | 311-0635-00                |                                | RES.,VAR,NONWIR:1K OHM,10%,0.50W                                     | 73138                                                  | 82-32-0            |
| A18R20                                                  | 315-0561-00                |                                | RES., FXD, CMPSN: 560 OHM, 5%, 0.25W                                 | 01121                                                  | CB5615             |
| A18R21                                                  | 315-0561-00                |                                | RES., FXD, CMPSN: 560 OHM, 5%, 0.25W                                 | 01121                                                  |                    |
| A18R26                                                  | 317-0270-00                |                                | RES., FXD, CMPSN: 27 OHM, 5%, 0.125W                                 | 01121                                                  |                    |
| A18R27                                                  | 322-0114-00                |                                | RES., FXD, FILM: 150 OHM, 1%, 0.25W                                  | 75042                                                  |                    |
| A18R28                                                  | 321-0039-00                |                                | RES.,FXD,FILM:150 OHM,1%,0.25W<br>RES.,FXD,FILM:24.9 OHM,1%,0.125W   | 91637                                                  | MFF1816G24R90F     |
| 110000                                                  |                            |                                |                                                                      |                                                        |                    |
| A18R29                                                  | 317-0047-00                |                                | RES.,FXD,CMPSN:4.7 OHM,5%,0.125W                                     | 01121                                                  |                    |
| A18R31                                                  | 323-0069-00                |                                | RES., FXD, FILM: 51.1 OHM, 1%, 0.50W                                 | 91637                                                  | MFF1226G51R10F     |
| A18R32                                                  | 317-0101-00                |                                | RES., FXD, CMPSN: 100 OHM, 5%, 0.125W                                | 01121                                                  |                    |
| A18R34                                                  | 317-0360-00                |                                | RES., FXD, CMPSN: 36 OHM, 5%, 0.125W                                 | 01121                                                  |                    |
| A18R41                                                  | 323-0121-00                |                                | RES., FXD, FILM: 178 OHM, 1%, 0.50W                                  | 75042                                                  |                    |
| A18R42                                                  | 315-0820-00                |                                | RES., FXD, CMPSN:82 OHM, 5%, 0.25W                                   |                                                        | CB8205             |
| A18R43                                                  | SELECTED                   |                                |                                                                      |                                                        |                    |
| A18R46                                                  |                            |                                |                                                                      |                                                        |                    |
|                                                         | 315-0820-00                |                                | RES.,FXD,CMPSN:82 OHM,5%,0.25W                                       | 01121                                                  | CB8205             |
| A18R47                                                  | SELECTED                   |                                |                                                                      |                                                        |                    |
| A18R48                                                  | 323-0121-00                |                                | RES.,FXD,FILM:178 OHM,1%,0.50W                                       | 75042                                                  | CECT0-1780F        |
| A18R62                                                  | 315-0621-00                |                                | RES.,FXD,CMPSN:620 OHM,5%,0.25W                                      | 01121                                                  | CB6215             |
| A18R63                                                  | 315-0103-00                |                                | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W                                 | 01121                                                  | CB1035             |
| A18R64                                                  | 321-0186-00                |                                | RES.,FXD,FILM:845 OHM,1%,0.125W                                      | 91637                                                  | MFF1816G845R0F     |
| A18R65                                                  | 311-0622-01                |                                | RES., VAR, NONWIR: 100 OHM, 10%, 0.50W                               | 32997                                                  |                    |
| A18R68                                                  | 321-0114-00                |                                |                                                                      |                                                        | 3326H-K28-101      |
| A18R69                                                  |                            |                                | RES., FXD, FILM: 150 OHM, 1%, 0.125W                                 |                                                        | MFF1816G150R0F     |
|                                                         | 321-0126-00                |                                | RES., FXD, FILM: 200 OHM, 1%, 0.125W                                 |                                                        | MFF1816G200R0F     |
| A18R71                                                  | 315-0911-00                |                                | RES.,FXD,CMPSN:910 OHM,5%,0.25W                                      | 01121                                                  | CB9115             |
| A18R72                                                  | 315-0510-00                |                                | RES.,FXD,CMPSN:51 OHM,5%,0.25W                                       | 01121                                                  | CB5105             |
| A18R73                                                  | 321-0081-00                |                                | RES.,FXD,FILM:68.1 OHM,1%,0.125W                                     | 91637                                                  | MFF1816G68R10F     |
| A18R74                                                  | 321-0135-00                |                                | RES., FXD, FILM: 249 OHM, 1%, 0.125W                                 | 91637                                                  | MFF1816G249R0F     |
| A18R75                                                  | 321-0251-00                |                                | RES., FXD, FILM: 4.02K OHM, 1%, 0.125W                               |                                                        |                    |
| A18R76                                                  | 321-0123-00                |                                |                                                                      | 91637                                                  | MFF1816G40200F     |
| A18R77                                                  |                            |                                | RES., FXD, FILM: 187 OHM, 1%, 0.125W                                 | 91637                                                  | MFF1816G187R0F     |
| A18R79                                                  | 315-0361-00<br>321-0203-00 |                                | RES.,FXD,CMPSN:360 OHM,5%,0.25W<br>RES.,FXD,FILM:1.27K OHM,1%,0.125W | 01121                                                  | CB3615             |
|                                                         |                            |                                | 100., FAD, FILM. 1. 2/K UNFI, 16, U. 12. JW                          | 91637                                                  | MFF1816G12700F     |
| A18R81                                                  | 311-1261-00                | B010100 B010175                | RES.,VAR,NONWIR:500 OHM,10%,0.50W                                    | 32997                                                  | 3329P-L58-501      |
| A18R81                                                  | 311-1263-00                | B010176                        | RES., VAR, NONWIR: 1K OHM, 10%, 0.50W                                | 32997                                                  | 3329P-L58-102      |
| A18R82                                                  | 321-0259-00                |                                | RES., FXD, FILM: 4.87K OHM, 1%, 0.125W                               | 91637                                                  | MFF1816G48700F     |
| A18R88                                                  | 321-0114-00                |                                | RES.,FXD,FILM:150 OHM,1%,0.125W                                      | 91637                                                  | MFF1816G150R0F     |
| A18R89                                                  | 321-0126-00                |                                | RES., FXD, FILM: 200 OHM, 1%, 0.125W                                 | 91637                                                  | MFF1816G200R0F     |
| A18R91                                                  | 315-0911-00                |                                | RES., FXD, CMPSN: 910 OHM, 5%, 0.25W                                 |                                                        | CB9115             |
| A18R92                                                  | 321_0060 00                |                                |                                                                      |                                                        |                    |
| A18R92<br>A18R93                                        | 321-0068-00<br>321-0081-00 |                                | RES.,FXD,FILM:49.9 OHM,1%,0.125W<br>RES.,FXD,FILM:68.1 OHM,1%,0.125W |                                                        | MFF1816G49R90F     |
| -                                                       |                            |                                |                                                                      | 91037                                                  | MFF1816G68R10F     |
|                                                         |                            |                                |                                                                      |                                                        |                    |

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|               | Tektronix              | Serial/Model No. |                                                                  | Mfr   |                                |
|---------------|------------------------|------------------|------------------------------------------------------------------|-------|--------------------------------|
| Component No. | Part No.               | Eff Dscont       | Name & Description                                               | Code  | Mfr Part Number                |
| A18R94        | 321-0135-00            |                  | RES., FXD, FILM: 249 OHM, 1%, 0.125W                             | 91637 | MFF1816G249R0F                 |
| A18R95        | 321-0251-00            |                  | RES., FXD, FILM: 4.02K OHM, 1%, 0.125W                           | 91637 | MFF1816G40200F                 |
| A18R96        | 321-0123-00            |                  | RES., FXD, FILM: 187 OHM, 1%, 0.125W                             | 91637 | MFF1816G187R0F                 |
| A18R97        | 315-0361-00            |                  | RES., FXD, CMPSN: 360 OHM, 5%, 0.25W                             | 01121 | CB3615                         |
| A18R99        | 321-0203-00            |                  | RES.,FXD,FILM:1.27K OHM,1%,0.125W                                | 91637 | MFF1816G12700F                 |
| A18R104       | 321-0214-00            |                  | RES.,FXD,FILM:1.65K OHM,1%,0.125W                                | 91637 | MFF1816G16500F                 |
| A18R105       | 311-1262-00            |                  | RES.,VAR,NONWIR:750 OHM,10%,0.50W                                | 32997 | 3329P-L58-751                  |
| A18R106       | 321-0214-00            |                  | RES.,FXD,FILM:1.65K OHM,1%,0.125W                                | 91637 |                                |
| A18R107       | 321-0101-00            |                  | RES., FXD, FILM: 110 OHM, 1%, 0.125W                             | 91637 | MFF1816G110R0F                 |
| A18R111       | 322-0114-00            |                  | RES.,FXD,FILM:150 OHM,1%,0.25W                                   | 75042 | CEBT0-1500F                    |
| A18R112       | 322-0114-00            |                  | RES., FXD, FILM: 150 OHM, 1%, 0.25W                              | 75042 | CEBTO-1500F                    |
| A18R113       | 321-0059-00            |                  | RES., FXD, FILM: 40.2 OHM, 1%, 0.125W                            | 91637 | MFF1816G40R20F                 |
| A18R121       | 315-0472-00            |                  | RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W                            |       | CB4725                         |
| A18R122       | 315-0472-00            |                  | RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W                            |       | CB4725                         |
| A18R123       | 315-0222-00            |                  | RES.,FXD,CMPSN:2.2K OHM,5%,0.25W                                 | 01121 | CB2225                         |
| A18R124       | 315-0271-00            |                  | RES.,FXD,CMPSN:270 OHM,5%,0.25W                                  |       | CB2715                         |
| A18R125       | 315-0621-00            |                  | RES.,FXD,CMPSN:620 OHM,5%,0.25W                                  | 01121 |                                |
| A18R126       | 323-0006-00            |                  | RES.,FXD,FILM:11.3 OHM,1%,0.5W                                   | 24546 |                                |
| A18R127       | 323-0088-00            |                  | RES., FXD, FILM:80.6 OHM, 1%, 0.50W                              | 75042 |                                |
| A18R133       | 317-0470-00            |                  | RES.,FXD,CMPSN:47 OHM,5%,0.125W                                  | 01121 | BB4705                         |
| A18R136       | 323-0097-00            |                  | RES.,FXD,FILM:100 OHM,1%,0.50W                                   | 75042 | CECT0-1000F                    |
| A18R137       | 323-0097-00            |                  | RES., FXD, FILM: 100 OHM, 1%, 0.50W                              | 75042 | CECT0-1000F                    |
| A18R138       | 317-0510-00            |                  | RES., FXD, CMPSN:51 OHM, 5%, 0.125W<br>(NOMINAL VALUE, SELECTED) | 01121 | BB5105                         |
| A18R139       | 311-1265-00            | B010100 B030919  | RES., VAR, NONWIR: 2K OHM, 10%, 0.50W                            | 32997 | 3329P-L58-202                  |
| A18R139       | 311-1862-00            | B030920          | RES.,VAR,NONWIR:5K OHM,10%,0.50W                                 | 73138 | 82-102-1                       |
| A18R140       | 315-0471-00            |                  | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W                             | 01121 | CB4715                         |
|               |                        |                  | (NOMINAL VALUE, SELECTED)                                        |       |                                |
| A18R141       | 315-0751-00            |                  | RES.,FXD,CMPSN:750 OHM,5%,0.25W<br>(NOMINAL VALUE, SELECTED)     | 01121 | CB7515                         |
| A18R142       | 311-1261-00            |                  | RES.,VAR,NONWIR:500 OHM,10%,0.50W                                | 32997 | 3329P-L58-501                  |
| A18R143       | SELECTED               |                  |                                                                  |       |                                |
| A18R146       | 323-0069-00            |                  | RES., FXD, FILM: 51.1 OHM, 1%, 0.50W                             | 91637 | MFF1226G51R10F                 |
| A18R147       | 317-0101-00            |                  | RES., FXD, CMPSN: 100 OHM, 5%, 0.125W                            | 01121 | BB1015                         |
| A18R160       | 311-0622-01            |                  | RES., VAR, NONWIR: 100 OHM, 10%, 0.50W                           | 32997 | 3326н-к28-101                  |
| A18R163       | 317-0470-00            |                  | RES.,FXD,CMPSN:47 OHM,5%,0.125W                                  | 01121 | BB4705                         |
| A18R166       | 323-0097-00            |                  | RES., FXD, FILM: 100 OHM, 1%, 0.50W                              | 75042 |                                |
| A18R167       | 323-0097-00            |                  | RES., FXD, FILM: 100 OHM, 1%, 0.50W                              |       | CECT0-1000F                    |
| A18R169       | 311-0635-00            |                  | RES., VAR, NONWIR: 1K OHM, 10%, 0.50W                            | 73138 | 82-32-0                        |
| A18R170       | 315-0471-00            |                  | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W                             | 01121 | CB4715                         |
|               | 100 MT AB 100 100      |                  | (NOMINAL VALUE, SELECTED)                                        |       |                                |
| A18R171       | 315-0561-00            |                  | RES.,FXD,CMPSN:560 OHM,5%,0.25W                                  | 01121 | CB5615                         |
| A18R172       | 311-1261-00            |                  | (NOMINAL VALUE, SELECTED)<br>RES.,VAR,NONWIR:500 OHM,10%,0.50W   | 32997 | 3329P-L58-501                  |
|               | and the set of the set |                  | (NOMINAL VALUE, SELECTED)                                        |       |                                |
| A18R173       | SELECTED               |                  |                                                                  |       |                                |
| A18R176       | 323-0069-00            |                  | RES.,FXD,FILM:51.1 OHM,1%,0.50W                                  |       | MFF1226G51R10F                 |
| A18R177       | 317-0101-00            |                  | RES., FXD, CMPSN: 100 OHM, 5%, 0.125W                            | 01121 |                                |
| A18R191       | 321-0324-00            |                  | RES., FXD, FILM: 23.2K OHM, 1%, 0.125W                           |       | MFF1816G23201F                 |
| A18R192       | 321-0289-00            |                  | RES., FXD, FILM: 10K OHM, 1%, 0.125W                             | 91637 |                                |
| A18R193       | 315-0472-00            |                  | RES.,FXD,CMPSN:4.7K OHM,5%,0.25W                                 | 01121 | CB4725                         |
| A18R194       | 315-0362-00            |                  | RES.,FXD,CMPSN:3.6K OHM,5%,0.25W                                 |       | CB3625                         |
| A18R196       | 315-0362-00            |                  | RES., FXD, CMPSN: 3.6K OHM, 5%, 0.25W                            |       | CB3625                         |
| A18R201       | 323-0064-00            |                  | RES., FXD, FILM: 45.3 OHM, 1%, 0.50W                             |       | MFF1226G45R30F                 |
| A18R202       | 323-0064-00            |                  | RES., FXD, FILM: 45.3 OHM, 1%, 0.50W                             |       | MFF1226G45R30F<br>CECTO-61R90F |
| A18R203       | 323-0077-00            |                  | RES.,FXD,FILM:61.9 OHM,1%,0.50W                                  | /3042 | GECIU-UIR90F                   |
| A18R226       | 322-0086-00            |                  | RES., FXD, FILM: 76.8 OHM, 1%, 0.25W                             |       |                                |
|               | 522 0000 00            |                  |                                                                  |       |                                |

| Component No.                                       | Tektronix<br>Part No.                                                   | Serial/<br>Eff | Model No.<br>Dscont | Name & Description                                                                                                                                                                                | Mfr<br>Code                               | Mfr Part Number                         |
|-----------------------------------------------------|-------------------------------------------------------------------------|----------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----------------------------------------|
| A18R228<br>A18RT133<br>A18U50<br>A18U150<br>A18W227 | 322-0189-00<br>307-0364-00<br>155-0059-00<br>155-0064-00<br>131-0566-00 |                |                     | RES., FXD, FILM:909 OHM, 1%, 0.25W<br>RES., THERMAL:50 OHM, 5%, 0.125W<br>MICROCIRCUIT, LI:ML, HIGH FREQUENCY AMPL<br>MICROCIRCUIT, LI:OUTPUT AMPLIFIER<br>BUS CONDUCTOR:DUMMY RES, 2.375, 22 AWG | 75042<br>15454<br>80009<br>80009<br>55210 | DG125500J<br>155-0059-00<br>155-0064-00 |

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| Component No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Tektronix<br>Part No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Serial/Model No. | Nome 9 Dependention                                                            | Mfr            |                  |           |
| THE CONTRACTOR OF CONTRACTOR OF THE SECTOR O | APP IN THE ROLE AND ADDRESS AND ADDRESS AND ADDRESS ADDR | Eff Dscont       | Name & Description                                                             | Code           | Mfr Part Number  | ~         |
| A19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  | CKT BOARD ASSY:VERTICAL CHANNEL SW                                             |                |                  |           |
| A19C11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 281-0811-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP.,FXD,CER DI:10PF,10%,100V                                                  | 72982          | 8035D2AADC1G100K |           |
| A19C12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 281-0775-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP.,FXD,CER DI:0.1UF,20%,50V                                                  | 72982          | 8005D9AABZ5U104M |           |
| A19C13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 281-0775-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V                                              | 72982          | 8005D9AABZ5U104M |           |
| A19C25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 285-0650-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, PLSTC: 0.027UF, 5%, 100V                                            | 56289          |                  |           |
| A19C30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 285-0598-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP.,FXD,PLSTC:0.01UF,5%,100V                                                  | 01002          | 61F10AC103       |           |
| A19C33                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 285-0643-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                                                                                |                |                  |           |
| A19C37                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 283-0666-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, PLSTC: 0.0047UF, 5%, 100V                                           | 56289          | 410P374          |           |
| A19C42                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  | CAP., FXD, MICA D: 890PF, 2%, 100V                                             | 00853          | D151F891G0       |           |
| A19C50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 283-0649-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, MICA D:105PF, 1%, 300V                                              | 00853          | D153F1050F0      |           |
| A19C53                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 281-0204-00<br>281-0775-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  | CAP., VAR, PLSTC: 2-22PF, 100V                                                 | 80031          | 287C00222MJ02    |           |
| A19C79                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 281-0775-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V                                              | 72982          |                  |           |
| M19079                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 201-0775-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V                                              | 72982          | 8005D9AABZ5U104M |           |
| A19C80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 290-0846-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP.,FXD,ELCTLT:47UF,-10+75%,35 WVDC                                           | 54473          | CC-435W/7LU      |           |
| A19C83                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 281-0775-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V                                              |                |                  |           |
| A19C88                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 281-0810-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, CER DI:5.6PF, 0.5%, 100V                                            | 72982<br>72982 | 8005D9AABZ5U104M |           |
| A19C111                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 281-0811-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, CER DI: 10PF, 10%, 100V                                             | 72982          | 1035D2ADC0G569D  |           |
| A19C112                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 281-0775-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V                                              | 72982          | 8035D2AADC1G100K |           |
| A19C113                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 281-0775-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, CER DI:0.10F, 20%, 50V                                              |                | 8005D9AABZ5U104M |           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  | on ., rkb, ook b1.0.10F, 20%, 90V                                              | 72982          | 8005D9AABZ5U104M |           |
| A19C125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 285-0650-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP.,FXD,PLSTC:0.027UF,5%,100V                                                 | 56289          | 410P104          |           |
| A19C130                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 285-0598-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, PLSTC: 0.01UF, 5%, 100V                                             | 01002          | 61F10AC103       |           |
| A19C133                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 285-0643-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, PLSTC: 0.0047UF, 5%, 100V                                           | 56289          | 410P374          |           |
| A19C137                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 283-0666-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, MICA D:890PF, 2%, 100V                                              | 00853          | D151F891G0       |           |
| A19C142                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 283-0649-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, MICA D:105PF, 1%, 300V                                              | 00853          | D153F1050F0      |           |
| A19C150                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 281-0204-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., VAR, PLSTC: 2-22PF, 100V                                                 | 80031          | 287C00222MJ02    | · • •     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |                                                                                |                |                  |           |
| A19C153                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 281-0775-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP.,FXD,CER DI:0.1UF,20%,50V                                                  | 72982          | 8005D9AABZ5U104M |           |
| A19C179                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 281-0775-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP.,FXD,CER DI:0.1UF,20%,50V                                                  | 72982          | 8005D9AABZ5U104M |           |
| A19C180                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 290-0846-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, ELCTLT: 47UF, -10+75%, 35 WVDC                                      | 54473          | ECE-A35V47LU     |           |
| A19C183                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 281-0775-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V                                              | 72982          | 8005D9AABZ5U104M |           |
| A19C188                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 281-0810-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP.,FXD,CER DI:5.6PF,0.5%,100V                                                | 72982          | 1035D2ADC0G569D  |           |
| A19C195                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 281-0218-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., VAR, CER DI:1-5PF, +2-2.5%, 100V                                         | 72982          | 513013A1-5       |           |
| A19C221                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 290-0745-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP.,FXD,ELCTLT:22UF,+50-10%,25V                                               | 5(000          | 5000005          |           |
| A19C222                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 290-0745-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, ELCTLT: 220F, +50-10%, 25V                                          | 56289          | 502D225          | -         |
| A19C223                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 290-0745-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, ELCTLT: 220F, +50-10%, 25V<br>CAP., FXD, ELCTLT: 220F, +50-10%, 25V | 56289          | 502D225          |           |
| A19C224                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 290-0745-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, ELCTLT: 22UF, +50-10%, 25V                                          | 56289          | 502D225          |           |
| A19C234                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 290-0782-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, ELCTLT: 4.7UF, +75-10%, 25V                                         | 56289          | 502D225          |           |
| A19C235                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 290-0782-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, ELCTLT: 4.70F, +75-10%, 35V                                         | 55680<br>55680 | 35ULA4R7V-T      |           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  | Sin . ,1 MD , 1101 E1 . 4 . 7 0F , 7 7 - 10% , 5 5 V                           | 10000          | 35ULA4R7V-T      |           |
| A19C242                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 281-0775-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V                                              | 72982          | 8005D9AABZ5U104M |           |
| A19CR94                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0153-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | SEMICOND DEVICE: SILICON, 15V, 50MA                                            | 07263          | FD7003           |           |
| A19CR95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0153-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | SEMICOND DEVICE:SILICON, 15V, 50MA                                             |                | FD7003           |           |
| A19CR99                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0141-02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | SEMICOND DEVICE: SILICON, 30V, 150MA                                           |                | 1N4152R          |           |
| A19L221                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 108-0245-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | COIL, RF: 3.9UH                                                                |                | B6310-1          |           |
| A19L222                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 108-0245-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | COIL, RF: 3.9UH                                                                |                | B6310-1          |           |
| A19L223                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 108-0245-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                                                                                |                |                  | ~         |
| A19L224                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 108-0245-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | COIL, RF: 3.9UH                                                                | 76493          | B6310-1          |           |
| A19Q59                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0192-03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | COIL, RF: 3.90H                                                                | 76493          | B6310-1          |           |
| A19Q60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0192-03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | TRANSISTOR: SILICON, NPN                                                       | 80009          | 151-0192-03      |           |
| A19Q69                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0190-05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | TRANSISTOR: SILICON, NPN                                                       | 80009          | 151-0192-03      |           |
| A19Q70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0190-05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | TRANSISTOR: SILICON, NPN                                                       | 80009          | 151-0190-05      |           |
| /\                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 191 0190-03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | TRANSISTOR:SILICON, NPN                                                        | 80009          | 151-0190-05      |           |
| A19Q79                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0451-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | TRANSISTOR:SILICON,NPN                                                         | 02735          | 65128            |           |
| A19Q86                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0192-03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | TRANSISTOR: SILICON, NPN                                                       | 80009          | 151-0192-03      |           |
| A19Q87                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0220-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | TRANSISTOR: SILICON, PNP                                                       | 07263          | S036228          |           |
| A19Q88                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0192-03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | TRANSISTOR: SILICON, NPN                                                       | 80009          | 151-0192-03      |           |
| A19Q99                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0190-05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | TRANSISTOR: SILICON, NPN                                                       | 80009          | 151-0190-05      |           |
| A19Q159                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 151-0192-03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | TRANSISTOR: SILICON, NPN                                                       | 80009          | 151-0192-03      |           |
| A19Q160                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 151-0102 02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                                                                                | -              |                  |           |
| A19Q169                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 151-0192-03<br>151-0190-05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  | TRANSISTOR: SILICON, NPN                                                       | 80009          | 151-0192-03      |           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1)1 0170-0J                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | TRANSISTOR:SILICON,NPN                                                         | 80009          | 151-0190-05      |           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |                                                                                |                |                  | - A halos |

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|                    |                  | Tektronix                  | Serial/Model No. |                                                                              | Mfr            |                                  |
|--------------------|------------------|----------------------------|------------------|------------------------------------------------------------------------------|----------------|----------------------------------|
| gaine de la c      | Component No.    | Part No.                   | Eff Dscont       | Name & Description                                                           |                | Mfr Part Number                  |
|                    | A19Q170          | 151-0190-05                |                  | TRANSISTOR:SILICON, NPN                                                      | 80000          | 151-0190-05                      |
|                    | A19Q179          | 151-0451-00                |                  | TRANSISTOR: SILICON, NPN                                                     |                | 65128                            |
| Jan - Malain       | A19Q186          | 151-0192-03                |                  | TRANSISTOR: SILICON, NPN                                                     |                | 151-0192-03                      |
|                    | A19Q187          | 151-0220-00                |                  | TRANSISTOR: SILICON, PNP                                                     |                | S036228                          |
|                    | A19Q188          | 151-0192-03                |                  | TRANSISTOR: SILICON, NPN                                                     | 80009          | 151-0192-03                      |
|                    | A19Q233          | 151-0188-03                |                  | TRANSISTOR: SILICON, PNP, SEL                                                | 80009          | 151-0188-03                      |
|                    | A19Q243<br>A19R6 | 151-0188-03                |                  | TRANSISTOR: SILICON, PNP, SEL                                                |                | 151-0188-03                      |
|                    | A19R7            | 321-0289-00                |                  | RES., FXD, FILM: 10K OHM, 1%, 0.125W                                         |                | MFF1816G10001F                   |
|                    | A19R9            | 321-0289-00<br>321-0335-00 |                  | RES.,FXD,FILM:10K OHM,1%,0.125W<br>RES.,FXD,FILM:30.1K OHM,1%,0.125W         |                | MFF1816G10001F                   |
| Vite Artist,       | (10-1)           |                            |                  | RD., 1 RD, F 194. 30.1K OH4, 1%, 0.123W                                      | 91037          | MFF1816G30101F                   |
|                    | A19R11           | 321-0335-00                |                  | RES., FXD, FILM: 30.1K OHM, 1%, 0.125W                                       | 91637          | MFF1816G30101F                   |
|                    | A19R12<br>A19R13 | 315-0101-00<br>315-0101-00 |                  | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W                                         |                | CB1015                           |
|                    | A19R20           | 311-1235-00                |                  | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W                                         |                | CB1015                           |
| 5×6 - 10×1+1       | A19R21           | 315-0104-00                | B010100 B030899  | RES.,VAR,NONWIR:100K OHM,20%,0.50W<br>RES.,FXD,CMPSN:100K OHM,5%,0.25W       | 32997          | 3386F-T04-104<br>CB1045          |
|                    | 410701           |                            |                  |                                                                              | 01121          | 001040                           |
|                    | A19R21           | 315-0913-00                | B030900          | RES.,FXD,CMPSN:91K OHM,5%,0.25W                                              | 01121          | CB9135                           |
|                    | A19R22<br>A19R22 | 315-0564-00                | B010100 B030899  | RES., FXD, CMPSN: 560K OHM, 5%, 0.25W                                        |                | CB5645                           |
| Call of the second | A19R24           | 315-0224-00<br>315-0203-00 | B030900          | RES., FXD, CMPSN: 220K OHM, 5%, 0.25W                                        |                | CB2245                           |
|                    | A19R25           | 311-1214-00                |                  | RES.,FXD,CMPSN:20K OHM,5%,0.25W<br>RES.,VAR,NONWIR:200K OHM,20%,0.50W        |                | CB2035                           |
|                    |                  |                            |                  | RES., VAR, NONWIR: 200K OHM, 20%, 0.50W                                      | /3138          | 72-16-0                          |
|                    | A19R26           | 315-0204-00                |                  | RES., FXD, CMPSN: 200K OHM, 5%, 0.25W                                        | 01121          | CB2045                           |
| approximate        | A19R29           | 315-0474-00                |                  | RES., FXD, CMPSN: 470K OHM, 5%, 0.25W                                        | 01121          | CB4745                           |
|                    | A19R30<br>A19R32 | 315-0474-00                |                  | RES., FXD, CMPSN: 470K OHM, 5%, 0.25W                                        |                | CB4745                           |
|                    | A19R33           | 315-0163-00<br>311-1235-00 |                  | RES., FXD, CMPSN: 16K OHM, 5%, 0.25W                                         |                | CB1635                           |
|                    |                  | 511 12.55 00               |                  | RES.,VAR,NONWIR:100K OHM,20%,0.50W                                           | 32997          | 3386F-T04-104                    |
| 10 (510) 43        | A19R34           | 315-0104-00                |                  | RES.,FXD,CMPSN:100K OHM,5%,0.25W                                             | 01121          | CB1045                           |
|                    | A19R36           | 315-0203-00                |                  | RES.,FXD,CMPSN:20K OHM,5%,0.25W                                              | 01121          | CB2035                           |
|                    | A19R37<br>A19R38 | 311-1232-00                |                  | RES., VAR, NONWIR: 50K OHM, 20%, 0.50W                                       | 32997          |                                  |
|                    | A19R58           | 315-0753-00<br>315-0183-00 |                  | RES., FXD, CMPSN: 75K OHM, 5%, 0.25W                                         | 01121          |                                  |
| menger,            |                  |                            |                  | RES.,FXD,CMPSN:18K OHM,5%,0.25W                                              | 01121          | CB1835                           |
|                    | A19R42           | 311-1230-00                |                  | RES.,VAR,NONWIR:20K OHM,20%,0.50W                                            | 32997          | 3386F-T04-203                    |
|                    | A19R43           | 315-0104-00                |                  | RES., FXD, CMPSN: 100K OHM, 5%, 0.25W                                        | 01121          | СВ1045                           |
| an and             | A19R45<br>A19R46 | 311-1230-00<br>315-0104-00 |                  | RES., VAR, NONWIR: 20K OHM, 20%, 0.50W                                       | 32997          | 3386F-T04-203                    |
|                    | A19R50           | 315-0243-00                |                  | RES.,FXD,CMPSN:100K OHM,5%,0.25W<br>RES.,FXD,CMPSN:24K OHM,5%,0.25W          | 01121          | CB1045                           |
|                    | 410050           |                            |                  |                                                                              | 01121          | CB2435                           |
|                    | A19R53<br>A19R54 | 321-0138-00                |                  | RES., FXD, FILM: 267 OHM, 1%, 0.125W                                         | 91637          | MFF1816G267R0F                   |
| and the second     | A19R56           | 321-0138-00<br>321-0091-00 |                  | RES., FXD, FILM: 267 OHM, 1%, 0.125W                                         |                | MFF1816G267R0F                   |
|                    | A19R57           | 321-0113-00                |                  | RES.,FXD,FILM:86.6 OHM,1%,0.125W<br>RES.,FXD,FILM:147 OHM,1%,0.125W          | 91637          | MFF1816G86R60F                   |
|                    | A19R58           | 321-0109-00                |                  | RES., FXD, FILM: 147 OHM, 12, 0.125W<br>RES., FXD, FILM: 133 OHM, 12, 0.125W | 91637<br>91637 | MFF1816G147R0F<br>MFF1816G133R0F |
|                    | A19R59           | 331 0300 00                |                  |                                                                              |                |                                  |
|                    | A19R60           | 321-0200-00<br>321-0200-00 |                  | RES., FXD, F1LM: 1.18K OHM, 1%, 0.125W                                       |                | MFF1816G11800F                   |
|                    | A19R63           | 321-0038-00                |                  | RES.,FXD,FILM:1.18K OHM,1%,0.125W<br>RES.,FXD,FILM:24.3 OHM,1%,0.125W        |                | MFF1816G11800F                   |
|                    | A19R65           | 315-0202-00                |                  | RES., FXD, CMPSN: 2K OHM, 5%, 0.25W                                          |                | MFF1816G24R30F<br>CB2025         |
| و مهر مربع         | A19R66           | 315-0202-00                |                  | RES., FXD, CMPSN: 2K OHM, 5%, 0.25W                                          |                | CB2025                           |
|                    | A19R67           | 315-0102-00                |                  | RES.,FXD,CMPSN:1K OHM,5%,0.25W                                               |                |                                  |
|                    | A19R69           | 315-0101-00                |                  | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W<br>RES., FXD, CMPSN: 100 OHM, 5%, 0.25W  |                | CB1025                           |
|                    | A19R70           | 315-0101-00                |                  | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W                                         | 01121<br>01121 |                                  |
| (Married)          | A19R71           | 315-0511-00                |                  | RES., FXD, CMPSN: 510 OHM, 5%, 0.25W                                         | 01121          |                                  |
|                    | A19R72           | 315-0202-00                |                  | RES., FXD, CMPSN: 2K OHM, 5%, 0.25W                                          | 01121          |                                  |
|                    | A19R73           | 315-0271-00                |                  | RES.,FXD,CMPSN:270 OHM,5%,0.25W                                              | 01121          | CB2715                           |
|                    | A19R79           | 303-0200-00                |                  | RES., FXD, CMPSN: 20 OHM, 5%, 0.25W                                          |                | GB2005                           |
| r (ess.Wor         | A19R80           | 315-0751-00                |                  | RES., FXD, CMPSN: 750 OHM, 5%, 0.25W                                         | 01121          |                                  |
|                    | A19R81           | 315-0561-00                |                  | RES., FXD, CMPSN: 560 OHM, 5%, 0.25W                                         | 01121          |                                  |
|                    | A19R82           | 321-0235-00                |                  | RES., FXD, FILM: 2.74K OHM, 1%, 0.125W                                       |                | MFF1816G27400F                   |
| Transmiss.         | A19R83           | 321-0134-00                |                  | RES.,FXD,FILM:243 OHM,1%,0.125W                                              | 91637          | MFF1816G243R0F                   |
|                    | A19R86           | 315-0471-00                |                  | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W                                         | 01121          | CB4715                           |
|                    | A19R87           | 315-0820-00                |                  | RES., FXD, CMPSN:82 OHM, 5%, 0.25W                                           | 01121          | CB8205                           |
|                    |                  |                            |                  |                                                                              |                |                                  |

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| Component No.      | Tektronix<br>Part No.      | Serial/Model No.<br>Eff Dscont | Name & Description                                                       | Mfr<br>Code | Mfr Part Number          |            |
|--------------------|----------------------------|--------------------------------|--------------------------------------------------------------------------|-------------|--------------------------|------------|
| A19R88             | 315-0821-00                |                                | RES., FXD, CMPSN: 820 OHM, 5%, 0.25W                                     | 01121       | СВ8215                   |            |
| A19R91             | 321-0277-00                |                                | RES., FXD, FILM: 7.5K OHM, 1%, 0.125W                                    |             | MFF1816G75000F           |            |
| A19R91<br>A19R92   | 321-0277-00                |                                | RES., FXD, F1LM: 7.5K OHM, 1%, 0.125W                                    | 91637       |                          |            |
| A19R94             | 315-0103-00                |                                | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W                                     |             | CB1035                   |            |
| A19R95             | 315-0133-00                |                                | RES., FXD, CMPSN: 13K OHM, 5%, 0.25W                                     |             | CB1335                   |            |
| A19R97             | 315-0101-00                |                                | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W                                     | 01121       | CB1015                   |            |
| A19R98             | 315-0101-00                |                                | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W                                     | 01121       | CB1015                   |            |
| A19R99             | 315-0431-00                |                                | RES., FXD, CMPSN: 430 OHM, 5%, 0.25W                                     |             | CB4315                   |            |
| A19R106            | 321-0289-00                |                                | RES., FXD, FILM: 10K OHM, 1%, 0.125W                                     | 91637       | MFF1816G10001F           |            |
| A19R107            | 321-0289-00                |                                | RES., FXD, FILM: 10K OHM, 1%, 0.125W                                     | 91637       | MFF1816G10001F           |            |
| A19R109            | 321-0335-00                |                                | RES., FXD, FILM: 30.1K OHM, 1%, 0.125W                                   | 91637       | MFF1816G30101F           |            |
| A19R111            | 321-0335-00                |                                | RES., FXD, FILM: 30.1K OHM, 1%, 0.125W                                   | 91637       | MFF1816G30101F           |            |
| A19R112            | 315-0101-00                |                                | RES.,FXD,CMPSN:100 OHM,5%,0.25W                                          | 01121       | CB1015                   |            |
| A19R113            | 315-0101-00                |                                | RES.,FXD,CMPSN:100 OHM,5%,0.25W                                          | 01121       |                          |            |
| A19R120            | 311-1235-00                |                                | RES.,VAR,NONWIR:100K OHM,20%,0.50W                                       | 32997       | 3386F-T04-104            | -          |
| A19R121            | 315-0104-00                | B010100 B030899                | RES.,FXD,CMPSN:100K OHM,5%,0.25W                                         |             | CB1045                   |            |
| A19R121            | 315-0913-00                | B030900                        | RES., FXD, CMPSN: 91K OHM, 5%, 0.25W                                     |             | CB9135                   |            |
| A19R122            | 315-0564-00                | B010100 B030899                | RES.,FXD,CMPSN:560K OHM,5%,0.25W                                         |             | CB5645                   |            |
| A19R122            | 315-0224-00                | B030900                        | RES., FXD, CMPSN: 220K OHM, 5%, 0.25W                                    |             | CB2245                   |            |
| A19R124            | 315-0203-00                |                                | RES.,FXD,CMPSN:20K OHM,5%,0.25W                                          | 01121       | СВ2035                   |            |
| A19R125            | 311-1214-00                |                                | RES.,VAR,NONWIR:200K OHM,20%,0.50W                                       | 73138       | 72-16-0                  |            |
| A19R126            | 315-0204-00                |                                | RES., FXD, CMPSN: 200K OHM, 5%, 0.25W                                    | 01121       | CB2045                   | -          |
| A19R129            | 315-0474-00                |                                | RES., FXD, CMPSN: 470K OHM, 5%, 0.25W                                    | 01121       | CB4745                   |            |
| A19R130            | 315-0474-00                |                                | RES., FXD, CMPSN: 470K OHM, 5%, 0.25W                                    |             | CB4745                   |            |
| A19R132            | 315-0163-00                |                                | RES.,FXD,CMPSN:16K OHM,5%,0.25W                                          | 01121       | CB1635                   |            |
| A19R133            | 311-1235-00                |                                | RES.,VAR,NONW1R:100K OHM,20%,0.50W                                       | 32997       | 3386F-T04-104            |            |
| A19R134            | 315-0104-00                |                                | RES., FXD, CMPSN: 100K OHM, 5%, 0.25W                                    | 01121       |                          |            |
| A19R136            | 315-0203-00                |                                | RES.,FXD,CMPSN:20K OHM,5%,0.25W                                          | 01121       |                          |            |
| A19R137            | 311-1232-00                |                                | RES., VAR, NONWIR: 50K OHM, 20%, 0.50W                                   | 32997       |                          |            |
| A19R138            | 315-0753-00                |                                | RES.,FXD,CMPSN:75K OHM,5%,0.25W                                          | 01121       | CB7535                   | ~          |
| A19R141            | 315-0183-00                |                                | RES.,FXD,CMPSN:18K OHM,5%,0.25W                                          | 01121       | CB1835                   |            |
| A19R142            | 311-1230-00                |                                | RES., VAR, NONWIR: 20K OHM, 20%, 0.50W                                   | 32997       |                          |            |
| A19R143            | 315-0104-00                |                                | RES.,FXD,CMPSN:100K OHM,5%,0.25W                                         | 01121       |                          |            |
| A19R145            | 311-1230-00                |                                | RES.,VAR,NONWIR:20K OHM,20%,0.50W                                        | 32997       |                          |            |
| A19R146            | 315-0104-00                |                                | RES.,FXD,CMPSN:100K OHM,5%,0.25W                                         | 01121       | CB1045                   |            |
| A19R150            | 315-0243-00                |                                | RES.,FXD,CMPSN:24K OHM,5%,0.25W                                          |             | CB2435                   |            |
| A19R153            | 321-0138-00                |                                | RES.,FXD,FILM:267 OHM,1%,0.125W                                          | -           | MFF1816G267R0F           |            |
| A19R154            | 321-0138-00                |                                | RES.,FXD,FILM:267 OHM,1%,0.125W                                          |             | MFF1816G267R0F           |            |
| A19R156            | 321-0091-00                |                                | RES., FXD, FILM: 86.6 OHM, 1%, 0.125W                                    |             | MFF1816G86R60F           |            |
| A19R157            | 321-0113-00                |                                | RES.,FXD,FILM:147 OHM,1%,0.125W                                          | 91037       | MFF1816G14/ROF           |            |
| A19R158            | 321-0109-00                |                                | RES., FXD, FILM: 133 OHM, 1%, 0.125W                                     |             | MFF1816G133R0F           | ,          |
| A19R159            | 321-0200-00                |                                | RES., FXD, FILM: 1.18K OHM, 1%, 0.125W                                   | 91637       |                          |            |
| A19R160            | 321-0200-00                |                                | RES., FXD, FILM: 1.18K OHM, 1%, 0.125W                                   | 91637       |                          |            |
| A19R163<br>A19R165 | 321-0038-00<br>315-0202-00 |                                | RES.,FXD,FILM:24.3 OHM,1%,0.125W<br>RES.,FXD,CMPSN:2K OHM,5%,0.25W       | 01121       | MFF1816G24R30F<br>CB2025 |            |
|                    |                            |                                |                                                                          |             | am 00.05                 |            |
| A19R166            | 315-0202-00                |                                | RES., FXD, CMPSN: 2K OHM, 5%, 0.25W                                      |             | CB2025<br>CB1025         |            |
| A19R167            | 315-0102-00                |                                | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W                                      |             | CB1025<br>CB1015         |            |
| A19R169            | 315-0101-00                |                                | RES.,FXD,CMPSN:100 OHM,5%,0.25W<br>RES.,FXD,CMPSN:100 OHM,5%,0.25W       |             | CB1015                   |            |
| A19R170<br>A19R171 | 315-0101-00<br>315-0511-00 |                                | RES., FXD, CMPSN: 510 OHM, 5%, 0.25W                                     |             | CB5115                   |            |
|                    |                            |                                | RES., FXD, CMPSN: 2K OHM, 5%, 0.25W                                      | 01121       | CB2025                   |            |
| A19R172            | 315-0202-00                |                                | RES.,FXD,CMPSN:2K OHM,5%,0.25W<br>RES.,FXD,CMPSN:270 OHM,5%,0.25W        |             | CB2025<br>CB2715         |            |
| A19R173            | 315-0271-00                |                                | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W<br>RES., FXD, CMPSN: 20 OHM, 5%, 1W |             | GB2005                   | -          |
| A19R179<br>A19R180 | 303-0200-00<br>315-0681-00 |                                | RES., FXD, CMPSN: 20 OHM, 5%, 1W<br>RES., FXD, CMPSN: 680 OHM, 5%, 0.25W |             | CB6815                   |            |
| A19R180            | 315-0511-00                |                                | RES., FXD, CMPSN: 510 OHM, 5%, 0.25W                                     | 01121       |                          | ********** |
| A19R182            | 321-0238-00                |                                | RES., FXD, FILM: 2.94K OHM, 1%, 0.125W                                   | 91637       | MFF1816G29400F           | -          |
| A19R183            | 321-0258-00                |                                | RES., FXD, FILM: 60 OHM, 1%, 0.125W                                      | 91637       |                          |            |
| A19R186            | 315-0471-00                |                                | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W                                     | 01121       |                          |            |
|                    | 515 0471 00                |                                | ······································                                   |             |                          |            |

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| erra.  | Component No.      | Tektronix<br>Part No. | Serial/N<br>Eff | Aodel No.<br>Dscont | Name & Description                            | Mfr<br>Code    | Mfr Part Number |
|--------|--------------------|-----------------------|-----------------|---------------------|-----------------------------------------------|----------------|-----------------|
|        | A19R187            | 315-0820-00           |                 |                     | RES., FXD, CMPSN:82 OHM, 5%, 0.25W            | 01121          | CB8205          |
|        | A19R188            | 315-0751-00           |                 |                     | RES., FXD, CMPSN: 750 OHM, 5%, 0.25W          | 01121          | CB7515          |
|        | A19R191            | 321-0277-00           |                 |                     | RES., FXD, FILM: 7.5K OHM, 1%, 0.125W         | 91637          | MFF1816G75000F  |
| ~*     | A19R192            | 321-0277-00           |                 |                     | RES., FXD, FILM: 7.5K OHM, 1%, 0.125W         | 91637          | MFF1816G75000F  |
|        | A19R192            | 311-1259-00           |                 |                     | RES., VAR, NONWIR: 100 OHM, 10%, 0.50W        | 32997          | 3329P-L58-101   |
|        | A19R231            | 321-0257-00           |                 |                     | RES., FXD, FILM: 4.64K OHM, 1%, 0.125W        | 91637          | MFF1816G46400F  |
|        | A19R232            | 321-0145-00           |                 |                     | RES., FXD, FILM: 316 OHM, 1%, 0.125W          | 91637          | MFF1816G316R0F  |
|        | A19R232            | 315-0102-00           |                 |                     | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W           | 01121          | CB1025          |
|        | A19R234            | 315-0100-00           |                 |                     | RES., FXD, CMPSN:10 OHM, 5%, 0.25W            | 01121          | CB1005          |
|        | A19R234            | 315-0100-00           |                 |                     | RES., FXD, CMPSN:10 OHM, 5%, 0.25W            | 01121          | CB1005          |
|        | A19R241            | 321-0238-00           |                 |                     | RES., FXD, FILM: 2.94K OHM, 1%, 0.125W        | 91637          | MFF1816G29400F  |
| ch ar, | A19R242            | 321-0223-00           |                 |                     | RES., FXD, FILM: 2.05K OHM, 1%, 0.125W        | 91637          | MFF1816G20500F  |
|        | A19R243            | 315-0820-00           |                 |                     | RES., FXD, CMPSN:82 OHM, 5%, 0.25W            | 01121          | CB8205          |
|        | A19U11             | 156-1149-00           |                 |                     | MICROCIRCUIT, LI: OPERATIONAL AMP, JFET INPUT | 27014          | LF351N          |
|        | A19050             | 156-1149-00           |                 |                     | MICROCIRCUIT, LI: OPERATIONAL AMP, JFET INPUT | 27014          | LF351N          |
| w      | A19U75             | 155-0206-00           |                 |                     | MICROCIRCUIT, LI: CHANNEL SWITCH              | 80009          | 155-0206-00     |
|        | A19U111            | 156-1149-00           |                 |                     | MICROCIRCUIT, LI: OPERATIONAL AMP, JFET INPUT | 27014          | LF351N          |
|        | A190111<br>A190150 | 156-1149-00           |                 |                     | MICROCIRCUIT, LI: OPERATIONAL AMP, JFET INPUT | 27014          | LF351N          |
|        | A190130            | 130-1149-00           |                 |                     | HIGHOULADI, DI, OLDAHITOWAD AM, SIDI INICI    | <b>_</b> , 014 |                 |

| Component No.        | Tektronix<br>Part No.                   | Serial/Model No.<br>Eff Dscont | Name & Description                       | Mfr<br>Code | Mfr Part Number    | 2010<br>1 | - 7854            |
|----------------------|-----------------------------------------|--------------------------------|------------------------------------------|-------------|--------------------|-----------|-------------------|
| A20                  | ann an |                                |                                          | 0000        |                    |           |                   |
| A20C9                | 283-0068-00                             |                                | CKT BOARD ASSY:HIGH VOLTAGE              |             |                    |           |                   |
| A20C10               | 283-0068-00                             |                                | CAP., FXD, CER DI:0.01UF, +100-0%, 500V  |             | 19C241             |           |                   |
| A20C11               |                                         |                                | CAP., FXD, CER DI:0.01UF, +100-0%, 500V  | 56289       |                    |           |                   |
| A20C22               | 283-0068-00                             |                                | CAP., FXD, CER DI:0.01UF, +100-0%, 500V  |             | 19C241             |           |                   |
| A20C33               | 283-0111-00                             |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V        |             | 8121-N088Z5U104M   |           |                   |
| A20033               | 283-0078-00                             |                                | CAP., FXD, CER DI:0.001UF, 20%, 500V     | 56289       | 20C114A8           |           |                   |
| A20C34               | 283-0068-00                             |                                | CAR EVE CER DI O OUR 100 0% FOOM         | 56000       | 1000/1             |           |                   |
| A20C36               | 283-0271-00                             |                                | CAP., FXD, CER DI:0.01UF, +100-0%, 500V  | 56289       | 19C241             |           |                   |
| A20C39               | 283-0271-00                             |                                | CAP., FXD, CER DI:0.001UF, 20%, 4000V    | 56289       |                    |           |                   |
| A20C42               | 283-0271-00                             |                                | CAP., FXD, CER DI:0.001UF, 20%, 4000V    | 56289       |                    |           |                   |
| A20C53               | 283-0279-00                             |                                | CAP., FXD, CER DI:0.001UF, 20%, 4000V    |             | 33C325             |           |                   |
| A20C64               | 283-0092-00                             |                                | CAP., FXD, CER DI:0.001UF, 20%, 3000V    |             | 55C153             |           |                   |
| 1120004              | 203 0092-00                             |                                | CAP.,FXD,CER DI:0.03UF,+80-20%,200V      | 72982       | 845-534E303Z       |           |                   |
| A20C66               | 283-0271-00                             |                                | CAP.,FXD,CER DI:0.001UF,20%,4000V        | 56289       | 33C325             |           |                   |
| A20C69               | 283-0271-00                             |                                | CAP., FXD, CER DI:0.001UF, 20%, 4000V    | 56289       | 33C325             |           |                   |
| A20C72               | 283-0271-00                             |                                | CAP., FXD, CER DI:0.001UF, 20%, 4000V    | 56289       |                    |           |                   |
| A20C82               | 283-0105-00                             |                                | CAP.,FXD,CER DI:0.01UF,+80-20%,2000V     |             | 410316             |           | age of them       |
| A20C84               | 283-0272-00                             |                                | CAP., FXD, CER DI:0.0068UF, 30%, 4000V   |             | 3888-510C 682M     |           |                   |
| A20C86               | 283-0272-00                             |                                | CAP., FXD, CER DI:0.0068UF, 30%, 4000V   |             | 3888-510C 682M     |           |                   |
|                      |                                         |                                | SHI ., IND, CHK DI. 0.000001, 50%, 4000V | 12902       | J000-J100 002M     |           |                   |
| A20C87               | 283-0105-00                             |                                | CAP.,FXD,CER DI:0.01UF,+80-20%,2000V     | 56289       | 41C316             |           |                   |
| A20C89               | 283-0272-00                             |                                | CAP., FXD, CER DI:0.0068UF.30%.4000V     | 72982       |                    |           | a period and      |
| A20C91               | 283-0272-00                             |                                | CAP., FXD, CER DI:0.0068UF, 30%, 4000V   | 72982       |                    |           |                   |
| A20C103              | 290-0767-00                             |                                | CAP., FXD, ELCTLT: 4.7UF, +75-10%, 160V  | 56289       |                    |           |                   |
| A20C104              | 290-0767-00                             |                                | CAP., FXD, ELCTLT: 4.7UF, +75-10%, 160V  | 56289       |                    |           |                   |
| A20C112              | 281-0593-00                             |                                | CAP., FXD, CER DI: 3.9PF, 10%, 500V      |             | 7001-1113          |           | <del>6</del> .nj. |
|                      |                                         |                                |                                          |             |                    |           |                   |
| A20C119              | 283-0271-00                             |                                | CAP.,FXD,CER DI:0.001UF,20%,4000V        | 56289       | 33C325             |           |                   |
| A20C122              | 283-0000-00                             |                                | CAP.,FXD,CER DI:0.001UF,+100-0%,500V     | 59660       | 831-519-25U-102P   |           |                   |
| A20C127              | 283-0000-00                             |                                | CAP.,FXD,CER DI:0.001UF,+100-0%,500V     | 59660       | 831-519-25U-102P   |           | 400 Tel 10        |
| A20C143              | 283-0068-00                             |                                | CAP., FXD, CER DI:0.01UF, +100-0%, 500V  | 56289       | 19C241             |           |                   |
| A20C144              | 283-0068-00                             |                                | CAP.,FXD,CER DI:0.01UF,+100-0%,500V      | 56289       | 19C241             |           |                   |
| A20C156              | 283-0068-00                             |                                | CAP.,FXD,CER DI:0.01UF,+100-0%,500V      | 56289       | 19C241             |           |                   |
| A20C159              | 283-0068-00                             |                                |                                          | 5 ( 0 0 0   | 1000/1             |           |                   |
| A20CR17              |                                         | P010100 P010/10                | CAP., FXD, CER DI:0.01UF, +100-0%, 500V  | 56289       | 19C241             |           | the second        |
| A20CR17<br>A20CR17   | 152-0586-00<br>152-0242-00              | B010100 B010419                | SEMICOND DEVICE:SILICON, 600V, 500MA     | 14936       |                    |           |                   |
| A20CR18              | 152-0242-00                             | B010420                        | SEMICOND DEVICE: SILICON, 225V, 200MA    | 07263       | FDH5004            |           |                   |
| A20CR19              | 152-0242-00                             |                                | SEMICOND DEVICE: SILICON, 225V, 200MA    | 07263       |                    |           |                   |
| A20CR33              | 152-0242-00                             |                                | SEMICOND DEVICE: SILICON, 225V, 200MA    |             | FDH5004            |           | THE PARTY         |
| n200R35              | 152-0242-00                             |                                | SEMICOND DEVICE: SILICON, 225V, 200MA    | 07263       | FDH5004            |           |                   |
| A20CR34              | 152-0242-00                             |                                | SEMICOND DEVICE:SILICON,225V,200MA       | 07263       | FDH5004            |           |                   |
| A20CR37              | 152-0242-00                             |                                | SEMICOND DEVICE:SILICON,225V,200MA       |             | FDH5004            |           |                   |
| A20CR38              | 152-0242-00                             |                                | SEMICOND DEVICE:SILICON,225V,200MA       |             | FDH5004<br>FDH5004 |           | ma.               |
| A20CR51              | 152-0242-00                             |                                | SEMICOND DEVICE:SILICON,225V,200MA       |             | FDH5004            |           |                   |
| A20CR63              | 152-0242-00                             |                                | SEMICOND DEVICE: SILICON, 225V, 200MA    |             | FDH5004            |           |                   |
| A20CR64              | 152-0242-00                             |                                | SEMICOND DEVICE:SILICON, 225V, 200MA     |             | FDH5004            |           |                   |
|                      |                                         |                                |                                          | -,203       |                    |           |                   |
| A20CR67              | 152-0242-00                             |                                | SEMICOND DEVICE:SILICON,225V,200MA       | 07263       | FDH5004            |           | A119086           |
| A20CR68              | 152-0242-00                             |                                | SEMICOND DEVICE: SILICON, 225V, 200MA    | 07263       | FDH5004            |           |                   |
| A20CR82              | 152-0639-00                             |                                | SEMICOND DEVICE: RECT, SI, 10KV, 10MA    | 52306       | CX345              |           |                   |
| A20CR83              | 152-0639-00                             |                                | SEMICOND DEVICE: RECT, SI, 10KV, 10MA    | 52306       | CX345              |           |                   |
| A20CR101             | 152-0586-00                             |                                | SEMICOND DEVICE: SILICON, 600V, 500MA    | 14936       | RGP10J             |           |                   |
| A20CR102             | 152-0586-00                             |                                | SEMICOND DEVICE:SILICON,600V,500MA       | 14936       | RGP10J             |           |                   |
| A 20CB 112           | 152-02/2 02                             |                                |                                          |             |                    |           |                   |
| A20CR113<br>A20CR114 | 152-0242-00                             |                                | SEMICOND DEVICE: SILICON, 225V, 200MA    | 07263       | FDH5004            |           |                   |
| A20CR114<br>A20CR124 | 152-0242-00                             |                                | SEMICOND DEVICE:SILICON,225V,200MA       | 07263       | FDH5004            |           | 101.00 M          |
|                      | 152-0242-00                             |                                | SEMICOND DEVICE: SILICON, 225V, 200MA    | 07263       | FDH5004            |           |                   |
| A20CR126             | 152-0242-00                             |                                | SEMICOND DEVICE: SILICON, 225V, 200MA    | 07263       | FDH5004            |           |                   |
| A20CR129<br>A20DS45  | 152-0066-03                             |                                | SEMICOND DEVICE: RECT, SI, 400V, 1A      | 80009       | 152-0066-03        |           |                   |
| A20004J              | 150-0035-00                             |                                | LAMP,GLOW:90V,0.3MA                      | 53944       | A1B-3              |           |                   |
| A20DS46              | 150-0035-00                             |                                | LAMP, GLOW: 90V, 0.3MA                   | 53944       | A1B-3              |           | un a Million      |
| A20DS47              | 150-0035-00                             |                                | LAMP, GLOW: 90V, 0. 3MA                  |             | A1B-3              |           |                   |
| A20DS75              | 150-0035-00                             |                                | LAMP, GLOW: 90V, 0. 3MA                  | 53944       |                    | - 10      |                   |
|                      |                                         |                                |                                          | 23244       |                    |           |                   |

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| , ee - 100.        | Component No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Tektronix<br>Part No.                                                 | Serial/Model No.<br>Eff Dscont | Name & Description                       | Mfr   | Mfr Part Number  |
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|                    | THE REAL PROPERTY AND A RE | ти политических положивания на политических и неконология на начина н |                                |                                          | oouc  | WITH FAIL NUMBER |
|                    | A20DS76                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 150-0035-00                                                           |                                | LAMP,GLOW:90V,0.3MA                      |       | Alb-3            |
|                    | A20DS90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 150-0035-00                                                           |                                | LAMP,GLOW:90V,0.3MA                      |       | A1B-3            |
|                    | A20DS113                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 150-0035-00                                                           | XB010181                       | LAMP,GLOW:90V,0.3MA                      |       | A1B-3            |
| u d'hafur          | A20Q23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0443-00                                                           |                                | TRANSISTOR: SILICON, PNP                 |       | 151-0443-00      |
|                    | A20Q129                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 151-0279-00                                                           |                                | TRANSISTOR: SILICON, NPN                 |       | 151-0279-00      |
|                    | A20R14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 308-0123-00                                                           |                                | RES.,FXD,WW:20 OHM,5%,5W                 | 05347 | C56-20R0J        |
| 70                 | A20R16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 301-0272-00                                                           |                                | RES.,FXD,CMPSN:2.7K OHM,5%,0.50W         | 01121 | EB2725           |
|                    | A20R17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0100-02                                                           |                                | RES.,FXD,CMPSN:10 OHM,5%,0.25W           | 01121 | CB1005           |
|                    | A20R18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0472-03                                                           | XB010420                       | RES.,FXD,CMPSN:4.7K OHM,5%,0.25W         | 01121 | CB4725           |
|                    | A20R19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0472-03                                                           | XB010420                       | RES.,FXD,CMPSN:4.7K OHM,5%,0.25W         | 01121 | CB4725           |
|                    | A20R22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0304-00                                                           |                                | RES.,FXD,CMPSN:300K OHM,5%,0.25W         | 01121 | CB3045           |
| ga 1964 a          | A20R23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0113-00                                                           |                                | RES.,FXD,CMPSN:11K OHM,5%,0.25W          | 01121 | CB1135           |
|                    | A20R24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0153-00                                                           |                                | RES.,FXD,CMPSN:15K OHM,5%,0.25W          | 01121 | CB1535           |
|                    | A20R31                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 301-0305-00                                                           |                                | RES., FXD, CMPSN: 3M OHM, 5%, 0.50W      | 01121 | EB3055           |
| 1. Then            | A20R32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 301-0305-00                                                           |                                | RES.,FXD,CMPSN:3M OHM,5%,0.50W           |       | EB3055           |
|                    | A20R33                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0104-03                                                           |                                | RES.,FXD CMPSN:100K OHM,5%,0.25W         | 01121 | CB1045           |
|                    | A20R37                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0183-03                                                           |                                | RES.,FXD,CMPSN:18K OHM,5%,0.25W          | 01121 | CB1835           |
|                    | A20R39                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0226-01                                                           |                                | RES.,FXD,CMPSN:22M OHM,5%,0.25W          | 01121 | CB2265           |
| 01.04°             | A20R42                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0202-02                                                           |                                | RES.,FXD,CMPSN:2K OHM,5%,0.25W           | 01121 | CB2025           |
|                    | A20R43                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0104-03                                                           |                                | RES., FXD CMPSN: 100K OHM, 5%, 0.25W     | 01121 | CB1045           |
|                    | A20R44                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0105-03                                                           |                                | RES., FXD, CMPSN: 1M OHM, 5%, 0.25W      | 01121 | CB1055           |
|                    | A20R52                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 307-1135-00                                                           |                                | RES NTWK, FXD FI: HIGH VOLTAGE DIVIDER   | 80009 | 307-1135-00      |
|                    | A20R55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 311-1968-00                                                           |                                | RES.,VAR,NONWIR:PNL,5M OHM,20%,0.50W     | 01121 | 72M4N048S505M    |
| ,                  | A20R61                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 301-0305-00                                                           |                                | RES.,FXD,CMPSN:3M OHM,5%,0.50W           | 01121 | EB3055           |
|                    | A20R62                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 301-0305-00                                                           |                                | RES.,FXD,CMPSN:3M OHM,5%,0.50W           | 01121 | EB3055           |
|                    | A20R63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0103-03                                                           |                                | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W     | 01121 | CB1035           |
| Menge - terestages | A20R65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 311-1284-00                                                           |                                | RES.,VAR,NONWIR:20K OHM,10%,0.5W         | 32997 | 3329W-L58-203    |
|                    | A20R66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0123-00                                                           |                                | RES.,FXD,CMPSN:12K OHM,5%,0.25W          |       | CB1235           |
|                    | A20R67                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0183-03                                                           |                                | RES.,FXD,CMPSN:18K OHM,5%,0.25W          | 01121 | CB1835           |
|                    | A20R69                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0226-01                                                           |                                | RES.,FXD,CMPSN:22M OHM,5%,0.25W          | 01121 | CB2265           |
|                    | A20R72                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0101-03                                                           |                                | RES.,FXD,CMPSN:100 OHM,5%,0.25W          | 01121 | CB1015           |
|                    | A20R73                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0104-03                                                           |                                | RES., FXD CMPSN: 100K OHM, 5%, 0.25W     | 01121 | CB1045           |
|                    | A20R84                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0472-03                                                           |                                | RES.,FXD,CMPSN:4.7K OHM,5%,0.25W         | 01121 | CB4725           |
|                    | A20R86                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0472-03                                                           |                                | RES.,FXD,CMPSN:4.7K OHM,5%,0.25W         | 01121 | CB4725           |
|                    | A20R87                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315 <del>-</del> 0472-03                                              |                                | RES.,FXD,CMPSN:4.7K OHM,5%,0.25W         | 01121 | CB4725           |
|                    | A20R89                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0331-03                                                           |                                | RES.,FXD,CMPSN:330 OHM,5%,0.25W          | 01121 | СВЗЗ15           |
|                    | A20R91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0101-03                                                           |                                | RES.,FXD,CMPSN:100 OHM,5%,0.25W          | 01121 | CB1015           |
|                    | A20R92                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 308-0058-00                                                           |                                | RES., FXD, WW:1.5 OHM, 10%, 1W           | 75042 | BW20-1R500K      |
|                    | A20R93                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 315-0104-03                                                           |                                | RES.,FXD CMPSN:100K OHM,5%,0.25W         | 01121 | CB1045           |
|                    | A20R103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 315-0100-02                                                           |                                | RES.,FXD,CMPSN:10 OHM,5%,0.25W           | 01121 | CB1005           |
|                    | A20R104                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 301-0560-00                                                           | B010100 B010180                | RES.,FXD,CMPSN:56 OHM,5%,0.50W           | 01121 |                  |
|                    | A20R104                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 301-0101-00                                                           | B010181                        | RES.,FXD,CMPSN:100 OHM,5%,0.50W          | 01121 | EB1015           |
| ******             | A20R112                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 315-0136-01                                                           |                                | RES., FXD, CMPSN: 13M OHM, 5%, 0.25W     | 01121 | CB1365           |
|                    | A20R113                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 315-0203-02                                                           |                                | RES., FXD, CMPSN: 20K OHM, 5%, 0.25W     |       | СВ2035           |
|                    | A20R115                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 311-1285-00                                                           |                                | RES., VAR, NONWIR: 25K OHM, 10%, 0.5W    | 32997 | 3329W-L58-253    |
|                    | A20R116                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 321-0430-00                                                           |                                | RES., FXD, FILM: 294K OHM, 1%, 0.125W    | 91637 | MFF1816G29402F   |
| ***                | A20R119                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 301-0102-00                                                           |                                | RES., FXD, CMPSN: 1K OHM, 5%, 0.50W      | 01121 | EB1025           |
|                    | A20R122                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 315-0474-00                                                           |                                | RES.,FXD,CMPSN:470K OHM,5%,0.25W         | 01121 | CB4745           |
|                    | A20R124                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 315-0331-03                                                           |                                | RES.,FXD,CMPSN:330 OHM,5%,0.25W          | 01121 | CB3315           |
|                    | A20R126                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 315-0681-00                                                           |                                | RES., FXD, CMPSN: 680 OHM, 5%, 0.25W     |       | CB6815           |
|                    | A20R127                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 315-0332-00                                                           |                                | RES.,FXD,CMPSN:3.3K OHM,5%,0.25W         |       | CB3325           |
|                    | A20R128                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 301-0623-00                                                           |                                | RES., FXD, CMPSN: 62K OHM, 5%, 0.50W     | 01121 |                  |
|                    | A20R129                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 315-0150-00                                                           |                                | RES.,FXD,CMPSN:15 OHM,5%,0.25W           |       | CB1505           |
|                    | A20R143                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 311-1287-00                                                           |                                | RES., VAR, NONWIR: TRMR, 100K OHM, 0.50W | 32997 | 3329W-L58-104    |
| al Real            | A20R154                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 321-0299-00                                                           |                                | RES., FXD, FILM: 12.7K OHM, 1%, 0.125W   | 91637 | MFF1816G12701F   |
|                    | A20R155                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 311-1281-00                                                           |                                | RES., VAR, NONWIR: 2.5K OHM, 10%, 0.5W   | 32997 | 3329W-L58-252    |
| and the second     | A20R156                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 321-0338-00                                                           |                                | RES., FXD, FILM: 32.4K OHM, 1%, 0.125W   | 91637 | MFF1816G32401F   |
|                    | A20T14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 120-1281-00                                                           |                                | TRANSFORMER, RF: TOROID, 2 WINDINGS      | 80009 | 120-1281-00      |
| (ma).              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                       |                                |                                          |       |                  |

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|               | Tektronix   | Serial/ | Model No. |                                         | Mfr   |                 |
|---------------|-------------|---------|-----------|-----------------------------------------|-------|-----------------|
| Component No. | Part No.    | Eff     | Dscont    | Name & Description                      | Code  | Mfr Part Number |
| A20U21        | 152-0716-00 |         |           | SEMICOND DVC, DI: HV MULTR              | 52306 | CMX387A         |
| A20U123       | 156-0067-12 |         |           | MICROCIRCUIT, LI: OPERATIONAL AMPLIFIER | 04713 | MC1741CU        |
| A20VR51       | 152-0247-00 |         |           | SEMICOND DEVICE:ZENER,0.4W,150V,5%      | 04713 | SZG275K1RL      |

**REV OCT 1981** 

| Component No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Tektronix<br>Part No. | Serial/Model No.<br>Eff Dscont | Name & Description                                                         | Mfr<br>Code    | Mfr Part Numb              |
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| - CLARGON TRUE THE COMPLEX CONTROL CONFERENCE OF THE CONTROL OF TH |                       |                                |                                                                            | 0000           |                            |
| A21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |                                | CKT BOARD ASSY:Z-AXIS                                                      |                |                            |
| A21C2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 283-0003-00           |                                | CAP.,FXD,CER DI:0.01UF,+80-20%,150V                                        |                | SP103Z151-4R9              |
| A21C3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 283-0003-00           |                                | CAP.,FXD,CER DI:0.01UF,+80-20%,150V                                        | 91418          | SP103Z151-4R9              |
| A21C4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 290-0539-00           |                                | CAP., FXD, ELCTLT: 47UF, 20%, 20V                                          | 90201          | THF476M020P11              |
| A21C6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 283-0003-00           |                                | CAP., FXD, CER DI:0.01UF, +80-20%, 150V                                    | 91418          | SP103Z151-4R               |
| A21C7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 283-0003-00           |                                | CAP., FXD, CER DI:0.01UF, +80-20%, 150V                                    |                | SP103Z151-4R               |
| A21C8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 283-0177-00           |                                | CAP., FXD, CER DI: 1UF, +80-20%, 25V                                       | 56289          | 27305                      |
| A21C9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 283-0059-00           |                                | CAP., FXD, CER DI: 10F, +80-20%, 25V                                       |                | 8131N031Z5U0               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |                                |                                                                            |                |                            |
| A21C10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 283-0003-00           |                                | CAP., FXD, CER DI:0.01UF, +80-20%, 150V                                    |                | SP103Z151-4R               |
| A21C11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 290-0539-00           |                                | CAP., FXD, ELCTLT: 47UF, 20%, 20V                                          | 90201          | THF476M020P1               |
| A21C12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 283-0003-00           |                                | CAP., FXD, CER DI:0.01UF, +80-20%, 150V                                    | 91418          |                            |
| A21C13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 283-0003-00           |                                | CAP.,FXD,CER DI:0.01UF,+80-20%,150V                                        | 91418          | SP103Z151-4R               |
| A21C76                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 283-0001-00           |                                | CAP.,FXD,CER DI:0.005UF,+100-0%,500V                                       |                | 831-559E502P               |
| A21C79                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 283-0001-00           |                                | CAP.,FXD,CER DI:0.005UF,+100-0%,500V                                       | 72982          | 831-559E502P               |
| A21C83                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 283-0003-00           |                                | CAP.,FXD,CER DI:0.01UF,+80-20%,150V                                        | 91418          | SP103Z151-4R               |
| A21C103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 283-0000-00           |                                | CAP., FXD, CER DI:0.001UF, +100-0%, 500V                                   | 59660          | 831-519-250-               |
| A21C113                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 283-0003-00           |                                | CAP., FXD, CER DI:0.01UF, +80-20%, 150V                                    | 91418          | SP103Z151-4R               |
| A21C123                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 283-0003-00           |                                | CAP., FXD, CER DI:0.01UF, +80-20%, 150V                                    | 91418          | SP103Z151-4R               |
| A210125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 203 0003 00           |                                | CRI., FRD, CER DI.0.010F, +80-20%, 1904                                    | 71410          | 5F1052151-4K               |
| A21C150                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 281-0118-00           |                                | CAP., VAR, MICA D:8-90PF, 175V                                             | 52769          | GSM231                     |
| A21C151                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 281-0550-00           |                                | CAP., FXD, CER DI: 120PF, 10%, 500V                                        | 04222          |                            |
| A21C155                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 281-0118-00           |                                | CAP.,VAR,MICA D:8-90PF,175V                                                | 52769          | GSM231                     |
| A21C156                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 281-0584-00           |                                | CAP.,FXD,CER DI:100PF,5%,500V                                              | 72982          | 0301000Y5E01               |
| A21C169                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 283-0211-00           |                                | CAP., FXD, CER DI:0.1UF, 10%, 200V                                         | 72982          | 8141N210X7R0               |
| A21C171                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 290-0149-00           |                                | CAP.,FXD,ELCTLT:5UF,+75-10%,150V                                           | 56289          | 30D505G150DD               |
| A21C172                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 283-0000-00           | ,                              | CAP.,FXD,CER DI:0.001UF,+100-0%,500V                                       | 59660          | 831-519-Z5U-               |
| A21C179                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 281-0619-00           |                                | CAP., FXD, CER DI:1.2PF,+/-0.1PF,200V                                      | 59660          | 374 018 COKO               |
| A21C180                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 281-0092-00           |                                | CAP., VAR, CER DI:9-35PF, 200V                                             |                | 538-011 D9-3               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |                                |                                                                            |                |                            |
| A21C183                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 283-0003-00           |                                | CAP., FXD, CER DI:0.01UF, +80-20%, 150V                                    | 91418          | SP103Z151-4R               |
| A21C186                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 281-0609-00           |                                | CAP.,FXD,CER DI:1PF,+/-0.1PF,500V                                          | 04222          | 7040-COK-1R0               |
| A21CR32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0141-02           |                                | SEMICOND DEVICE:SILICON, 30V, 150MA                                        | 01295          | 1N4152R                    |
| A21CR35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0141-02           |                                | SEMICOND DEVICE:SILICON, 30V, 150MA                                        | 01295          | 1N4152R                    |
| A21CR36                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0141-02           |                                | SEMICOND DEVICE:SILICON, 30V, 150MA                                        | 01295          | 1N4152R                    |
| A21CR37                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0141-02           |                                | SEMICOND DEVICE: SILICON, 30V, 150MA                                       |                | 1N4152R                    |
| A21CR39                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0141-02           |                                | SEMICOND DEVICE:SILICON, 30V, 150MA                                        |                | 1N4152R                    |
| A21CR43                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0141-02           |                                | SEMICOND DEVICE:SILICON, 30V, 150MA                                        | 01295          |                            |
| A21CR45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0141-02           |                                | SEMICOND DEVICE:SILICON, SOV, ISOMA<br>SEMICOND DEVICE:SILICON, 30V, 150MA |                | 1N4152R                    |
| 10100/7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 150 0000 00           |                                |                                                                            | 070(0          |                            |
| A21CR47                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0333-00           |                                | SEMICOND DEVICE: SILICON, 55V, 200MA                                       | 07263          | FDH-6012                   |
| A21CR64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0141-02           |                                | SEMICOND DEVICE:SILICON, 30V, 150MA                                        | 01295          | 1N4152R                    |
| A21CR65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0141-02           |                                | SEMICOND DEVICE: SILICON, 30V, 150MA                                       | 01295          | 1N4152R                    |
| A21CR76                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0141-02           |                                | SEMICOND DEVICE:SILICON, 30V, 150MA                                        | 01295          | 1N4152R                    |
| A21CR82                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0141-02           |                                | SEMICOND DEVICE: SILICON, 30V, 150MA                                       | 01295          | 1N4152R                    |
| A21CR86                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0066-03           |                                | SEMICOND DEVICE: RECT, SI, 400V, 1A                                        | 80009          | 152-0066-03                |
| A21CR105                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 152-0141-02           |                                | SEMICOND DEVICE:SILICON, 30V, 150MA                                        | 01295          | 1N4152R                    |
| A21CR127                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 152-0141-02           |                                | SEMICOND DEVICE:SILICON, 30V, 150MA                                        | 01295          | 1N4152R                    |
| A21CR143                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |                                |                                                                            | 14433          |                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 152-0071-00           |                                | SEMICOND DEVICE: GERMANIUM, 15V, 40MA                                      |                |                            |
| A21CR152                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 152-0141-02           |                                | SEMICOND DEVICE: SILICON, 30V, 150MA                                       | 01295          | 1N4152R                    |
| A21CR153                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 152-0141-02           |                                | SEMICOND DEVICE: SILICON, 30V, 150MA                                       | 01295          |                            |
| A21CR173                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 152-0141-02           |                                | SEMICOND DEVICE:SILICON, 30V, 150MA                                        | 01295          | 1N4152R                    |
| A21CR177                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 152-0233-00           |                                | SEMICOND DEVICE:SILICON,85V,100MA                                          | 80009          | 152-0233-00                |
| A21CR184                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 152-0141-02           |                                | SEMICOND DEVICE:SILICON, 30V, 150MA                                        | 01295          | 1N4152R                    |
| A21Q32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0190-05           |                                | TRANSISTOR: SILICON, NPN                                                   | 80009          | 151-0190-05                |
| A21Q36                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0223-03           |                                | TRANSISTOR: STELEON, MIN<br>TRANSISTOR: NPN, SI, PRESTRESSED & TESTED      | 80009          | 151-0223-03                |
| A21Q39                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0190-05           |                                |                                                                            |                |                            |
| A21Q39                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0223-03           |                                | TRANSISTOR:SILICON,NPN<br>TRANSISTOR:NPN,SI,PRESTRESSED & TESTED           | 80009<br>80009 | 151-0190-05<br>151-0223-03 |
| 1210/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |                                |                                                                            |                |                            |
| A21Q49                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0190-05           |                                | TRANSISTOR: SILICON, NPN                                                   | 80009          | 151-0190-05                |
| A21Q50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0190-05           |                                | TRANSISTOR: SILICON, NPN                                                   | 80009          | 151-0190-05                |

**REV OCT 1981** 

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|               | Tektronix                                                         | Serial/Model No. |                                         | 544         |                 |                 |
|---------------|-------------------------------------------------------------------|------------------|-----------------------------------------|-------------|-----------------|-----------------|
| Component No. | Part No.                                                          | Eff Dscont       | Name & Description                      | Mfr<br>Code | Mfr Part Number | معى             |
|               | 99 Y 1997 La ango la ango na ang mang mang mang mang mang mang ma |                  |                                         |             |                 |                 |
| A21Q67        | 151-0220-00                                                       |                  | TRANSISTOR:SILICON, PNP                 | 07263       | S036228         |                 |
| A21Q68        | 151-0220-00                                                       |                  | TRANSISTOR:SILICON, PNP                 | 07263       | S036228         |                 |
| A21Q77        | 151-0443-02                                                       |                  | TRANSISTOR: SILICON, PNP                | 80009       | 151-0443-02     |                 |
| A21Q83        | 151-0444-01                                                       |                  | TRANSISTOR: SILICON, NPN                | 80009       | 151-0444-01     |                 |
| A21Q105       | 151-0190-05                                                       |                  | TRANSISTOR: SILICON, NPN                | 80009       | 151-0190-05     |                 |
| A21Q113       | 151-0220-00                                                       |                  | TRANSISTOR: SILICON, PNP                | 07063       | 002(220         |                 |
| A21Q122       | 151-0220-00                                                       |                  | •                                       | 07263       | S036228         |                 |
| A21Q127       | 151-0192-03                                                       |                  | TRANSISTOR: SILICON, PNP                | 07263       | S036228         |                 |
| A21Q132       |                                                                   |                  | TRANSISTOR: SILICON, NPN                | 80009       | 151-0192-03     |                 |
| A21Q142       | 151-0220-00<br>151-0190-05                                        |                  | TRANSISTOR: SILICON, PNP                | 07263       |                 |                 |
|               | 191-0190-05                                                       |                  | TRANSISTOR: SILICON, NPN                | 80009       | 151-0190-05     |                 |
| A21Q143       | 151-0220-00                                                       |                  | TRANSISTOR: SILICON, PNP                | 07263       | S036228         | -0              |
| A21Q162       | 151-0220-00                                                       |                  | TRANSISTOR: SILICON, PNP                | 07263       |                 |                 |
| A21Q166       | 151-0434-01                                                       |                  | TRANSISTOR: SILICON, PNP                | 80009       | 151-0434-01     |                 |
| A21Q167       | 151-0434-01                                                       |                  | TRANSISTOR: SILICON, PNP                | 80009       | 151-0434-01     |                 |
| A21Q173       | 151-0270-00                                                       |                  | TRANSISTOR: SILICON, PNP                | 04713       |                 |                 |
|               |                                                                   |                  |                                         | 04715       | OBD             |                 |
| A21Q183       | 151-0274-00                                                       |                  | TRANSISTOR: SILICON, NPN                | 80009       | 151-0274-00     |                 |
| A21Q184       | 151-0192-03                                                       |                  | TRANSISTOR: SILICON, NPN                | 80009       | 151-0192-03     |                 |
| A21R4         | 307-0106-00                                                       |                  | RES.,FXD,CMPSN:4.7 OHM,5%,0.25W         | 01121       | CB47G5          |                 |
| A21R8         | 315-0100-00                                                       |                  | RES., FXD, CMPSN: 10 OHM, 5%, 0.25W     | 01121       | CB1005          | s her           |
| A21R9         | 307-0107-00                                                       |                  | RES.,FXD,CMPSN:5.6 OHM,5%,0.25W         |             | CB56G5          |                 |
| A21R11        | 307-0106-00                                                       |                  |                                         |             |                 |                 |
|               | 307-0106-00                                                       |                  | RES., FXD, CMPSN: 4.7 OHM, 5%, 0.25W    | 01121       | CB47G5          |                 |
| A21R12        | 315-0100-00                                                       |                  | RES.,FXD,CMPSN:10 OHM,5%,0.25W          | 01121       | CB1005          |                 |
| A21R31        | 321-0306-00                                                       |                  | RES.,FXD,FILM:15K OHM,1%,0.125W         | 91637       | MFF1816G15001F  |                 |
| A21R35        | 315-0221-00                                                       |                  | RES.,FXD,CMPSN:220 OHM,5%,0.25W         | 01121       | CB2215          |                 |
| A21R36        | 315-0102-00                                                       |                  | RES.,FXD,CMPSN:1K OHM,5%,0.25W          | 01121       | CB1025          |                 |
| A21R37        | 321-0305-00                                                       |                  | RES.,FXD,FILM:14.7K OHM,1%,0.125W       | 91637       | MEE1914014701E  | , and being and |
| A21R42        | 321-0333-00                                                       |                  | RES., FXD, FILM: 28.7K OHM, 1%, 0.125W  |             | MFF1816G14701F  |                 |
| A21R43        | 321-0333-00                                                       |                  |                                         | 91637       | MFF1816G28701F  |                 |
| A21R44        | 315-0102-00                                                       |                  | RES., FXD, FILM: 28.7K OHM, 1%, 0.125W  | 91637       |                 |                 |
| A21R46        | 315-0102-00                                                       |                  | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W     | 01121       |                 |                 |
|               | 515 0102 00                                                       |                  | RES.,FXD,CMPSN:1K OHM,5%,0.25W          | 01121       | CB1025          | - 10            |
| A21R61        | 321-0341-00                                                       |                  | RES., FXD, FILM: 34.8K OHM, 1%, 0.125W  | 91637       | MFF1816G34801F  |                 |
| A21R62        | 321-0193-00                                                       |                  | RES., FXD, FILM: 1K OHM, 1%, 0.125W     | 91637       | MFF1816G10000F  |                 |
| A21R63        | 311-1757-00                                                       |                  | RES., VAR, NONWIR: 2.5K OHM, 10%, 0.50W | 32997       | 3326н-G48-252   |                 |
| A21R64        | 315-0471-00                                                       |                  | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W    | 01121       | CB4715          |                 |
| A21R65        | 321-0254-00                                                       |                  | RES., FXD, FILM: 4.32K OHM, 1%, 0.125W  |             | MFF1816G43200F  |                 |
| A21R67        | 315-0102-00                                                       |                  |                                         |             |                 |                 |
| A21R70        |                                                                   |                  | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W     | 01121       | СВ1025          |                 |
|               | 311-1267-00                                                       |                  | RES., VAR, NONWIR: 5K OHM, 10%, 0.50W   | 32997       | 3329P-L58-502   | ~               |
| A21R71        | 321-0334-00                                                       |                  | RES.,FXD,F1LM:29.4K OHM,1%,0.125W       | 91637       | MFF1816G29401F  |                 |
| A21R72        | 321-0231-00                                                       |                  | RES.,FXD,F1LM:2.49K OHM,1%,0.125W       | 91637       | MFF1816G24900F  |                 |
| A21R73        | 321-0410-00                                                       |                  | RES.,FXD,FILM:182K OHM,1%,0.125W        | 91637       | MFF1816G18202F  |                 |
| A21R75        | 315-0753-00                                                       |                  | RES., FXD, CMPSN: 75K OHM, 5%, 0.25W    | 01121       | CB7535          |                 |
| A21R76        | 321-0260-00                                                       |                  | RES., FXD, FILM: 4.99K OHM, 1%, 0.125W  | 91637       | MFF1816G49900F  |                 |
| A21R77        | 315-0132-00                                                       |                  | RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W   |             |                 |                 |
| A21R79        | 315-0473-00                                                       |                  |                                         | 01121       | CB1325          |                 |
| A21R81        | 315-0103-00                                                       |                  | RES., FXD, CMPSN: 47K OHM, 5%, 0.25W    | 01121       |                 |                 |
|               | 517 0105-00                                                       |                  | RES.,FXD,CMPSN:10K OHM,5%,0.25W         | 01121       | CB1035          |                 |
| A21R82        | 315-0391-00                                                       |                  | RES.,FXD,CMPSN:390 OHM,5%,0,25W         | 01121       | CB3915          |                 |
| A21R83        | 315-0101-00                                                       |                  | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W    | 01121       | CB1015          |                 |
| A21R101       | 321-0283-00                                                       |                  | RES., FXD, FILM: 8.66K OHM, 1%, 0.125W  | 91637       | MFF1816G86600F  |                 |
| A21R102       | 311-1260-00                                                       |                  | RES., VAR, NONWIR: 250 OHM, 10%, 0.50W  | 32997       | 3329P~L58-251   |                 |
| A21R103       | 315-0102-00                                                       |                  | RES., FXD, CMPSN:1K OHM, 5%, 0.25W      | 01121       | CB1025          |                 |
| A01p104       | 315 6156                                                          |                  |                                         |             |                 |                 |
| A21R104       | 315-0152-00                                                       |                  | RES.,FXD,CMPSN:1.5K OHM,5%,0.25W        | 01121       | CB1525          |                 |
| A21R106       | 315-0510-00                                                       |                  | RES., FXD, CMPSN: 51 OHM, 5%, 0.25W     | 01121       | CB5105          |                 |
| A21R109       | 321-0126-00                                                       |                  | RES., FXD, FILM: 200 OHM, 1%, 0.125W    | 91637       | MFF1816G200R0F  |                 |
| A21R110       | 321-0066-00                                                       |                  | RES., FXD, FILM: 47.5 OHM, 1%, 0.125W   | 91637       | MFF1816G47R50F  |                 |
| A21R111       | 321-0193-00                                                       |                  | RES.,FXD,FILM:1K OHM,1%,0.125W          | 91637       | MFF1816G10000F  | ·~ .            |
| A21R113       | 315-0101-00                                                       |                  | RES.,FXD,CMPSN:100 OHM,5%,0.25W         | 01101       | CB1015          |                 |
|               |                                                                   |                  |                                         | 01121       | CB1015          | ~~              |

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| w            | Component No.      | Tektronix<br>Part No. | Serial/Model No.<br>Eff Dscont | Name & Description                     | Mfr<br>Code | Mfr Part Number |
|--------------|--------------------|-----------------------|--------------------------------|----------------------------------------|-------------|-----------------|
|              | A21R121            | 321-0126-00           |                                | RES., FXD, FILM: 200 OHM, 1%, 0.125W   | 91637       | MFF1816G200R0F  |
|              | A21R122            | 321-0120-00           |                                | RES.,FXD,FILM:200 0HM,1%,0.125W        | 91637       |                 |
|              | A21R123            | 315-0272-00           |                                |                                        |             |                 |
|              | A21R125            |                       |                                | RES., FXD, CMPSN: 2.7K OHM, 5%, 0.25W  | 01121       |                 |
|              |                    | 323-0275-00           |                                | RES., FXD, FILM: 7.15K OHM, 1%, 0.50W  |             | CECTO-7151F     |
|              | A21R125<br>A21R126 | 311-1263-00           |                                | RES., VAR, NONWIR: 1K OHM, 10%, 0.50W  |             | 3329P-L58-102   |
|              | AZIKIZO            | 321-0126-00           |                                | RES.,FXD,FILM:200 OHM,1%,0.125W        | 91637       | MFF1816G200R0F  |
| · · · · ·    | A21R127            | 315-0102-00           |                                | RES.,FXD,CMPSN:1K OHM,5%,0.25W         | 01121       | CB1025          |
|              | A21R128            | 315-0200-00           |                                | RES., FXD, CMPSN: 20 OHM, 5%, 0.25W    |             | CB2005          |
|              | A21R129            | 321-0126-00           |                                | RES., FXD, FILM: 200 OHM, 1%, 0.125W   |             | MFF1816G200R0F  |
|              | A21R132            | 321-0206-00           |                                | RES., FXD, FILM: 1.37K OHM, 1%, 0.125W |             | MFF1816G13700F  |
|              | A21R133            | 315-0101-00           |                                | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W   |             | CB1015          |
| en " total   | A21R134            | 315-0561-00           |                                | RES.,FXD,CMPSN:560 OHM,5%,0.25W        |             | CB5615          |
|              | A21R135            | 311-1260-00           |                                | RES.,VAR,NONWIR:250 OHM,10%,0.50W      | 32997       | 3329P-L58-251   |
|              | A21R136            | 315-0271-00           |                                | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W   |             | CB2715          |
|              | A21R141            | 315-0682-00           |                                | RES., FXD, CMPSN: 6.8K OHM, 5%, 0.25W  |             | CB6825          |
|              | A21R142            | 315-0682-00           |                                | RES., FXD, CMPSN: 6.8K OHM, 5%, 0.25W  |             | CB6825          |
|              | A21R142            | 315-0152-00           |                                | RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W  |             | CB1525          |
|              | A21R145            | 311-0622-00           |                                | RES., VAR, NONWIR: 100 OHM, 10%, 0.50W |             |                 |
|              | AZIKIJU            | 511-0022-00           |                                | RES., VAR, NONWIK: 100 OHM, 10%, 0.50W | 32997       | 3329H-G48-101   |
| Arresta .    | A21R155            | 311-0622-00           |                                | RES.,VAR,NONWIR:100 OHM,10%,0.50W      | 32997       | 3329H-G48-101   |
|              | A21R156            | 315-0105-00           |                                | RES.,FXD,CMPSN:1M OHM,5%,0.25W         | 01121       | CB1055          |
|              | A21R161            | 315-0101-00           |                                | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W   | 01121       | CB1015          |
|              | A21R162            | 315-0202-00           |                                | RES., FXD, CMPSN: 2K OHM, 5%, 0.25W    |             | CB2025          |
|              | A21R166            | 315-0391-00           |                                | RES., FXD, CMPSN: 390 OHM, 5%, 0.25W   |             | CB3915          |
|              | A21R167            | 315-0681-00           |                                | RES.,FXD,CMPSN:680 OHM,5%,0.25W        |             | CB6815          |
|              | A21R168            | 315-0302-00           |                                | RES., FXD, CMPSN: 3K OHM, 5%, 0.25W    | 01121       | СВ3025          |
|              | A21R169            | 303-0432-00           |                                | RES., FXD, CMPSN: 4.3K OHM, 5%, 1W     |             | GB4325          |
| and a second | A21R171            | 321-0347-00           |                                | RES., FXD, FILM:40.2K OHM, 1%, 0.125W  |             | MFF1816G40201F  |
|              | A21R172            | 321-0369-00           |                                | RES., FXD, FILM:68.1K OHM, 1%, 0.125W  |             | MFF1816G68101F  |
|              | A21R173            | 315-0510-00           |                                | RES., FXD, CMPSN: 51 OHM, 5%, 0.25W    |             | CB5105          |
|              | A21R176            | 301-0472-00           |                                | RES., FXD, CMPSN: 4.7K OHM, 5%, 0.50W  |             | EB4725          |
| n,≪~⇒r¥n,    | 4010177            | 201 01 70 00          |                                |                                        |             |                 |
|              | A21R177            | 301-0472-00           |                                | RES., FXD, CMPSN: 4.7K OHM, 5%, 0.50W  |             | EB4725          |
|              | A21R179            | 323-0356-00           |                                | RES., FXD, FILM: 49.9K OHM, 1%, 0.50W  |             | CECTO-4992F     |
|              | A21R180            | 321-0260-00           |                                | RES., FXD, FILM: 4.99K OHM, 1%, 0.125W |             | MFF1816G49900F  |
|              | A21R183            | 321-0097-00           |                                | RES., FXD, FILM: 100 OHM, 1%, 0.125W   |             | MFF1816G100R0F  |
|              | A21TP32            | 214-0579-00           |                                | TERM, TEST POINT: BRS CD PL            | 80009       | 214-0579-00     |
|              | A21TP83            | 214-0579-00           |                                | TERM, TEST POINT: BRS CD PL            | 80009       | 214-0579-00     |
|              | A21TP103           | 214-0579-00           |                                | TERM, TEST POINT: BRS CD PL            | 80009       | 214-0579-00     |
| -            | A21TP106           | 214-0579-00           |                                | TERM, TEST POINT: BRS CD PL            | 80009       | 214-0579-00     |
|              | A21TP122           | 214-0579-00           |                                | TERM, TEST POINT: BRS CD PL            | 80009       | 214-0579-00     |
|              | A21TP143           | 214-0579-00           |                                | TERM, TEST POINT: BRS CD PL            | 80009       | 214-0579-00     |
|              | A21TP183           | 214-0579-00           |                                | TERM, TEST POINT: BRS CD PL            | 80009       | 214-0579-00     |
|              | A21TP186           | 214-0579-00           |                                | TERM, TEST POINT: BRS CD PL            | 80009       | 214-0579-00     |
| /****        | A21U105            | 156-0251-01           |                                | MICROCIRCUIT, LI: HIGH SPEED COMPTR    | 80009       | 156-0251-01     |

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------|------------------------------------------|-------|---------------------|--------------------------|
| Component No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Part No.                   | Eff Dscont       | Name & Description                       |       | Mfr Part Number     |                          |
| NAMES OF A DOMESTIC ADDRESS OF AD | Fail NU.                   | LII DSCOIIL      |                                          | 0000  |                     |                          |
| A22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                  | CKT BOARD ASSY:LV REGULATOR              |       |                     |                          |
| A22C8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 290-0778-00                |                  | CAP., FXD, ELCTLT: 1UF, +50-10%, 50V     |       | ECE-A50N1           |                          |
| A22C12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 290-0778-00                |                  | CAP., FXD, ELCTLT: 1UF, +50-10%, 50V     |       | ECE-A50N1           |                          |
| A22C13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 283-0047-00                |                  | CAP., FXD, CER DI: 270PF, 5%, 500V       |       | 0831522Z5D00271J    |                          |
| A22C15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 281-0629-00                |                  | CAP., FXD, CER DI: 33PF, 5%, 600V        |       | 7027-0260           |                          |
| A22C17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 290-0778-00                |                  | CAP.,FXD,ELCTLT:1UF,+50-10%,50V          | 54473 | ECE-A50N1           |                          |
| 10000/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                            |                  | 04D TWD CED DI 0 00500 100 100 100       | 56280 | 19C242B             |                          |
| A22C24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 283-0110-00                |                  | CAP., FXD, CER DI:0.005UF, +80-20%, 150V | 72982 |                     |                          |
| A22C36                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 281-0775-00                |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V        |       | 835-515B102K        |                          |
| A22C44                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 283-0067-00                |                  | CAP., FXD, CER DI:0.001UF, 10%, 200V     |       | 301-000C0G0220K     |                          |
| A22C45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 281-0511-00                |                  | CAP., FXD, CER DI:22PF, +/-2.2PF, 500V   |       | ECE-A50N1           |                          |
| A22C47                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 290-0778-00                |                  | CAP., FXD, ELCTLT: 1UF, +50-10%, 50V     |       | 19C242B             |                          |
| A22C54                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 283-0110-00                |                  | CAP.,FXD,CER DI:0.005UF,+80-20%,150V     | J0209 | 1902420             |                          |
| A22C64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 281-0540-00                |                  | CAP., FXD, CER DI:51PF, 5%, 500V         | 59660 | 301-000U2J0510J     |                          |
| A22C68                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 290-0420-00                |                  | CAP., FXD, ELCTLT: 0.68UF, 20%, 75V      |       | 150D684X0075A2      |                          |
| A22C69                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 283-0067-00                |                  | CAP., FXD, CER DI:0.001UF, 10%, 200V     |       | 835-515B102K        |                          |
| A22C84                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 281-0629-00                |                  | CAP., FXD, CER DI: 33PF, 5%, 600V        |       | 7027-0260           | 100 PM                   |
| A22C88                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 290-0420-00                |                  | CAP., FXD, ELCTLT: 0.68UF, 20%, 75V      |       | 150D684X0075A2      |                          |
| A22C000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 281-0605-00                |                  | CAP., FXD, CER DI: 200PF, 10%, 500V      | -     | 7001-1375           |                          |
| A220114                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 201 0005 00                |                  |                                          |       |                     |                          |
| A22C156                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 290-0745-00                |                  | CAP., FXD, ELCTLT: 22UF, +50-10%, 25V    | 56289 | 502D225             | - PRADes                 |
| A22CR7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 152-0333-00                |                  | SEMICOND DEVICE: SILICON, 55V, 200MA     | 07263 | FDH-6012            |                          |
| A22CR8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA      | 07263 | FDH-6012            |                          |
| A22CR10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA      | 07263 | FDH-6012            |                          |
| A22CR11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0333-00                |                  | SEMICOND DEVICE: SILICON, 55V, 200MA     | 07263 | FDH-6012            |                          |
| A22CR13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0066-03                |                  | SEMICOND DEVICE: RECT, SI, 400V, 1A      | 80009 | 152-0066-03         | an Marian                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |                  |                                          |       |                     |                          |
| A22CR15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0333-00                |                  | SEMICOND DEVICE:SILICON,55V,200MA        | 07263 | FDH-6012            |                          |
| A22CR19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA      |       | 1N4152R             |                          |
| A22CR20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA      |       | 1N4152R             | <br>                     |
| A22CR21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA      |       | 1N4152R             |                          |
| A22CR22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0333-00                |                  | SEMICOND DEVICE:SILICON,55V,200MA        |       | FDH-6012            |                          |
| A22CR28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0066-03                |                  | SEMICOND DEVICE:RECT,SI,400V,1A          | 80009 | 152-0066-03         |                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |                  |                                          | 07762 | EDIT 6012           | setters.                 |
| A22CR45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0333-00                |                  | SEMICOND DEVICE: SILICON, 55V, 200MA     |       | FDH-6012<br>1N4152R |                          |
| A22CR49                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0141-02                |                  | SEMICOND DEVICE: SILICON, 30V, 150MA     |       | 1N4152R             |                          |
| A22CR50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA      |       | 1N4152R             |                          |
| A22CR51                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0141-02                |                  | SEMICOND DEVICE: SILICON, 30V, 150MA     |       | FDH-6012            |                          |
| A22CR52                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0333-00                |                  | SEMICOND DEVICE: SILICON, 55V, 200MA     |       | 152-0066-03         |                          |
| A22CR58                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0066-03                |                  | SEMICOND DEVICE: RECT, SI, 400V, 1A      | 80009 | 152 0000 05         |                          |
| A22CR64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA      | 07263 | FDH-6012            |                          |
| A22CR76                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0066-03                |                  | SEMICOND DEVICE: RECT, SI, 400V, 1A      | 80009 | 152-0066-03         |                          |
| A22CR84                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA      | 07263 | FDH-6012            | · (***(** <sub>2</sub> ) |
| A22CR96                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 152-0066-03                |                  | SEMICOND DEVICE: RECT, SI, 400V, 1A      | 80009 | 152-0066-03         |                          |
| A22CR114                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA      | 07263 | FDH-6012            |                          |
| A22CR142                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 152-0423-00                |                  | SEMICOND DEVICE: SILICON, 400V, 3A       | 04713 | 1N5000              |                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |                  |                                          |       |                     | ~**:+p.                  |
| A22CR143                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA      | 01295 |                     |                          |
| A22CR144                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 152-0423-00                |                  | SEMICOND DEVICE: SILICON, 400V, 3A       | 04713 |                     |                          |
| A22CR148                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA      |       | 5 1N4152R           |                          |
| A22Q22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0350-00                |                  | TRANSISTOR: SILICON, PNP                 | 04713 |                     |                          |
| A22Q34                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0103-00                |                  | TRANSISTOR: SILICON, NPN                 | 80009 |                     | 474 Mary                 |
| A22Q38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0134-00                |                  | TRANSISTOR: SILICON, PNP                 | 80009 | 151-0134-00         |                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |                  |                                          | 5(00) | ) )NEEE)            |                          |
| A22Q52                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0347-00                |                  | TRANSISTOR: SILICON, NPN                 | 56289 |                     |                          |
| A22Q68                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0347-00                |                  | TRANSISTOR: SILICON, NPN                 | 56289 |                     | organiew,                |
| A22Q88                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 151-0342-00                |                  | TRANSISTOR: SILICON, PNP                 | 07263 |                     |                          |
| A22Q118                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 151-0302-00                |                  | TRANSISTOR: SILICON, NPN                 | 07263 |                     |                          |
| A22Q144                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 151-0190-05                |                  | TRANSISTOR: SILICON, NPN                 | 80009 |                     |                          |
| A22Q148                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 151-0373-00                | •                | TRANSISTOR: SILICON, PNP                 | 80009 | 9 151-0373-00       | -                        |
| A 2 2 D 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 301.0260.00                |                  | RES.,FXD,FILM:68.1K OHM,1%,0.125W        | 91637 | 7 MFF1816G68101F    | - 10 May 20              |
| A22R1<br>A22R2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 321-0369-00<br>321-0386-00 |                  | RES., FXD, FILM: 102K OHM, 1%, 0.125W    | 91633 |                     |                          |
| ALLAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 521-0500-00                | ,                | and stable there to a delige of the the  | ,,    |                     |                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |                  |                                          |       |                     |                          |

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| ar t sa          | Component No.    | Tektronix<br>Part No.      | Serial/Model No.<br>Eff Dscont | Name & Description                                                  | Mfr<br>Code | Mfr Part Number              |
|------------------|------------------|----------------------------|--------------------------------|---------------------------------------------------------------------|-------------|------------------------------|
|                  | A22R3            | 321-0336-00                |                                | RES., FXD, F1LM: 30.9K 0HM, 1%, 0.125W                              | 91637       | MFF1816G30901F               |
|                  | A22R3            | 321-0390-00                |                                | RES., FXD, F1LM: 10.2K OHM, 1%, 0.125W                              |             | MFF1816G10201F               |
|                  | A22R4<br>A22R5   | 321-0290-00                |                                | RES., FXD, FILM: 20.5K OHM, 1%, 0.125W                              |             | MFF1816G20501F               |
| No. 1            | A22R3<br>A22R8   |                            |                                | RES., FXD, CMPSN: 3.3K OHM, 5%, 0.25W                               |             | CB3325                       |
|                  |                  | 315-0332-00                |                                | RES.,FXD,FILM:5.62K OHM,1%,0.50W                                    |             | CECTO-5621F                  |
|                  | A22R10<br>A22R12 | 323-0265-00<br>315-0512-00 |                                | RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W                               |             | CB5125                       |
|                  | 100010           | 215 0102-00                |                                | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W                                | 01121       | СВ1035                       |
| 19.19            | A22R13           | 315-0103-00                |                                | RES.,FXD,FILM:5.703K OHM,0.25%,0.125W                               |             | MFF1816C57030C               |
|                  | A22R14           | 321-0730-06                |                                | RES., VAR, NONWIR: 1K OHM, 20%, 0.50W                               |             | 3386F-T04-102                |
|                  | A22R15           | 311-1225-00                |                                | RES., FXD, FILM: 27.4K OHM, 1%, 0.125W                              |             | MFF1816C27401F               |
|                  | A22R16           | 321-0331-09                |                                |                                                                     |             | CB1515                       |
| an mare          | A22R17<br>A22R21 | 315-0151-00<br>315-0104-00 |                                | RES.,FXD,CMPSN:150 OHM,5%,0.25W<br>RES.,FXD,CMPSN:100K OHM,5%,0.25W |             | CB1045                       |
|                  | 100000           |                            |                                |                                                                     | 01101       | CP0015                       |
|                  | A22R22           | 315-0821-00                |                                | RES., FXD, CMPSN: 820 OHM, 5%, 0.25W                                |             | CB8215                       |
|                  | A22R24           | 315-0331-00                |                                | RES., FXD, CMPSN: 330 OHM, 5%, 0.25W                                |             | CB3315                       |
|                  | A22R25           | 315-0471-00                |                                | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W                                |             | CB4715                       |
|                  | A22R26           | 315-0181-00                |                                | RES., FXD, CMPSN: 180 OHM, 5%, 0.25W                                |             | CB1815                       |
|                  | A22R27           | 315-0512-00                |                                | RES.,FXD,CMPSN:5.1K OHM,5%,0.25W                                    |             | CB5125                       |
|                  | A22R28           | 308-0365-00                |                                | RES.,FXD,WW:1.5 OHM,5%,3W                                           | 91637       | CW2B-1R500J                  |
| ar-ra            | A22R32           | 315-0432-00                |                                | RES.,FXD,CMPSN:4.3K OHM,5%,0.25W                                    | 01121       | CB4325                       |
|                  | A22R34           | 304-0102-00                |                                | RES.,FXD,CMPSN:1K OHM,10%,1W                                        |             | GB1021                       |
|                  | A22R36           | 315-0121-00                |                                | RES.,FXD,CMPSN:120 OHM,5%,0.25W                                     | 01121       | CB1215                       |
|                  | A22R37           | 315-0123-00                |                                | RES., FXD, CMPSN: 12K OHM, 5%, 0.25W                                | 01121       | CB1235                       |
|                  | A22R38           | 301-0182-00                |                                | RES., FXD, CMPSN: 1.8K OHM, 5%, 0.5W                                | 01121       | EB1825                       |
|                  | A22R42           | 315-0203-00                |                                | RES., FXD, CMPSN: 20K OHM, 5%, 0.25W                                | 01121       | CB2035                       |
|                  | A22R44           | 315-0103-00                |                                | RES.,FXD,CMPSN:10K OHM,5%,0.25W                                     | 01121       | CB1035                       |
|                  | A22R45           | 321-0924-07                |                                | RES., FXD, FILM: 40K OHM, 0.1%, 0.125W                              |             | MFF1816C40001B               |
| Citer of Patrice | A22R45           | 321-0924-07                |                                | RES., FXD, FILM:40K OHM, 0.1%, 0.125W                               |             | MFF1816C40001B               |
|                  | A22R40           | 315-0151-00                |                                | RES., FXD, CMPSN: 150 OHM, 5%, 0.25W                                |             | CB1515                       |
|                  | A22R51           | 315-0104-00                |                                | RES., FXD, CMPSN: 100K OHM, 5%, 0.25W                               |             | CB1045                       |
|                  | A22R51           | 315-0821-00                |                                | RES., FXD, CMPSN:820 OHM, 5%, 0.25W                                 |             | CB8215                       |
|                  | 10005/           | 215 0511 00                |                                | RES., FXD, CMPSN: 510 OHM, 5%, 0.25W                                | 01121       | CB5115                       |
|                  | A22R54           | 315-0511-00                |                                |                                                                     |             | CB4715                       |
|                  | A22R55           | 315-0471-00                |                                | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W                                |             | CB1515                       |
|                  | A22R56           | 315-0151-00                |                                | RES., FXD, CMPSN: 150 OHM, 5%, 0.25W                                |             | CB5125                       |
|                  | A22R57           | 315-0512-00                |                                | RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W                               |             |                              |
| *****            | A22R58<br>A22R61 | 308-0686-00<br>321-0332-07 |                                | RES.,FXD,WW:2.2 OHM,5%,2W<br>RES.,FXD,F1LM:28K OHM,0.1%,0.125W      |             | BWH-2R200J<br>MFF1816C28001B |
|                  | MELIKO I         | 52x 0352 07                |                                |                                                                     |             |                              |
|                  | A22R62           | 321-1296-07                |                                | RES., FXD, FILM: 12K OHM, 0.1%, 0.125W                              |             | MFF1816C12001B               |
|                  | A22R63           | 315-0152-00                |                                | RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W                               |             | CB1525                       |
|                  | A22R67           | 315-0123-00                |                                | RES., FXD, CMPSN: 12K OHM, 5%, 0.25W                                |             | CB1235                       |
|                  | A22R68           | 315-0302-00                |                                | RES., FXD, CMPSN: 3K OHM, 5%, 0.25W                                 |             | CB3025                       |
|                  | A22R69           | 315-0822-00                |                                | RES., FXD, CMPSN: 8.2K OHM, 5%, 0.25W                               |             | CB8225                       |
|                  | A22R73           | 315-0201-00                |                                | RES.,FXD,CMPSN:200 OHM,5%,0.25W                                     | 01121       | CB2015                       |
| 7.0as            | A22R74           | 315-0393-00                |                                | RES.,FXD,CMPSN:39K OHM,5%,0.25W                                     | 01121       | СВ3935                       |
|                  | A22R75           | 308-0804-00                |                                | RES.,FXD,NONWIR:0.025 OHM,5%,0.5W                                   | 80009       | 308-0804-00                  |
|                  | A22R76           | 315-0151-00                |                                | RES.,FXD,CMPSN:150 OHM,5%,0.25W                                     | 01121       | CB1515                       |
|                  | A22R77           | 315-0432-00                |                                | RES., FXD, CMPSN: 4.3K OHM, 5%, 0.25W                               | 01121       | CB4325                       |
|                  | A22R80           | 321-0924-07                |                                | RES., FXD, FILM: 40K OHM, 0.1%, 0.125W                              | 91637       | MFF1816C40001B               |
|                  | A22R81           | 321-1296-07                |                                | RES.,FXD,FILM:12K OHM,0.1%,0.125W                                   |             | MFF1816C12001B               |
|                  | A22R82           | 315-0912-00                |                                | RES., FXD, CMPSN: 9.1K OHM, 5%, 0.25W                               | 01121       | CB9125                       |
|                  | A22R82           | 315-0102-00                |                                | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W                                 |             | CB1025                       |
|                  |                  |                            |                                | RES., FXD, CMPSN: 12K OHM, 5%, 0.25W                                |             | CB1235                       |
|                  | A22R87           | 315-0123-00                |                                | RES., FXD, CMPSN: 12K OHM, 5%, 0.25W                                |             | CB3025                       |
|                  | A22R88           | 315-0302-00                |                                | RES.,FXD,CMPSN:3K OHM,5%,0.25W<br>RES.,FXD,CMPSN:200 OHM,5%,0.25W   |             | CB2015                       |
|                  | A22R93           | 315-0201-00                |                                |                                                                     |             |                              |
|                  | A22R94           | 315-0393-00                |                                | RES.,FXD,CMPSN:39K OHM,5%,0.25W                                     | 01121       | 10707                        |
|                  | A22R95           | 308-0804-00                |                                | RES.,FXD,NONWIR:0.025 OHM,5%,0.5W                                   | 80009       | 308-0804-00                  |
|                  | AZZK9J           | JUU 0004 00                |                                | Red, ir Rd, nonwith to to 25 of mi, 5%, or 5%                       | 00007       | 500 000 00                   |

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| 0             | Tektronix   |     | Model No. |                                                                              | Mfr   |                                |        |
|---------------|-------------|-----|-----------|------------------------------------------------------------------------------|-------|--------------------------------|--------|
| Component No. | Part No.    | Eff | Dscont    | Name & Description                                                           | Code  | Mfr Part Number                |        |
| A22R97        | 315-0432-00 |     |           | RES.,FXD,CMPSN:4.3K OHM,5%,0.25W                                             | 01121 | CB4325                         |        |
| A22R113       | 321-1713-07 |     |           | RES., FXD, FILM: 36K OHM, 0.1%, 0.125W                                       |       |                                |        |
| A22R114       | 321-0926-07 |     |           | RES., FXD, FILM: 36K OHM, 0.1%, 0.125W                                       | 24340 | NE55E3602B<br>MFF1816C40000B   |        |
| A22R121       | 315-0512-00 |     |           | RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W                                        |       | CB5125                         |        |
| A22R126       | 315-0131-00 |     |           | RES., FXD, CMPSN: 130 OHM, 5%, 0.25W                                         |       | CB1315                         |        |
|               |             |     |           | 1                                                                            | 01121 | 001010                         |        |
| A22R127       | 315-0203-00 |     |           | RES., FXD, CMPSN: 20K OHM, 5%, 0.25W                                         | 01121 | CB2035                         |        |
| A22R128       | 315-0203-00 |     |           | RES., FXD, CMPSN: 20K OHM, 5%, 0.25W                                         | 01121 | CB2035                         |        |
| A22R129       | 315-0101-00 |     |           | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W                                         | 01121 | CB1015                         |        |
| A22R131       | 315-0362-00 |     |           | RES., FXD, CMPSN: 3.6K OHM, 5%, 0.25W                                        | 01121 | CB3625                         |        |
| A22R132       | 315-0151-00 |     |           | RES., FXD, CMPSN: 150 OHM, 5%, 0.25W                                         | 01121 | CB1515                         |        |
| A22R133       | 308-0804-00 |     |           | RES.,FXD,NONWIR:0.025 OHM,5%,0.5W                                            | 80000 | 200 000/ 00                    |        |
| A22R134       | 308-0804-00 |     |           | RES., FXD, NONWIR: 0.025 OHM, 5%, 0.5W                                       | 80009 |                                |        |
| A22R135       | 315-0470-00 |     |           | RES., FXD, NONWIR:0.025 OHM, 5%, 0.5W<br>RES., FXD, CMPSN:47 OHM, 5%, 0.25W  | 80009 | 308-0804-00<br>CB4705          |        |
| A22R136       | 315-0432-00 |     |           | RES., FXD, CMPSN:47 OHA, 5%, 0.25W                                           |       | CB4705<br>CB4325               |        |
| A22R141       | 315-0822-00 |     |           | RES., FXD, CMPSN: 8.2K OHM, 5%, 0.25W                                        |       | CB4325<br>CB8225               |        |
|               | 515 0022 00 |     |           | RES., FRD, OFFSN. 6.2K OFF, 5%, 0.25W                                        | 01121 | 080223                         |        |
| A22R142       | 315-0103-00 |     |           | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W                                         | 01121 | CB1035                         |        |
| A22R143       | 315-0243-00 |     |           | RES., FXD, CMPSN: 24K OHM, 5%, 0.25W                                         | 01121 | CB2435                         |        |
| A22R144       | 315-0562-00 |     |           | RES.,FXD,CMPSN:5.6K OHM,5%,0.25W                                             | 01121 | CB5625                         |        |
| A22R145       | 315-0221-00 |     |           | RES., FXD, CMPSN: 220 OHM, 5%, 0.25W                                         | 01121 | CB2215                         |        |
| A22R148       | 308-0702-00 |     |           | RES.,FXD,WW:0.33 OHM,5%,2W                                                   | 75042 | BWH-R3300J                     |        |
| A22R152       | 301-0561-00 |     |           | RES., FXD, CMPSN: 560 OHM, 5%, 0.50W                                         | 01101 | FDE(15                         |        |
| A22R156       | 301-0431-00 |     |           | RES., FXD, CMPSN: 300 OHM, 5%, 0.50W<br>RES., FXD, CMPSN: 430 OHM, 5%, 0.50W |       | EB5615                         |        |
| A22S72        | 131-0993-00 |     |           | BUS,CONDUCTOR:2 WIRE BLACK                                                   |       | EB4315                         |        |
| A22U15        | 156-0067-12 |     |           | MICROCIRCUIT, LI: OPERATIONAL AMPLIFIER                                      |       | 530153-2<br>MC1741CU           |        |
| A22U45        | 156-0067-12 |     |           | MICROCIRCUIT, LI: OPERATIONAL AMPLIFIER                                      |       | MC1741CU<br>MC1741CU           |        |
|               | 190 0007 12 |     |           | MICROCIRCUIT, EI. OFERATIONAL AMPEIFIER                                      | 04713 | MC1741C0                       |        |
| A22U64        | 156-0158-03 |     |           | MICROCIRCUIT, LI: DUAL OPNL AMPL, CHK                                        | 80009 | 156-0158-03                    | · •••• |
| A22U84        | 156-0158-03 |     |           | MICROCIRCUIT, LI: DUAL OPNL AMPL, CHK                                        | 80009 | 156-0158-03                    |        |
| A22U114       | 156-0158-03 |     |           | MICROCIRCUIT, LI: DUAL OPNL AMPL, CHK                                        | 80009 | 156-0158-03                    |        |
| A22VR10       | 152-0217-00 |     |           | SEMICOND DEVICE: ZENER, 0.4W, 8.2V, 5%                                       | 04713 | SZG20                          |        |
| A22VR12       | 152-0212-00 |     |           | SEMICOND DEVICE:ZENER,0.5W,9V,5%                                             | 04713 | SZ50646RL                      |        |
| A22VR17       | 152-0283-00 |     |           | SEMICOND DEVICE:ZENER,0.4W.43V.5%                                            | 1205/ | DZ750903B1N976B                |        |
| A22VR32       | 152-0281-00 |     |           | SEMICOND DEVICE:ZENER,0.4W,43V,5%                                            |       | 1N969B                         |        |
| A22VR36       | 152-0281-00 |     |           | SEMICOND DEVICE:ZENER,0.4W,22V,5%                                            | 12954 |                                |        |
| A22VR47       | 152-0283-00 |     |           | SEMICOND DEVICE:ZENER,0.4W,22V,5%                                            | 12954 |                                |        |
| A22VR152      | 152-0175-01 |     |           | SEMICOND DEVICE:ZENER,0.4W,45V,5%<br>SEMICOND DEVICE:ZENER,0.4W,5.6V,5%      |       | DZ750903B1N976B<br>152-0175-01 |        |
|               |             |     |           | Surroup Device. Denak, 0.4w, J. 0v, JA                                       | 00009 | 172-0175-01                    |        |
| A22VR156      | 152-0175-01 |     |           | SEMICOND DEVICE:ZENER,0.4W,5.6V,5%                                           | 80009 | 152-0175-01                    |        |

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|                             |               | Tektronix                                                | Serial/Model No. |                                         | Mfr   |                                                                                       |
|-----------------------------|---------------|----------------------------------------------------------|------------------|-----------------------------------------|-------|---------------------------------------------------------------------------------------|
|                             | Component No. | Part No.                                                 | Eff Dscont       | Name & Description                      |       | Mfr Part Number                                                                       |
|                             | A23           | -Nix Alfridades good weather setting to the state and to |                  | CKT BOARD ASSY:P.S. INVERTER            |       | ne menten konnen dekana uterakan kelandarakan kelandara kelandigan dia kelandekan ter |
|                             | A23C5         | 283-0022-00                                              |                  | CAP., FXD, CER DI:0.02UF, 1400VDCAC     | 01/10 | 1000 01/0 100                                                                         |
|                             | A23C6         | 283-0022-00                                              |                  |                                         | 91418 |                                                                                       |
|                             | A23C19        | 283-0057-00                                              |                  | CAP., FXD, CER DI:0.02UF, 1400VDCAC     |       | AU203-2142-1R0                                                                        |
|                             | A23C27        |                                                          |                  | CAP., FXD, CER DI:0.1UF, +80-20%, 200V  | 56289 |                                                                                       |
|                             | A23627        | 283-0280-00                                              |                  | CAP.,FXD,CER DI:2200PF,10%,2000V        | 56289 | 562CBA202EH222KA                                                                      |
|                             | A23C28        | 283-0280-00                                              |                  | CAP.,FXD,CER DI:2200PF,10%,2000V        | 56289 | 562CBA202EH222KA                                                                      |
| ·· ·· ·                     | A23C29        | 285-0939-00                                              |                  | CAP., FXD, PLSTC: 3UF, 5%, 400V         | 84411 | TEK111-30594                                                                          |
|                             | A23C31        | 290-0891-00                                              |                  | CAP.,FXD,ELCTLT:1UF,+75-10%,50V         | 55680 | 25U1A10V-T                                                                            |
|                             | A23C35        | 283-0060-00                                              |                  | CAP., FXD, CER DI: 100PF, 5%, 200V      | 72982 | 855-535U2J101J                                                                        |
|                             | A23C36        | 283-0280-00                                              |                  | CAP.,FXD,CER DI:2200FF,10%,2000V        | 56289 | 562CBA202EH222KA                                                                      |
| familier.                   | A23C38        | 283-0279-00                                              |                  | CAP., FXD, CER DI:0.001UF, 20%, 3000V   | 56289 | 55C153                                                                                |
|                             | A23C39        | 290-0891-00                                              |                  | CAP., FXD, ELCTLT: 1UF, +75-10%, 50V    |       | 25U1A10V-T                                                                            |
|                             | A23C42        | 283-0079-00                                              |                  | CAP., FXD, CER DI:0.01UF, 20%, 250V     | 72982 | 8151B202Y5S0103M                                                                      |
|                             | A23C43        | 290-0767-00                                              |                  | CAP., FXD, ELCTLT: 4.7UF, +75-10%, 160V | 56289 | 502D228                                                                               |
|                             | A23CR15       | 152-0396-01                                              |                  | SEMICOND DEVICE: SILICON, 400V, 3A      |       | 652-821                                                                               |
|                             | A23CR32       | 152-0107-00                                              |                  | SEMICOND DEVICE:SILICON,400V,400MA      | 01295 | C727                                                                                  |
|                             | A23CR34       | 152-0400-00                                              |                  | SEMICOND DEVICE:SILICON,400V,1A         |       | 152-0400-00                                                                           |
|                             | A23CR36       | 152-0061-00                                              |                  | SEMICOND DEVICE:SILICON, 175V, 100MA    |       | FDH2161                                                                               |
|                             | A23CR37       | 152-0061-00                                              |                  | SEMICOND DEVICE:SILICON, 175V, 100MA    |       | FDH2161                                                                               |
|                             | A23CR38       | 152-0107-00                                              |                  | SEMICOND DEVICE:SILICON,400V,400MA      | 01205 |                                                                                       |
|                             | A23CR40       | 152-0107-00                                              |                  |                                         | 01005 |                                                                                       |
|                             | A23CR41       | 152-0400-00                                              |                  | SEMICOND DEVICE: SILICON, 400V, 400MA   | 01295 | G727                                                                                  |
| (and 1)                     | A23CR45       | 152-0061-00                                              |                  | SEMICOND DEVICE: SILICON, 400V, 1A      |       | 152-0400-00                                                                           |
|                             | A23CR46       | 152-0581-00                                              |                  | SEMICOND DEVICE: SILICON, 175V, 100MA   | 07263 |                                                                                       |
|                             | A23CR49       | 152-0107-00                                              |                  | SEMICOND DEVICE: SILICON, 20V, 1A       |       | 152-0581-00                                                                           |
|                             |               | 192-0107-00                                              |                  | SEMICOND DEVICE:SILICON,400V,400MA      | 01295 | G727                                                                                  |
|                             | A23DS19       | 150-0035-00                                              |                  | LAMP,GLOW:90V,0.3MA                     | 53944 | A1B-3                                                                                 |
|                             | A23E8         | 119-0181-00                                              |                  | ARSR,ELEC SURGE:230V,GAS FILLED         | 80009 | 119-0181-00                                                                           |
|                             | A23E13        | 119-0181-00                                              |                  | ARSR,ELEC SURGE:230V,GAS FILLED         | 80009 | 119-0181-00                                                                           |
|                             | A23L24        | 108-0681-00                                              |                  | COIL, RF: 140UH                         | 80009 | 108-0681-00                                                                           |
| -16-17 <sup>-06</sup> -1965 | A23Q30        | 151-0508-00                                              |                  | TRANSISTOR:UJT,SI,2N6027,TO-98          | 03508 | 2N6027                                                                                |
|                             | A23Q43        | 151-0347-00                                              |                  | TRANSISTOR:SILICON, NPN                 | 56289 | 2N5551                                                                                |
|                             | A23Q45        | 151-0350-00                                              |                  | TRANSISTOR: SILICON, PNP                | 04713 | SPS6700                                                                               |
|                             | A23Q46        | 151-0260-00                                              |                  | TRANSISTOR: SILICON, NPN                | 80009 | 151-0260-00                                                                           |
| 2017-14-6                   | A23R5         | 304-0270-00                                              |                  | RES., FXD, CMPSN: 27 OHM, 10%, 1W       | 01121 | GB2701                                                                                |
|                             | A23R8         | 308-0503-00                                              |                  | RES., FXD, WW:6.8 OHM, 5%, 2.50W        | 91637 | RS2B-D6R800J                                                                          |
|                             | A23R9         | 304-0473-00                                              |                  | RES.,FXD,CMPSN:47K OHM,10%,1W           | 01121 | GB4731                                                                                |
|                             | A23R10        | 303-0184-00                                              |                  | RES., FXD, CMPSN: 180K OHM, 5%, 1W      | 01121 |                                                                                       |
|                             | A23R12        | 308-0503-00                                              |                  | RES., FXD, WW: 6.8 OHM, 5%, 2.50W       |       | RS2B-D6R800J                                                                          |
|                             | A23R13        | 304-0473-00                                              |                  | RES., FXD, CMPSN: 47K OHM, 10%, 1W      | 01121 |                                                                                       |
|                             | A23R19        | 302-0565-00                                              |                  | RES., FXD, CMPSN: 5.6M OHM, 10%, 0.50W  | 01121 |                                                                                       |
|                             | A23R21        | 304-0154-00                                              |                  | RES., FXD, CMPSN: 150K OHM, 10%, 1W     | 01121 | GB1541                                                                                |
|                             | A23R25        | 315-0471-00                                              |                  | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W    | 01121 |                                                                                       |
|                             | A23R31        | 303-0100-00                                              |                  | RES., FXD, CMPSN: 10 OHM, 5%, 1W        | 01121 |                                                                                       |
|                             | A23R32        | 315-0220-00                                              |                  | RES., FXD, CMPSN: 22 OHM, 5%, 0.25W     | 01121 |                                                                                       |
|                             | A23R36        | 315-0103-00                                              |                  | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W    |       |                                                                                       |
| ية مجمعهم                   |               |                                                          |                  |                                         | 01121 | (6103)                                                                                |
|                             | A23R37        | 301-0200-00                                              |                  | RES.,FXD,CMPSN:20 OHM,5%,0.50W          | 01121 | EB2005                                                                                |
|                             | A23R38        | 315-0332-00                                              |                  | RES., FXD, CMPSN: 3.3K OHM, 5%, 0.25W   | 01121 | CB3325                                                                                |
|                             | A23R39        | 301-0200-00                                              |                  | RES., FXD, CMPSN: 20 OHM, 5%, 0.50W     |       | EB2005                                                                                |
| 100 <sup>10</sup> 10        | A23R40        | 315-0220-00                                              |                  | RES.,FXD,CMPSN:22 OHM,5%,0.25W          | 01121 | CB2205                                                                                |
|                             | A23R41        | 315-0753-00                                              |                  | RES., FXD, CMPSN: 75K OHM, 5%, 0.25W    | 01121 | CB7535                                                                                |
|                             | A23R42        | 315-030300                                               |                  | RES., FXD, CMPSN: 30K OHM, 5%, 0.25W    | 01121 | СВ3035                                                                                |
|                             | A23R43        | 315-0274-00                                              |                  | RES., FXD, CMPSN: 270K OHM, 5%, 0.25W   |       | CB2745                                                                                |
| page land                   | A23R44        | 315-0270-00                                              |                  | RES., FXD, CMPSN: 27 OHM, 5%, 0.25W     |       | CB2705                                                                                |
|                             | A23R45        | 315-0182-00                                              |                  | RES., FXD, CMPSN: 1.8K OHM, 5%, 0.25W   |       | CB1825                                                                                |
|                             | A23R46        | 315-0123-00                                              |                  | RES., FXD, CMPSN: 12K OHM, 5%, 0.25W    |       | CB1235                                                                                |
| , prose                     | A23R47        | 301-0184-00                                              |                  | RES.,FXD,CMPSN:180K OHM,5%,0.50W        | 01121 | EB1845                                                                                |

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| Tektronix<br>Part No. | Serial/Model No.<br>Eff Dscont                                                                                    | Name & Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Mfr<br>Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Mfr Part Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 307-0353-00           |                                                                                                                   | RES., FXD, FILM: 5 OHM, 10%, DISC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 15454                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 5DA5RO-K-270SS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 307-0353-00           |                                                                                                                   | RES., FXD, FILM: 5 OHM, 10%, DISC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 15454                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 5DA5R0-K-270SS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 120-0636-00           |                                                                                                                   | XFMR, PWR, STPDN: LINE TRIGGER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 80009                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 120-0636-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 120-0743-00           |                                                                                                                   | XFMR, TOROID:13 TURNS, BIFILAR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 80009                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 120-0743-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 120-0744-00           |                                                                                                                   | XFMR, TOROID:5 WINDINGS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 80009                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 120-0744-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 120-0747-00           |                                                                                                                   | XFMR, TOROID:55 TURNS, SINGLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 80009                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 120-0747-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 152-0241-00           |                                                                                                                   | SEMICOND DEVICE:ZENER,0.4W,33V,5%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 80009                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 152-0241-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 152-0428-00           |                                                                                                                   | SEMICOND DEVICE:ZENER,0.4W,120V,5%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 80009                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 152-0428-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                       | Part No.<br>307-0353-00<br>307-0353-00<br>120-0636-00<br>120-0743-00<br>120-0744-00<br>120-0747-00<br>152-0241-00 | Part No.         Eff         Dscont           307-0353-00         307-0353-00         120-0636-00         120-0743-00         120-0743-00         120-0744-00         120-0747-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00         152-0241-00 | Part No.         Eff         Dscont         Name & Description           307-0353-00         RES.,FXD,FILM:5 OHM,10%,DISC           307-0353-00         RES.,FXD,FILM:5 OHM,10%,DISC           307-0353-00         RES.,FXD,FILM:5 OHM,10%,DISC           120-0636-00         XFMR,PWR,STPDN:LINE TRIGGER           120-0743-00         XFMR,TOROID:13 TURNS,BIFILAR           120-0744-00         XFMR,TOROID:5 WINDINGS           120-0747-00         XFMR,TOROID:55 TURNS,SINGLE           152-0241-00         SEMICOND DEVICE:ZENER,0.4W,33V,5% | Part No.         Eff         Dscont         Name & Description         Code           307-0353-00         RES., FXD, FILM:5 OHM, 10%, DISC         15454           307-0353-00         RES., FXD, FILM:5 OHM, 10%, DISC         15454           307-0353-00         RES., FXD, FILM:5 OHM, 10%, DISC         15454           120-0636-00         XFMR, PWR, STPDN: LINE TRIGGER         80009           120-0743-00         XFMR, TOROID:13 TURNS, BIFILAR         80009           120-0744-00         XFMR, TOROID:5 WINDINGS         80009           120-0747-00         XFMR, TOROID:55 TURNS, SINGLE         80009           152-0241-00         SEMICOND DEVICE: ZENER, 0.4W, 33V, 5%         80009 |

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| Component No.      | Tektronix<br>Part No.      | Serial/Model No.<br>Eff Dscont | Name & Description                                                | Mfr<br>Code    | Mfr Part Numbe                         |
|--------------------|----------------------------|--------------------------------|-------------------------------------------------------------------|----------------|----------------------------------------|
| A25                |                            |                                |                                                                   |                | ************************************** |
| A25C2              | 290-0745-00                |                                | CKT BOARD ASSY: DIGITIZER                                         | 56000          | 5000005                                |
|                    |                            |                                | CAP., FXD, ELCTLT: 220F, +50-10%, 25V                             | 56289          |                                        |
| A25C3              | 283-0111-00                |                                | CAP.,FXD,CER DI:0.1UF,20%,50V                                     | 72982          |                                        |
| A25C4              | 290-0745-00                |                                | CAP., FXD, ELCTLT: 22UF, +50-10%, 25V                             | 56289          |                                        |
| A25C6              | 290-0745-00                |                                | CAP.,FXD,ELCTLT:22UF,+50-10%,25V                                  | 56289          | 502D225                                |
| A25C11             | 283-0195-00                |                                | CAP., FXD, CER DI: 680PF, 5%, 50V                                 | 72982          | 8121N075C0G068                         |
| A25C12             | 283-0210-00                |                                | CAP.,FXD,CER DI:5600PF,10%,100V                                   | 72982          | 8131N145W5R562                         |
| A25C13             | 283-0239-00                |                                | CAP., FXD, CER DI:0.022UF, 10%, 50V                               | 72982          | 8121N083X7R022                         |
| A25C23             | 281-0809-00                |                                | CAP., FXD, CER DI: 200PF, 5%, 100V                                | 72982          |                                        |
| A25C24             | 283-0196-00                |                                | CAP., FXD, CER DI: 270PF, 10%, 50V                                |                | 8101B057X7R02                          |
| A25C30             | 283-0260-00                |                                | CAP., FXD, CER DI: 5.6PF, 5%, 200V                                |                | 8111B200C0G56                          |
| A25C33             | 283-0158-00                |                                | CAP., FXD, CER DI: 1PF, 10%, 50V                                  |                | 8101B057C0K01                          |
| 1250/0             | 281 0158 00                |                                |                                                                   | 73900          |                                        |
| A25C40             | 281-0158-00                |                                | CAP., VAR, CER D1:7-45PF, 50V                                     | 73899          |                                        |
| A25C42             | 283-0140-00                |                                | CAP.,FXD,CER DI:4.7PF,5%,50V<br>(NOMINAL VALUE, SELECTED)         | 72982          | 8101E003A479C                          |
| A25C50             | 283-0260-00                |                                | CAP., FXD, CER DI: 5.6PF, 5%, 200V                                | 72982          | 8111B200C0G56                          |
| A25C52             | 283-0158-00                |                                |                                                                   | 72982          |                                        |
| A20002             | 285-0158-00                |                                | CAP.,FXD,CER DI:1PF,10%,50V<br>(NOMINAL VALUE, SELECTED)          | 12902          | 8101B037C0K01                          |
|                    |                            |                                | ·                                                                 |                | 0101005                                |
| A25C53             | 283-0158-00                |                                | CAP., FXD, CER DI: 1PF, 10%, 50V                                  | 72982          |                                        |
| A25C60             | 283-0251-00                |                                | CAP.,FXD,CER DI:87 PF,5%,100V                                     | 72982          |                                        |
| A25C61             | 281-0123-00                |                                | CAP.,VAR,CER DI:5-25PF,100V                                       | 72982          | 518-000A5-25                           |
| A25C62             | 281-0218-00                |                                | CAP.,VAR,CER DI:1-5PF,+2-2.5%,100V                                | 72982          | 513013A1-5                             |
| A25C73             | 281-0810-00                |                                | CAP., FXD, CER DI:5.6PF, 0.5%, 100V                               | 72982          | 1035D2ADC0G56                          |
| A25C84             | 281-0788-00                |                                | CAP., FXD, CER DI: 470PF, 10%, 100V                               |                | 8005H9AADW5R4                          |
| A25C85             | 283-0177-00                |                                | CAP., FXD, CER DI: 1UF, +80-20%, 25V                              | 56280          | 273C5                                  |
| A25C87             |                            |                                |                                                                   |                |                                        |
|                    | 283-0067-00                |                                | CAP., FXD, CER DI:0.001UF, 10%, 200V                              |                | 835-515B102K                           |
| A25C91             | 283-0111-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                 |                | 8121-N088Z5U1                          |
| A25C104            | 283-0195-00                |                                | CAP.,FXD,CER DI:680PF,5%,50V                                      |                | 8121N075C0G06                          |
| A25C105            | 283-0353 <b>-</b> 00       |                                | CAP.,FXD,CER DI:0.1UF,10%,50V                                     |                | VJ1210Y104K-H                          |
| A25C106            | 283-0136-00                |                                | CAP.,FXD,CER DI:10PF,5%,50V                                       | 51642          | A100050-NP0-1                          |
| A25C114            | 283-0195-00                |                                | CAP., FXD, CER DI:680PF, 5%, 50V                                  | 72982          | 8121N075C0G06                          |
| A25C122            | 283-0154-00                |                                | CAP., FXD, CER DI: 22PF, 5%, 50V                                  | 72982          | 8111B061C0G22                          |
| A25C129            | 283-0111-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                 | 72982          |                                        |
|                    |                            |                                |                                                                   |                |                                        |
| A25C133            | 290-0745-00                |                                | CAP., FXD, ELCTLT: 22UF, +50-10%, 25V                             | 56289          |                                        |
| A25C134<br>A25C135 | 290-0746-00<br>283-0111-00 |                                | CAP.,FXD,ELCTLT:47UF,+50-10%,16V<br>CAP.,FXD,CER DI:0.1UF,20%,50V | 55680<br>72982 |                                        |
| A290133            | 205 0111 00                |                                | GRI ., FRD, GER DI. 0. 10F, 20%, 904                              | 12902          | 0121 N0002901                          |
| A25C139            | 283-0111-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                 | 72982          |                                        |
| A25C202            | 290-0745-00                |                                | CAP., FXD, ELCTLT: 22UF, +50-10%, 25V                             | 56289          |                                        |
| A25C207            | 281-0775-00                |                                | CAP.,FXD,CER DI:0.1UF,20%,50V                                     | 72982          |                                        |
| A25C221            | 290-0804-00                |                                | CAP.,FXD,ELCTLT:10UF,+50-10%,25V                                  | 55680          | 25ULA10V-T                             |
| A25C226            | 281-0775-00                |                                | CAP.,FXD,CER DI:0.1UF,20%,50V                                     | 72982          | 8005D9AABZ5U1                          |
| A25C234            | 283-0203-00                |                                | CAP.,FXD,CER DI:0.47UF,20%,50V                                    | 72982          | 8131N075E474M                          |
| A25C235            | 283-0203-00                |                                | CAP., FXD, CER DI:0.47UF, 20%, 50V                                | 72982          | 8131N075E474M                          |
| A25C236            | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                 | 72982          | 8005D9AABZ5U1                          |
| A25C237            | 281-0775-00                |                                | CAP., FXD, CER DI:0.10F, 20%, 50V                                 | 72982          |                                        |
|                    |                            |                                |                                                                   |                | 8121-N088Z5U1                          |
| A25C240            | 283-0111-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                 | 72982          |                                        |
| A25C244            | 283-0111-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                 | 72982          |                                        |
| A25C245            | 281-0218-00                |                                | CAP.,VAR,CER DI:1-5PF,+2-2.5%,100V                                | 72982          | 513013A1-5                             |
| A25C246            | 283-0353-00                |                                | CAP.,FXD,CER DI:0.1UF,10%,50V                                     | 95275          | VJ1210Y104K-H                          |
| A25C249            | 283-0353-00                |                                | CAP., FXD, CER DI:0.1UF, 10%, 50V                                 | 95275          | VJ1210Y104K-H                          |
| A25C250            | 283-0353-00                |                                | CAP., FXD, CER DI:0.1UF, 10%, 50V                                 | 95275          |                                        |
| A25C262            | 281-0138-00                |                                | CAP., VAR, PLSTC: 0.4-1.2PF, 600V                                 | 74970          | 273-0051-001                           |
| A25C264            | 283-0348-00                |                                | CAP., FXD, CER DI:0.5PF,+/-0.1PF,100V                             | 51642          | 100-100-NP0-5                          |
|                    |                            |                                | (NOMINAL VALUE, SELECTED)                                         | 51042          | 100 100 MI 0-J                         |
| 4250267            | 202 0175 00                |                                | -                                                                 | 70000          | 0101021000001                          |
| A25C267            | 283-0175-00<br>283-0111-00 |                                | CAP.,FXD,CER DI:10PF,5%,200V<br>CAP.,FXD,CER DI:0.1UF,20%,50V     | 72982<br>72982 | 8101B210C0G01<br>8121-N088Z5U1         |
| A25C269            |                            |                                |                                                                   |                |                                        |

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|               | Tektronix                                               | Serial/Model No. |                                        | Mfr       |                  |                                                                                                                |
|---------------|---------------------------------------------------------|------------------|----------------------------------------|-----------|------------------|----------------------------------------------------------------------------------------------------------------|
| Component No. | Part No.                                                | Eff Dscont       | Name & Description                     |           | Mfr Part Number  |                                                                                                                |
| A25C276       | 283-0111-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8121-N088Z5U104M |                                                                                                                |
| A25C294       | 281-0811-00                                             |                  | CAP., FXD, CER DI: 10PF, 10%, 100V     | 72982     | 8035D2AADC1G100K |                                                                                                                |
| A25C296       | 281-0759-00                                             |                  | CAP., FXD, CER DI: 22PF, 10%, 100V     | 72982     | 8035D9AADC1G220K |                                                                                                                |
| A25C297       | 283-0111-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     |                  |                                                                                                                |
| A25C299       | 283-0111-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8121-N088Z5U104M |                                                                                                                |
| A25C321       | 281-0775-00                                             |                  | CAP.,FXD,CER DI:0.1UF,20%,50V          | 72982     | 8005D9AABZ5U104M |                                                                                                                |
| A25C324       | 283-0067-00                                             |                  | CAP., FXD, CER DI:0.001UF, 10%, 200V   | 72982     | 835-515B102K     |                                                                                                                |
| A25C326       | 290-0804-00                                             |                  | CAP., FXD, ELCTLT: 10UF, +50-10%, 25V  | 55680     | 25ULA10V-T       | -                                                                                                              |
| A25C334       | 283-0203-00                                             |                  | CAP., FXD, CER DI:0.47UF, 20%, 50V     | 72982     | 8131N075E474M    |                                                                                                                |
| A25C335       | 283~0203-00                                             |                  | CAP., FXD, CER DI:0.47UF, 20%, 50V     | 72982     | 8131N075E474M    |                                                                                                                |
| A25C336       | 281-0775-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8005D9AABZ5U104M |                                                                                                                |
| A25C337       | 281-0775-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8005D9AABZ5U104M |                                                                                                                |
| A25C340       | 283-0111-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8121-N088Z5U104M |                                                                                                                |
| A25C344       | 283-0111-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8121-N088Z5U104M |                                                                                                                |
| A25C345       | 281-0811-00                                             |                  | CAP., FXD, CER DI: 10PF, 10%, 100V     | 72982     | 8035D2AADC1G100K |                                                                                                                |
| A25C349       | 283-0353-00                                             |                  | CAP., FXD, CER DI:0.1UF, 10%, 50V      | 95275     | VJ1210Y104K-H    |                                                                                                                |
| A25C350       | 283-0111-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8121-N088Z5U104M |                                                                                                                |
| A25C362       | 281-0123-00                                             |                  | CAP., VAR, CER DI: 5-25PF, 100V        | 72982     | 518-000A5-25     |                                                                                                                |
| A25C367       | 283-0175-00                                             |                  | CAP., FXD, CER DI: 10PF, 5%, 200V      | 72982     | 8101B210C0G0100J |                                                                                                                |
| A25C369       | 283-0111-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8121-N088Z5U104M |                                                                                                                |
| A25C376       | 283-0111-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8121-N088Z5U104M |                                                                                                                |
| A25C383       | 281-0775-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8005D9AABZ5U104M |                                                                                                                |
| A25C401       | 283-0111-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8121-N088Z5U104M |                                                                                                                |
| A25C402       | 290-0745-00                                             |                  | CAP., FXD, ELCTLT: 22UF, +50-10%, 25V  | 56289     | 502D225          | -1                                                                                                             |
| A25C403       | 283-0111-00                                             |                  | CAP.,FXD,CER DI:0.1UF,20%,50V          | 72982     | 8121-N08825U104M |                                                                                                                |
| A25C404       | 290-0804-00                                             |                  | CAP., FXD, ELCTLT: 10UF, +50-10%, 25V  | 55680     | 25ULA10V-T       |                                                                                                                |
| A25C407       | 290-0804-00                                             |                  | CAP., FXD, ELCTLT: 10UF, +50-10%, 25V  | 55680     | 25ULA10V-T       | _                                                                                                              |
| A25C408       | 283-0111-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8121~N088Z5U104M | Contraction of the local data                                                                                  |
| A25C409       | 290-0804-00                                             |                  | CAP., FXD, ELCTLT: 10UF, +50-10%, 25V  | 55680     | 25ULA10V-T       |                                                                                                                |
| A25C412       | 290-0804-00                                             |                  | CAP., FXD, ELCTLT: 10UF, +50-10%, 25V  | 55680     | 25ULA10V-T       |                                                                                                                |
| A25C424       | 290-0804-00                                             |                  | CAP., FXD, ELCTLT: 10UF, +50-10%, 25V  | 55680     | 25ULA10V-T       | - 48                                                                                                           |
| A25C426       | 283-0111-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8121-N088Z5U104M |                                                                                                                |
| A25C427       | 290-0804-00                                             |                  | CAP., FXD, ELCTLT: 10UF, +50-10%, 25V  | 55680     | 25ULA10V-T       |                                                                                                                |
| A25C429       | 290-0804-00                                             |                  | CAP., FXD, ELCTLT: 10UF, +50-10%, 25V  | 55680     | 25ULA10V-T       |                                                                                                                |
| A25C431       | 283-0111-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8121-N088Z5U104M |                                                                                                                |
| A25C432       | 290-0804-00                                             |                  | CAP., FXD, ELCTLT: 10UF, +50-10%, 25V  | 55680     | 25ULA10V-T       |                                                                                                                |
| A25C433       | 290-0745-00                                             |                  | CAP., FXD, ELCTLT: 22UF, +50-10%, 25V  | 56289     | 502D225          |                                                                                                                |
| A25C434       | 283-0111-00                                             |                  | CAP.,FXD,CER DI:0.1UF,20%,50V          | 72982     | 8121-N088Z5U104M |                                                                                                                |
| A25C458       | 281-0775-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8005D9AABZ5U104M |                                                                                                                |
| A25C492       | 281-0775-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8005D9AABZ5U104M |                                                                                                                |
| A25C501       | 281-0759-00                                             |                  | CAP., FXD, CER DI:22PF, 10%, 100V      | 72982     | 8035D9AADC1G220K |                                                                                                                |
| A25C506       | 281-0812-00                                             |                  | CAP., FXD, CER DI: 1000PF, 10%, 100V   | 72982     | 8035D9AADX7R102K |                                                                                                                |
| A25C507       | 281-0762-00                                             |                  | CAP., FXD, CER DI: 27PF, 20%, 100V     | 72982     | 8035D9AADC0G270M | ,405,                                                                                                          |
| A25C510       | 281-0775-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8005D9AABZ5U104M |                                                                                                                |
| A25C511       | 281-0775-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8005D9AABZ5U104M |                                                                                                                |
| A25C515       | 283-0348-00                                             |                  | CAP., FXD, CER DI:0.5PF,+/-0.1PF,100V  | 51642     | 100-100-NP0-508B |                                                                                                                |
| A25C516       | 281-0775-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8005D9AABZ5U104M | **                                                                                                             |
| A25C523       | 281-0772-00                                             |                  | CAP., FXD, CER DI:0.0047UF, 10%, 100V  | 04222     | GC701C472K       |                                                                                                                |
| A25C533       | 281-0775-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8005D9AABZ5U104M |                                                                                                                |
| A25C543       | 281-0775-00                                             |                  | CAP., FXD, CER DI:0.10F, 20%, 50V      | 72982     | 8005D9AABZ5U104M |                                                                                                                |
| A25C546       | 290-0755-00                                             |                  | CAP., FXD, ELCTLT: 100UF, +50-10%, 10V | 56289     | 502D223          | 110<br>1                                                                                                       |
| A25C547       | 281-0775-00                                             |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V      | 72982     | 8005D9AABZ5U104M |                                                                                                                |
| A25C553       | 281-0819-00                                             |                  | CAP., FXD, CER DI: 33PF, 5%, 50V       | 72982     | 8035BC0G330      |                                                                                                                |
|               | 1990- Junio Maria (ann. 2011) - Maria Maria (ann. 2011) |                  | (NOMINAL VALUE, SELECTED)              | , 2 ) 0 2 |                  |                                                                                                                |
| A25C561       | 281-0811-00                                             |                  | CAP., FXD, CER DI: 10PF, 10%, 100V     | 77087     | 8035D2AADC1G100K | 427                                                                                                            |
|               |                                                         |                  | (NOMINAL VALUE, SELECTED)              | 12902     | 000002AADCIGIUUK |                                                                                                                |
|               |                                                         |                  |                                        |           |                  | a the second |

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------|------------------|----------------------------------------------------------------|----------------|--------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Component No.         | Part No.    | Eff Dscont       | Name & Description                                             |                | Mfr Part Number                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25C563               | 281-0775-00 |                  | CAP.,FXD,CER DI:0.1UF,20%,50V                                  | 72982          | 8005D9AABZ5U104M                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25C564               | 290-0755-00 |                  | CAP., FXD, ELCTLT: 100UF, +50-10%, 10V                         | 56289          | 502D223                              |
| 1000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | A25C566               | 281-0775-00 |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V                              | 72982          |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25C567               | 281-0775-00 |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V                              | 72982          |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25C568               | 281-0775-00 |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V                              | 72982          | 8005D9AABZ5U104M<br>8005D9AABZ5U104M |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25C569               | 281-0775-00 |                  | CAP.,FXD,CER DI:0.1UF,20%,50V                                  | 72982          | 8005D9AABZ5U104M                     |
| - · · · · ·                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | A25C570               | 281-0775-00 |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V                              | 72982          |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25C574               | 281-0762-00 |                  | CAP., FXD, CER DI: 27PF, 20%, 100V                             | 72982          |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25C578               | 281-0762-00 |                  | CAP., FXD, CER DI: 27PF, 20%, 100V                             | 72982          |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25C579               | 281-0762-00 |                  | CAP., FXD, CER DI: 27PF, 20%, 100V                             | 72982          |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25C583               | 281-0762-00 |                  | CAP., FXD, CER DI: 27PF, 20%, 100V                             | 72982          | 8035D9AADC0G270M                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25C584               | 281-0762-00 |                  | CAP., FXD, CER DI: 27PF, 20%, 100V                             | 72982          |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25C588               | 281-0762-00 |                  | CAP., FXD, CER DI: 27PF, 20%, 100V                             | 72982          |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25C589               | 281-0762-00 |                  |                                                                |                |                                      |
| -101 WWW.P.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | A25C593               | 281-0762-00 |                  | CAP.,FXD,CER DI:27PF,20%,100V<br>CAP.,FXD,CER DI:27PF,20%,100V | 72982<br>72982 |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 105050/               |             |                  |                                                                | 72902          | 5055D7AAD606270H                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25C594               | 281-0762-00 |                  | CAP., FXD, CER DI: 27PF, 20%, 100V                             | 72982          | 8035D9AADC0G270M                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25C599               | 281-0759-00 |                  | CAP., FXD, CER DI: 22PF, 10%, 100V                             | 72982          | 8035D9AADC1G220K                     |
| 10 (1990) -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1050(1)               |             |                  | (NOMINAL VALUE, SELECTED)                                      |                |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25C611               | 290-0755-00 |                  | CAP.,FXD,ELCTLT:100UF,+50-10%,10V                              | 56289          | 502D223                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR118              | 152-0141-02 |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                            | 01295          | 1N4152R                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR119              | 152-0141-02 |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                            | 01295          | 1N4152R                              |
| $ F_{\rm F} _{\rm F} = 0.$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | A25CR226              | 152-0141-02 |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                            |                | 1N4152R                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR227              | 152-0141-02 |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                            | 01295          |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR231              | 152-0503-01 |                  | SEMICOND DEVICE: STEP RECOVERY                                 | 50434          | QSRD-4866                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR232              | 152-0141-02 |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                            |                | 1N4152R                              |
| anna anna a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | A25CR242)<br>A25CR244 |             |                  |                                                                |                |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR245              | 119-1340-00 |                  | DIODE BRIDGE:4 MTCHD QUAD & 2 MTCHD QUAD                       | 80009          | 119-1340-00                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR246              |             |                  | Store Salbort Mione Cove & 2 Mione Cove                        | 00009          | 119-1940-00                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR247              |             |                  |                                                                |                |                                      |
| - 14"11"""                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | A25CR248)             |             |                  |                                                                |                |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR283              | 152-0141-02 |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                            | 01205          | 1N4152R                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR289              | 152-0141-02 |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                            |                | 1N4152R                              |
| ******                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | A25CR296              | 152-0141-02 |                  | SEMICOND DEVICE:SILICON, SOV, 150MA                            |                |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR315              | 152-0141-02 |                  | SEMICOND DEVICE: SILICON, SOV, ISOMA                           |                | 1N4152R<br>1N4152R                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |             |                  |                                                                | 01295          | IN41J2K                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR326              | 152-0141-02 |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                            | 01295          | 1N4152R                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR327              | 152-0141-02 |                  | SEMICOND DEVICE: SILICON, 30V, 150MA                           | 01295          | 1N4152R                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR331              | 152-0503-01 |                  | SEMICOND DEVICE: STEP RECOVERY                                 | 50434          | QSRD-4866                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR332              | 152-0141-02 |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                            | 01295          | 1N4152R                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR342              |             |                  |                                                                |                |                                      |
| 47° V.45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | A25CR344              |             |                  |                                                                |                |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR345              | 119-1340-00 |                  | DIODE BRIDGE:4 MTCHD QUAD & 2 MTCHD QUAD                       | 80009          | 119-1340-00                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR346              |             |                  |                                                                |                |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR347              |             |                  |                                                                |                |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR348J             |             |                  |                                                                |                |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR383              | 152-0141-02 |                  | SEMICOND DEVICE: SILICON, 30V, 150MA                           | 01205          | 1 1/ 15 20                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR491              | 152-0141-02 |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                            |                | 1N4152R                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25CR492              | 152-0141-02 |                  | SEMICOND DEVICE:SILICON, SOV, ISOMA                            | 01295          | 1N4152R                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25DL211              | 119-0400-00 |                  |                                                                | 01295          | 1N4152R                              |
| 1000 B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | A25L2                 | 108-0509-00 |                  | DELAY LINE,ELEC:100 OHM,14LD,DIP<br>COIL,RF:2.45UH             | 01961<br>80009 | PF20350<br>108-0509-00               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25L4                 | 108-0500 00 |                  |                                                                |                |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25L4<br>A25L6        | 108-0509-00 |                  | COIL, RF: 2.45UH                                               | 80009          | 108-0509-00                          |
| and a second sec | A25L6<br>A25L94       | 108-0509-00 | D010100 D01017   | COIL, RF: 2.45UH                                               | 80009          | 108-0509-00                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       | 120-0302-00 | B010100 B010150  | XFMR, TOROID:5 TURNS, SINGLE                                   | 80009          | 120-0302-00                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A25L94                | 108-1032-00 | B010151          | COIL, RF: FIXED, 244UH                                         | 80009          | 108-1032-00                          |
| 1 arrise                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | A25L103               | 108-0683-00 |                  | COIL, RF: 900MH                                                | 80009          | 108-0683-00                          |
| 20100 C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | A25L133               | 108-0598-00 |                  | COIL, RF: 200UH                                                | 80009          | 108-0598-00                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |             |                  | ·                                                              |                |                                      |

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| Component No.      | Tektronix<br>Part No.      | Serial/Model No.<br>Eff Dscont          | Name & Description                                                   | Mfr<br>Code    | Mfr Part Number            |  |
|--------------------|----------------------------|-----------------------------------------|----------------------------------------------------------------------|----------------|----------------------------|--|
| A25L134            | 108-0509-00                |                                         | COIL, RF: 2.45UH                                                     | 80009          | 108-0509-00                |  |
| A25L510            | 108-0309-00                |                                         | COIL, RF: 3.9UH                                                      | 76493          |                            |  |
| A25L546            | 108-0245-00                |                                         | COIL, RF: 3.9UH                                                      |                | B6310-1                    |  |
| A25L564            | 108-0245-00                |                                         | COIL, RF: 3.90H                                                      | 76493          |                            |  |
| A25L565            | 108-0245-00                |                                         | COIL, RF: 3.9UH                                                      | 76493          | B6310-1                    |  |
| A25LR113           | 108-0729-00                |                                         | COIL, RF: 195NH                                                      | 80009          | 108-0729-00                |  |
|                    |                            |                                         |                                                                      |                | 100 0527 00                |  |
| A25LR201           | 108-0537-00                |                                         | COIL, RF: 200UH                                                      | 80009<br>80009 | 108-0537-00<br>108-0537-00 |  |
| A25LR401           | 108-0537-00                |                                         | COIL, RF: 200UH                                                      | 80009          | 108-0537-00                |  |
| A25LR403           | 108-0537-00                |                                         | COIL, RF: 200UH                                                      | 80009          | 108-0537-00                |  |
| A25LR406           | 108-0537-00                |                                         | COIL, RF: 200UH                                                      | 80009          | 108-0537-00                |  |
| A25LR408           | 108-0537-00                |                                         | COIL, RF: 200UH                                                      | 80009          | 108-0537-00                |  |
| A25LR411           | 108-0537-00                |                                         | COIL, RF: 200UH                                                      | 80009          | 108-0337-00                |  |
| A25LR421           | 108-0537-00                |                                         | COIL, RF: 200UH                                                      | 80009          | 108-0537-00                |  |
| A25LR423           | 108-0537-00                |                                         | COIL, RF: 200UH                                                      | 80009          | 108-0537-00                |  |
| A25LR426           | 108-0537-00                |                                         | COIL, RF: 200UH                                                      | 80009          | 108-0537-00                |  |
| A25LR428           | 108-0537-00                |                                         | COIL, RF: 200UH                                                      | 80009          | 108-0537-00                |  |
| A25LR431           | 108-0537-00                |                                         | COIL, RF: 200UH                                                      | 80009          | 108-0537-00                |  |
| A25Q93             | 151-0190-05                |                                         | TRANSISTOR:SILICON,NPN                                               | 80009          | 151-0190-05                |  |
| A25094             | 151-0301-00                |                                         | TRANSISTOR:SILICON, PNP                                              | 27014          | 2N2907A                    |  |
| A25Q95             | 151-0301-00                |                                         | TRANSISTOR: SILICON, PNP                                             | 27014          | 2N2907A                    |  |
| A25Q104            | 151-0427-00                |                                         | TRANSISTOR: SILICON, NPN                                             | 80009          | 151-0427-00                |  |
| A25Q105            | 151-0450-00                |                                         | TRANSISTOR: SILICON, PNP, SEL FROM 2N5583                            | 80009          | 151-0450-00                |  |
| A25Q115            | 151-0427-00                |                                         | TRANSISTOR: SILICON, NPN                                             | 80009          | 151-0427-00                |  |
| A25Q125            | 151-0302-00                |                                         | TRANSISTOR:SILICON,NPN                                               | 07263          | \$038487                   |  |
| A25Q206            | 151-0220-00                |                                         | TRANSISTOR:SILICON, PNP                                              | 07263          | S036228                    |  |
| A25Q207            | 151-0220-00                |                                         | TRANSISTOR: SILICON, PNP                                             | 07263          |                            |  |
| A25Q222            | 151-0190-05                |                                         | TRANSISTOR: SILICON, NPN                                             | 80009          |                            |  |
| A25Q223            | 151-0190-05                |                                         | TRANSISTOR:SILICON, NPN                                              | 80009          | 151-0190-05                |  |
| A25Q227            | 151-0450-00                |                                         | TRANSISTOR:SILICON, PNP, SEL FROM 2N5583                             | 80009          | 151-0450-00                |  |
| A25Q250            | 151-1117-00                |                                         | TRANSISTOR:SILICON, FE, DUAL, N-CHANNEL                              | 22229          | MD1000                     |  |
| A25Q251            | 151-0190-05                |                                         | TRANSISTOR: SILICON, NPN                                             | 80009          | 151-0190-05                |  |
| A25Q252            | 151-0190-05                |                                         | TRANSISTOR: SILICON, NPN                                             | 80009          | 151-0190-05                |  |
| A25Q256            | 151-0190-05                |                                         | TRANSISTOR:SILICON, NPN                                              | 80009          | 151-0190-05                |  |
| A25Q262            | 151-0139-01                |                                         | TRANSISTOR: SILICON, NPN                                             | 04713          |                            |  |
| A25Q263            | 151-0220-00                |                                         | TRANSISTOR:SILICON, PNP                                              | 07263          |                            |  |
| A25Q273            | 151-0220-00                |                                         | TRANSISTOR: SILICON, PNP                                             | 07263          |                            |  |
| 125029/            | 151 0222 00                |                                         | TRANSISTOR:SILICON, NPN, SEL FROM MPS918                             | 04713          | SPS1752                    |  |
| A25Q284<br>A25Q285 | 151-0333-00<br>151-0139-01 | * · · · · · · · · · · · · · · · · · · · | TRANSISTOR: SILICON, NIN, SEL FROM MISSIO                            | 04713          |                            |  |
| A25Q286            | 151-0333-00                |                                         | TRANSISTOR:SILICON, NPN, SEL FROM MPS918                             | 04713          |                            |  |
| A25Q296            | 151-0220-00                |                                         | TRANSISTOR: SILICON, PNP                                             | 07263          |                            |  |
| A25Q311            | 151-0190-05                |                                         | TRANSISTOR: SILICON, NPN                                             |                | 151-0190-05                |  |
| A25Q322            | 151-0190-05                |                                         | TRANSISTOR:SILICON, NPN                                              |                | 151-0190-05                |  |
|                    | 151-0100 05                |                                         | TRANSISTOR:SILICON, NPN                                              | 80009          | 151-0190-05                |  |
| A25Q323            | 151-0190-05                |                                         | TRANSISTOR:SILICON,NPN<br>TRANSISTOR:SILICON,PNP,SEL FROM 2N5583     |                | 151-0450-00                |  |
| A25Q327            | 151-0450-00                |                                         | TRANSISTOR: SILICON, FE, DUAL, N-CHANNEL                             | 22229          |                            |  |
| A25Q350            | 151-1117-00                |                                         | TRANSISTOR: SILICON, PE, DOAL, N-CHANNEL<br>TRANSISTOR: SILICON, NPN | 80009          |                            |  |
| A25Q351            | 151-0190-05                |                                         | TRANSISION: SILICON, NPN                                             | 80009          |                            |  |
| A25Q352<br>A25Q356 | 151-0190-05<br>151-0190-05 |                                         | TRANSISTOR: SILICON, NPN                                             | 80009          | 151-0190-05                |  |
| *>~>>              |                            |                                         |                                                                      |                |                            |  |
| A25Q362            | 151-0139-01                |                                         | TRANSISTOR: SILICON, NPN                                             | 04713          |                            |  |
| A25Q363            | 151-0220-00                |                                         | TRANSISTOR: SILICON, PNP                                             | 07263          |                            |  |
| A25Q373            | 151-0220-00                |                                         | TRANSISTOR: SILICON, PNP                                             | 07263<br>04713 |                            |  |
| A25Q384            | 151-0333-00                |                                         | TRANSISTOR:SILICON, NPN, SEL FROM MPS918                             | 04713          |                            |  |
| A25Q385            | 151-0139-01                |                                         | TRANSISTOR:SILICON,NPN<br>TRANSISTOR:SILICON,PNP                     | 07263          |                            |  |
| A25Q452            | 151-0220-00                |                                         | 1                                                                    |                |                            |  |
| A25Q453            | 151-0220-00                |                                         | TRANSISTOR: SILICON, PNP                                             | 07263          |                            |  |
| A25Q485            | 151-0333-00                |                                         | TRANSISTOR:SILICON, NPN, SEL FROM MPS918                             | 04713          | SPS1752                    |  |

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| Component No. | Tektronix<br>Part No. | Serial/Model No.<br>Eff Dscont | Name & Description                         | Mfr<br>Code | Mfr Part Num |
|---------------|-----------------------|--------------------------------|--------------------------------------------|-------------|--------------|
| A25Q487       | 151-0333-00           |                                | TRANSISTOR:SILICON, NPN, SEL FROM MPS918   | 04713       | SPS1752      |
| •             |                       |                                | TRANSISTOR: SILICON, NPN                   | 80009       | 151-0190-05  |
| A25Q493       | 151-0190-05           |                                | *                                          |             |              |
| A25Q513       | 151-0190-05           |                                | TRANSISTOR: SILICON, NPN                   |             | 151-0190-05  |
| A25Q514       | 151-0190-05           |                                | TRANSISTOR: SILICON, NPN                   | 80009       | 151-0190-05  |
| A250556       | 151-0188-03           |                                | TRANSISTOR:SILICON, PNP, SEL               | 80009       | 151-0188-03  |
| A25R3         | 315-0101-00           |                                | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W       |             | CB1015       |
| A25R11        | 311-0607-00           |                                | RES.,VAR,NONWIR:10K OHM,10%,0.50W          | 73138       | 82-25-2      |
|               |                       |                                | RES., VAR, NONWIR: 10K OHM, 10%, 0.50W     |             | 82-25-2      |
| A25R12        | 311-0607-00           |                                |                                            |             |              |
| A25R13        | 311-0644-00           |                                | RES.,VAR,NONWIR:20K OHM,10%,0.50W          |             | 82-34-1      |
| A25R19        | 321-0260-00           |                                | RES.,FXD,F1LM:4.99K OHM,1%,0.125W          |             | MFF1816G49   |
| A25R20        | 321-0260-00           |                                | RES.,FXD,F1LM:4.99K OHM,1%,0.125W          | 91637       | MFF1816G499  |
| A25R21        | 321-0289-00           |                                | RES.,FXD,FILM:10K OHM,1%,0.125W            | 91637       | MFF1816G10   |
| A25R22        | 321-0244-00           |                                | RES.,FXD,F1LM:3.4K OHM,1%,0.125W           | 91637       | MFF1816G340  |
| A25R23        | 317-0272-00           |                                | RES., FXD, CMPSN: 2.7K OHM, 5%, 0.125W     | 01121       | BB2725       |
|               |                       |                                | RES., FXD, CMPSN: 47 OHM, 5%, 0.125W       |             | BB4705       |
| A25R24        | 317-0470-00           |                                |                                            |             |              |
| A25R30        | 317-0620-00           |                                | RES.,FXD,CMPSN:62 OHM,5%,0.125W            |             | BB6205       |
| A25R31        | 321-0052-00           |                                | RES.,FXD,FILM:34 OHM,1%,0.125W             |             | MFF1816G34   |
| A25R32        | 317-0200-00           |                                | RES., FXD, CMPSN: 20 OHM, 5%, 0.125W       | 01121       | BB2005       |
|               |                       |                                | (NOMINAL VALUE, SELECTED)                  |             |              |
| A25R33        | 317-0360-00           |                                | RES., FXD, CMPSN: 36 OHM, 5%, 0.125W       | 01121       | BB3605       |
| A25R34        | 325-0334-00           |                                | RES., FXD, FILM: 16.2 OHM, 1%, 0.05W       | 14298       |              |
|               |                       |                                |                                            |             |              |
| A25R37        | 317-0510-00           |                                | RES., FXD, CMPSN: 51 OHM, 5%, 0.125W       | 01121       |              |
| A25R39        | 323-0094-00           |                                | RES.,FXD,FILM:93.1 OHM,1%,0.50W            |             | CECTO-93R1   |
| A25R40        | 311-1261-00           |                                | RES.,VAR,NONWIR:500 OHM,10%,0.50W          | 32997       | 3329P-L58-   |
| A25R43        | SELECTED              |                                |                                            |             |              |
| A25R50        | 317-0620-00           |                                | RES.,FXD,CMPSN:62 OHM,5%,0.125W            | 01121       | BB6205       |
| A25R51        | 321-0052-00           |                                | RES., FXD, FILM: 34 OHM, 1%, 0.125W        | 91637       | MFF1816G34   |
|               |                       |                                | RES., FXD, CMPSN: 36 OHM, 5%, 0.125W       | 01121       |              |
| A25R53        | 317-0360-00           |                                |                                            |             |              |
| A25R54        | 325-0334-00           |                                | RES.,FXD,FILM:162. OHM,1%,0.05W            |             | RE1/816.2C   |
| A25R57        | 317-0510-00           |                                | RES.,FXD,CMPSN:51 OHM,5%,0.125W            | 01121       | BB5105       |
| A25R59        | 323-0094-00           |                                | RES.,FXD,FILM:93.1 OHM,1%,0.50W            | 75042       | CECTO-93R1   |
| A25R60        | 311-1265-00           |                                | RES.,VAR,NONWIR:2K OHM,10%,0.50W           | 32997       | 3329P-L58-:  |
| A25R61        | 311-0622-01           |                                | RES.,VAR,NONWIR:100 OHM,10%,0.50W          | 32997       | 3326н-к28-   |
|               |                       |                                | Albe, Machine and Complexity of the second |             |              |
| A25R63        | SELECTED              |                                |                                            | 01627       | MEE1016016   |
| A25R71        | 321-0399-00           |                                | RES.,FXD,F1LM:140K OHM,1%,0.125W           | 91637       |              |
| A25R72        | 315-0163-00           |                                | RES.,FXD,CMPSN:16K OHM,5%,0.25W            | 01121       |              |
| A25R73        | 321-0318-00           |                                | RES.,FXD,FILM:20K OHM,1%,0.125W            | 91637       | MFF1816G20   |
| A25R77        | 321-0289-00           |                                | RES.,FXD,FILM:10K OHM,1%,0.125W            | 91637       | MFF1816G10   |
| A25R79        | 321-0281-07           |                                | RES., FXD, FILM: 8.25K OHM, 0.10%, 0.125W  | 91637       | MFF1816C82   |
|               |                       |                                | RES., VAR, NONWIR: 100 OHM, 10%, 0.50W     |             | 3329P-L58-   |
| A25R80        | 311-1259-00           |                                |                                            |             | MFF1816C10   |
| A25R81        | 321-1686-07           |                                | RES., FXD, F1LM:10.97K OHM, 0.1%, 0.125W   |             |              |
| A25R85        | 315-0101-00           |                                | RES.,FXD,CMPSN:100 OHM,5%,0.25W            | 01121       |              |
| A25R86        | 315-0331-00           |                                | RES.,FXD,CMPSN:330 OHM,5%,0.25W            | 01121       | CB3315       |
| A25R87        | 315-0122-00           |                                | RES.,FXD,CMPSN:1.2K OHM,5%,0.25W           | 01121       | CB1225       |
| A25R91        | 323-0001-01           |                                | RES., FXD, FILM: 10 OHM, 0.5%, 0.50W       | 75042       | CECTO-20R0   |
|               | 321-0274-00           |                                | RES., FXD, FILM: 6.98K OHM, 1%, 0.125W     | 91637       | MFF1816G69   |
| A25R92        |                       |                                |                                            |             |              |
| A25R93        | 315-0622-00           |                                | RES., FXD, CMPSN: 6.2K OHM, 5%, 0.25W      | 01121       |              |
| A25R103       | 323-0066-00           |                                | RES.,FXD,FILM:47.5 OHM,1%,0.50W            | 75042       |              |
| A25R105       | 304-0101-00           |                                | RES.,FXD,CMPSN:100 OHM,10%,1W              | 01121       | GB1011       |
| A25R106       | 317-0270-00           |                                | RES.,FXD,CMPSN:27 OHM,5%,0.125W            | 01121       | BB2705       |
| A25R108       | 317-0201-00           |                                | RES., FXD, CMPSN: 200 OHM, 5%, 0.125W      | 01121       | BB2015       |
| A25R109       | 317-0471-00           |                                | RES., FXD, CMPSN: 470 OHM, 5%, 0.125W      | 01121       | BB4715       |
|               |                       |                                | RES., FXD, CMPSN: 33 OHM, 5%, 0.125W       | 01121       | BB3305       |
| A25R114       | 317-0330-00           |                                |                                            |             |              |
| A25R115       | 321-0222-00           |                                | RES.,FXD,FILM:2K OHM,1%,0.125W             | 91637       | MFF1816G200  |
| A25R117       | 321-0181-00           |                                | RES.,FXD,FILM:750 OHM,1%,0.125W            | 91637       | MFF1816G750  |
|               | 321-0190-00           |                                | RES., FXD, FILM: 931 OHM, 1%, 0.125W       | 91637       | MFF1816G93   |

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| Component No.      | Tektronix<br>Part No.      | Serial/Model No.<br>Eff Dscont | Name & Description                                                 | Mfr<br>Code | Mfr Part Number                  | sourcester, |
|--------------------|----------------------------|--------------------------------|--------------------------------------------------------------------|-------------|----------------------------------|-------------|
| A25R122            | 317-0470-00                |                                | RES.,FXD,CMPSN:47 OHM,5%,0.125W                                    | 01121       | BB4705                           |             |
| A25R124            | 321-0218-00                |                                | RES.,FXD,F1LM:1.82K OHM,1%,0.125W                                  |             | MFF1816G18200F                   |             |
| A25R125            | 321-0138-00                |                                | RES., FXD, FILM: 267 OHM, 1%, 0.125W                               |             | MFF1816G267R0F                   |             |
| A25R126            | 301-0470-00                |                                | RES., FXD, CMPSN:47 OHM, 5%, 0.50W                                 |             | EB4705                           | connegg.    |
| A25R127            | 315-0120-00                |                                | RES., FXD, CMPSN:12 OHM, 5%, 0.25W                                 |             | CB1205                           |             |
| A25R133            | 307-0103-00                |                                | RES., FXD, CMPSN: 2.7 OHM, 5%, 0.25W                               |             | CB27G5                           |             |
| A25R135            | 215-0101-00                |                                | DEC. THE CHECK LOG OUN OF A ACT                                    |             |                                  |             |
| A25R137            | 315-0101-00<br>321-0133-00 |                                | RES.,FXD,CMPSN:100 OHM,5%,0.25W<br>RES.,FXD,FILM:237 OHM,1%,0.125W |             | CB1015                           |             |
| A25R138            | 321-0189-00                |                                | RES.,FXD,FILM:237 OHM,1%,0.125W<br>RES.,FXD,FILM:909 OHM,1%,0.125W | 91637       |                                  |             |
| A25R139            | 321-0037-00                |                                | RES., FXD, FILM: 23.7 OHM, 1%, 0.125W                              | 91637       | MFF1816G909R0F<br>MFF1816G23R70F |             |
| A25R202            | 315-0102-00                |                                | RES.,FXD,CMPSN:1K OHM,5%,0.25W                                     |             | CB1025                           |             |
| A25R203            | 315-0101-00                |                                | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W                               |             | CB1015                           | ~~~ 04\$z   |
| A25R206            | 315-0202-00                |                                | RES., FXD, CMPSN: 2K OHM, 5%, 0.25W                                | 01121       | CROOSE                           |             |
| A25R207            | 315-0122-00                |                                | RES.,FXD,CMPSN:1.2K OHM,5%,0.25W                                   |             | CB2025<br>CB1225                 |             |
| A25R208            | 315-0121-00                |                                | RES., FXD, CMPSN: 120 OHM, 5%, 0.25W                               |             | CB1225<br>CB1215                 | - 55 TE (m. |
| A25R211            | 315-0472-00                |                                | RES., FXD, CMPSN:4.7K OHM, 5%, 0.25W                               |             | CB1215<br>CB4725                 |             |
| A25R212            | 315-0101-00                |                                | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W                               |             | CB1015                           |             |
| A25R221            | 315-0201-00                |                                | RES., FXD, CMPSN: 200 OHM, 5%, 0.25W                               |             | CB2015                           |             |
|                    |                            |                                |                                                                    |             | 0.2019                           | ********    |
| A25R222            | 301-0681-00                |                                | RES., FXD, CMPSN: 680 OHM, 5%, 0.50W                               |             | EB6815                           |             |
| A25R226            | 315-0561-00                |                                | RES., FXD, CMPSN: 560 OHM, 5%, 0.25W                               | 01121       |                                  |             |
| A25R227            | 301-0131-00                | B010100 B010150                | RES., FXD, CMPSN: 130 OHM, 5%, 0.50W                               | 01121       |                                  |             |
| A25R227            | 301-0181-00                | B010151                        | RES., FXD, CMPSN: 180 OHM, 5%, 0.50W                               | 01121       |                                  |             |
| A25R228<br>A25R228 | 311-0978-00<br>311-0635-00 | B010100 B010150<br>B010151     | RES., VAR, NONWIR: 250 OHM, 10%, 0.50W                             | 73138       |                                  | "watel      |
| AZJAZ ZO           | 311-0035-00                | B010151                        | RES.,VAR,NONWIR:1K OHM,10%,0.50W                                   | /3138       | 82-32-0                          |             |
| A25R231            | 301-0511-00                |                                | RES.,FXD,CMPSN:510 OHM,5%,0.50W                                    | 01121       | EB5115                           |             |
| A25R232            | 321-0771-01                |                                | RES.,FXD,FILM:50 OHM,0.5%,0.125W                                   | 91637       | MFF1816G50R00D                   |             |
| A25R233            | 321-0771-01                |                                | RES.,FXD,FILM:50 OHM,0.5%,0.125W                                   | 91637       | MFF1816G50R00D                   |             |
| A25R236            | 315-0103-00                |                                | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W                               | 01121       | CB1035                           |             |
| A25R237            | 315-0103-00                |                                | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W                               |             | CB1035                           |             |
| A25R240            | 317-0102-00                |                                | RES.,FXD,CMPSN:1K OHM,5%,0.125W                                    | 01121       | BB1025                           |             |
| A25R241            | 317-0390-00                |                                | RES.,FXD,CMPSN:39 OHM,5%,0.125W                                    | 01121       | BB3905                           |             |
| A25R243            | 317-0390-00                |                                | RES., FXD, CMPSN: 39 OHM, 5%, 0.125W                               | 01121       |                                  |             |
| A25R244            | 317-0102-00                |                                | RES., FXD, CMPSN: 1K OHM, 5%, 0.125W                               | 01121       |                                  |             |
| A25R245            | 325-0044-00                |                                | RES.,FXD,FILM:100 OHM,0.5%,0.05W                                   | 03888       | PME50-F1000R0D                   |             |
| A25R246            | 323-0097-03                |                                | RES.,FXD,FILM:100 OHM,0.25%,0.50W                                  | 75042       | CECT2-1000C                      | n te mater. |
| A25R247            | 317-0200-00                |                                | RES.,FXD,CMPSN:20 OHM,5%,0.125W                                    | 01121       | BB2005                           |             |
| A25R248            | 317-0241-00                |                                | RES., FXD, CMPSN: 240 OHM, 5%, 0.125W                              | 01121       | BB2415                           |             |
|                    | 1999 1990 1999 1997 1998   |                                | (NOMINAL VALUE, SELECTED)                                          |             |                                  | www.c.      |
| A25R249            | 315-0511-00                |                                | RES.,FXD,CMPSN:510 OHM,5%,0.25W                                    | 01121       | CB5115                           |             |
| A25R250            | SELECTED                   |                                |                                                                    |             |                                  |             |
| A25R251<br>A25R252 | 321-0230-00<br>321-0224-00 |                                | RES., FXD, FILM: 2.43K OHM, 1%, 0.125W                             |             | MFF1816G24300F                   |             |
| RZJRZJZ            | 521-0224-00                |                                | RES.,FXD,FILM:2.1K OHM,1%,0.125W                                   | 91637       | MFF1816G21000F                   | and Kitch   |
| A25R253            | 321-0188-00                |                                | RES.,FXD,FILM:887 OHM,1%,0.125W                                    | 91637       | MFF1816G887R0F                   |             |
| A25R254            | 321-0188-00                |                                | RES., FXD, FILM:887 OHM, 1%, 0.125W                                | 91637       | MFF1816G887R0F                   |             |
| A25R255            | 317-0101-00                |                                | RES., FXD, CMPSN: 100 OHM, 5%, 0.125W                              | 01121       | BB1015                           |             |
| A25R256            | 321-0265-00                |                                | RES.,FXD,FILM:5.62K OHM,1%,0.125W                                  | 91637       | MFF1816G56200F                   | Summer 12   |
| A25R257            | 321-0233-00                |                                | RES., FXD, FILM: 2.61K OHM, 1%, 0.125W                             | 91637       | MFF1816G26100F                   |             |
| A25R258            | 321-0192-00                |                                | RES.,FXD,FILM:976 OHM,1%,0.125W                                    | 91637       | MFF1816G976R0F                   |             |
| A25R262            | 321-0259-00                |                                | RES.,FXD,FILM:4.87K OHM,1%,0.125W                                  | 91637       | MFF1816G48700F                   |             |
| A25R264            | 321-0165-00                |                                | RES.,FXD,FILM:511 OHM,1%,0.125W                                    | 91637       | MFF1816G511R0F                   | 27.000      |
| A25R266            | 315-0302-00                |                                | RES.,FXD,CMPSN:3K OHM,5%,0.25W                                     | 01121       | CB3025                           |             |
| A25R267            | 315-0202-00                |                                | RES.,FXD,CMPSN:2K OHM,5%,0.25W                                     | 01121       | CB2025                           |             |
| A25R269            | 315-0911-00                |                                | RES., FXD, CMPSN:910 OHM, 5%, 0.25W                                | 01121       | CB9115                           |             |
| A25R272            | 321-0259-00                |                                | RES.,FXD,FILM:4.87K OHM,1%,0.125W                                  | 91637       | MFF1816G48700F                   | 84 0VE 700  |
| A25R273            | 317-0101-00                |                                | RES., FXD, CMPSN: 100 OHM, 5%, 0.125W                              | 01121       | BB1015                           |             |
| A25R274            | 321-0165-00                |                                | RES., FXD, FILM:511 OHM, 1%, 0.125W                                | 91637       | MFF1816G511R0F                   |             |
|                    |                            |                                |                                                                    |             |                                  |             |

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| Component No.                 | Tektronix<br>Part No.      | Serial/Model No.<br>Eff Dscont | Name & Description                                                          | Mfr<br>Code    | Mfr Part Number                  |
|-------------------------------|----------------------------|--------------------------------|-----------------------------------------------------------------------------|----------------|----------------------------------|
| A25R276                       | 315-0302-00                |                                | RES.,FXD,CMPSN:3K OHM,5%,0.25W                                              |                | CB3025                           |
| A25R279                       | 315-0301-00                |                                | RES., FXD, CMPSN: 300 OHM, 5%, 0.25W                                        |                |                                  |
| A25R280                       | 311-1757-00                |                                | RES., VAR, NONWIR: 2.5K OHM, 10%, 0.50W                                     |                | CB3015                           |
| A25R281                       | 315-0512-00                |                                |                                                                             |                | 3326H-G48-252                    |
| A25R283                       | 315-0622-00                |                                | RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W                                       |                | CB5125                           |
| A25R284                       | 321-0177-00                |                                | RES.,FXD,CMPSN:6.2K OHM,5%,0.25W<br>RES.,FXD,FILM:681 OHM,1%,0.125W         |                | CB6225<br>MFF1816G681R0F         |
|                               |                            |                                |                                                                             | 51057          | In Fibroood Kor                  |
| A25R285                       | 317-0101-00                |                                | RES., FXD, CMPSN: 100 OHM, 5%, 0.125W                                       |                | BB1015                           |
| A25R286                       | 315-0681-00                |                                | RES., FXD, CMPSN: 680 OHM, 5%, 0.25W                                        |                | CB6815                           |
| A25R289                       | 321-0288-00                |                                | RES., FXD, F11.M:9.76K OHM, 1%, 0.125W                                      | 91637          | MFF1816G97600F                   |
| A25R290                       | 311-0622-01                |                                | RES., VAR, NONWIR: 100 OHM, 10%, 0.50W                                      |                | 3326н-К28-101                    |
| A25R291<br>A25R292            | 315-0241-00<br>321-0290-00 |                                | RES.,FXD,CMPSN:240 OHM,5%,0.25W<br>RES.,FXD,FILM:10.2K OHM,1%,0.125W        |                | CB2415<br>MFF1816G10201F         |
| ine sine see                  | 521 0290 00                |                                | RED., FRD, FILM. 10.2K OHH, 18, 0.125W                                      | 91057          | MFF1010G10201F                   |
| A25R294                       | 315-0821-00                |                                | RES.,FXD,CMPSN:820 OHM,5%,0.25W                                             | 01121          | CB8215                           |
| A25R297                       | 315-0470-00                |                                | RES.,FXD,CMPSN:47 OHM,5%,0.25W                                              | 01121          | CB4705                           |
| A25R299                       | 315-0242-00                | •                              | RES.,FXD,CMPSN:2.4K OHM,5%,0.25W                                            | 01121          | CB2425                           |
| A25R311                       | 315-0751-00                |                                | RES.,FXD,CMPSN:750 OHM,5%,0.25W                                             | 01121          | CB7515                           |
| A25R313                       | 315-0101-00                |                                | RES.,FXD,CMPSN:100 OHM,5%,0.25W                                             | 01121          | CB1015                           |
| A25R315                       | 315-0132-00                |                                | RES.,FXD,CMPSN:1.3K OHM,5%,0.25W                                            | 01121          | CB1325                           |
| A25R319                       | 315-0101-00                |                                | RES.,FXD,CMPSN:100 OHM,5%,0.25W                                             | 01121          | CB1015                           |
| A25R321                       | 315-0201-00                |                                | RES., FXD, CMPSN: 200 OHM, 5%, 0.25W                                        |                | CB2015                           |
| A25R322                       | 301-0681-00                |                                | RES., FXD, CMPSN: 680 OHM, 5%, 0.50W                                        |                | EB6815                           |
| A25R324                       | 315-0331-00                |                                | RES., FXD, CMPSN: 330 OHM, 5%, 0.25W                                        |                |                                  |
| A25R326                       | 315-0561-00                |                                |                                                                             |                | CB3315                           |
| A25R327                       | 301-0181-00                |                                | RES.,FXD,CMPSN:560 OHM,5%,0.25W<br>RES.,FXD,CMPSN:180 OHM,5%,0.50W          |                | CB5615                           |
| R29R927                       | 501-0181-00                |                                | RES., FAD, CHESN 180 OHM, 5%, 0.50W                                         | 01121          | EB1815                           |
| A25R328                       | 311-0978-00                | B010100 B010150                | RES.,VAR,NONWIR:250 OHM,10%,0.50W                                           |                | 82-4-2                           |
| A25R328                       | 311-0635-00                | B010151                        | RES.,VAR,NONWIR:1K OHM,10%,0.50W                                            | 73138          | 82-32-0                          |
| A25R331                       | 301-0511-00                |                                | RES.,FXD,CMPSN:510 OHM,5%,0.50W                                             | 01121          | EB5115                           |
| A25R332                       | 321-0771-01                |                                | RES.,FXD,FILM:50 OHM,0.5%,0.125W                                            | 91637          | MFF1816G50R00D                   |
| A25R333                       | 321-0771-01                |                                | RES.,FXD,F1LM:50 OHM,0.5%,0.125W                                            | 91637          | MFF1816G50R00D                   |
| A25R336                       | 315-0103-00                |                                | RES.,FXD,CMPSN:10K OHM,5%,0.25W                                             | 01121          | CB1035                           |
| A25R337                       | 315-0103-00                |                                | RES.,FXD,CMPSN:10K OHM,5%,0.25W                                             | 01121          | CB1035                           |
| A25R340                       | 317-0102-00                |                                | RES., FXD, CMPSN:1K OHM, 5%, 0.125W                                         | 01121          |                                  |
| A25R341                       | 317-0390-00                |                                | RES., FXD, CMPSN: 39 OHM, 5%, 0.125W                                        | 01121          | BB3905                           |
| A25R343                       | 317-0390-00                |                                | RES., FXD, CMPSN: 39 OHM, 5%, 0.125W                                        | 01121          |                                  |
| A25R344                       | 317-0102-00                |                                | RES., FXD, CMPSN: 1K OHM, 5%, 0.125W                                        | 01121          | BB1025                           |
| A25R345                       | 325-0027-00                |                                | RES., FXD, FILM:93 OHM, 1%, 0.5W                                            | 03888          | AME50-E93ROOF                    |
| 495D9/7                       | 217 0100 00                |                                |                                                                             |                |                                  |
| A25R347                       | 317-0100-00                |                                | RES., FXD, CMPSN:10 OHM, 5%, 0.125W                                         |                | BB1005                           |
| A25R349                       | 315-0511-00                |                                | RES., FXD, CMPSN: 510 OHM, 5%, 0.25W                                        |                | CB5115                           |
| A25R350                       | 317-0100-00                |                                | RES., FXD, CMPSN:10 OHM, 5%, 0.125W                                         |                | BB1005                           |
| A25R351                       | 321-0230-00                |                                | RES., FXD, FILM: 2.43K OHM, 1%, 0.125W                                      |                | MFF1816G24300F                   |
| A25R352<br>A25R353            | 321-0224-00<br>321-0188-00 |                                | RES.,FXD,FILM:2.1K OHM,1%,0.125W<br>RES.,FXD,FILM:887 OHM,1%,0.125W         |                | MFF1816G21000F<br>MFF1816G887R0F |
|                               | 521 0100 00                |                                | KEO., 1 KD, 1 101.007 OH1, 1%, 0.129                                        | 91057          | HFF 10106007 KOF                 |
| A25R354                       | 321-0188-00                |                                | RES.,FXD,FILM:887 OHM,1%,0.125W                                             | 91637          | MFF1816G887R0F                   |
| A25R355                       | 317-0101-00                |                                | RES.,FXD,CMPSN:100 OHM,5%,0.125W                                            | 01121          | BB1015                           |
| A25R356                       | 321-0265-00                |                                | RES.,FXD,FILM:5.62K OHM,1%,0.125W                                           | 91637          | MFF1816G56200F                   |
| A25R357                       | 321-0233-00                |                                | RES.,FXD,FILM:2.61K OHM,1%,0.125W                                           | 91637          | MFF1816G26100F                   |
| A25R358                       | 321-0192-00                |                                | RES.,FXD,F1LM:976 OHM,1%,0.125W                                             | 91637          | MFF1816G976R0F                   |
| A25R362                       | 321-0259-00                |                                | RES.,FXD,FILM:4.87K OHM,1%,0.125W                                           | 91637          | MFF1816G48700F                   |
| A25R364                       | 321-0165-00                |                                | RES.,FXD,FILM:511 OHM,1%,0.125W                                             | 91637          | MFF1816G511ROF                   |
| A25R366                       | 315-0302-00                |                                | RES., FXD, CMPSN: 3K OHM, 5%, 0.25W                                         | 01121          |                                  |
| A25R367                       | 315-0202-00                |                                | RES., FXD, CMPSN: 2K OHM, 5%, 0.25W                                         | 01121          |                                  |
| A25R369                       | 315-0911-00                |                                | RES., FXD, CMPSN: 2K OHM, 5%, 0.25W<br>RES., FXD, CMPSN: 910 OHM, 5%, 0.25W | 01121          | CB2025<br>CB9115                 |
| A25R372                       | 321-0259-00                |                                | RES., FXD, FILM: 4.87K OHM, 1%, 0.125W                                      | 91637          | MFF1816G48700F                   |
|                               | 317-0101-00                |                                | RES., FXD, CMPSN: 100 OHM, 5%, 0.125W                                       | 01121          | BB1015                           |
| A25R373                       | 517-0101-00                |                                |                                                                             |                |                                  |
|                               |                            |                                |                                                                             |                |                                  |
| A25R373<br>A25R374<br>A25R376 | 321-0165-00<br>315-0302-00 |                                | RES.,FXD,FILM:511 OHM,1%,0.125W<br>RES.,FXD,CMPSN:3K OHM,5%,0.25W           | 91637<br>01121 | MFF1816G511R0F<br>CB3025         |

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| Component No.      | Tektronix<br>Part No.      | Serial/Model No.<br>Eff Dscont | Name & Description                                                   | Mfr<br>Code    | Mfr Part Number          | 22.00kg              |
|--------------------|----------------------------|--------------------------------|----------------------------------------------------------------------|----------------|--------------------------|----------------------|
| A25R379            | 315-0301-00                |                                | RES., FXD, CMPSN: 300 OHM, 5%, 0.25W                                 | 01121          | СВЗО15                   |                      |
| A25R380            | 311-1225-00                |                                | RES., VAR, NONWIR: 1K OHM, 20%, 0.50W                                |                | 3386F-T04-102            |                      |
| A25R381            | 315-0302-00                |                                | RES., FXD, CMPSN: 3K OHM, 5%, 0.25W                                  | 01121          | CB3025                   | 1995-744             |
| A25R383            | 315-0332-00                |                                | RES., FXD, CMPSN: 3.3K OHM, 5%, 0.25W                                | 01121          | CB3325                   |                      |
| A25R384            | 317-0101-00                |                                | RES., FXD, CMPSN: 100 OHM, 5%, 0.125W                                | 01121          | BB1015                   |                      |
| A25R385            | 315-0101-00                |                                | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W                                 | 01121          | CB1015                   |                      |
| A25R451            | 315-0101-00                |                                | RES.,FXD,CMPSN:100 OHM,5%,0.25W                                      | 01121          | CB1015                   | - On Aug             |
| A25R452            | 315-0103-00                |                                | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W                                 | 01121          | CB1035                   |                      |
| A25R452<br>A25R454 | 315-0122-00                |                                | RES., FXD, CMPSN: 1.2K OHM, 5%, 0.25W                                | 01121          | CB1225                   |                      |
| A25R455            | 315-0121-00                |                                | RES., FXD, CMPSN: 120 OHM, 5%, 0.25W                                 | 01121          | CB1215                   |                      |
| A25R455            | 315-0202-00                |                                | RES., FXD, CMPSN: 2K OHM, 5%, 0.25W                                  | 01121          | CB2025                   | we with              |
| A25R459            | 315-0202-00                |                                | RES., FXD, CMPSN: 2K OHM, 5%, 0.25W                                  | 01121          | CB2025                   |                      |
| A25R485            | 321-0109-00                |                                | RES.,FXD,FILM:133 OHM,1%,0.125W                                      | 91637          | MFF1816G133R0F           |                      |
| A25R487            | 321-0105-00                |                                | RES.,FXD,FILM:121 OHM,1%,0.125W                                      | 91637          |                          |                      |
| A25R491            | 321-0323-00                |                                | RES.,FXD,F1LM:22.6K OHM,1%,0.125W                                    | 91637          |                          |                      |
| A25R492            | 321-0264-00                |                                | RES.,FXD,FILM:5.49K OHM,1%,0.125W                                    | 91637          |                          |                      |
| A25R493            | 321-0222-00                |                                | RES.,FXD,FILM:2K OHM,1%,0.125W                                       | 91637          |                          |                      |
| A25R501            | 315-0471-00                |                                | RES.,FXD,CMPSN:470 OHM,5%,0.25W                                      | 01121          | CB4715                   |                      |
| A25R502            | 315-0334-00                |                                | RES.,FXD,CMPSN:330K OHM,5%,0.25W                                     | 01121          |                          | and the              |
| A25R503            | 321-0193-00                |                                | RES.,FXD,FILM:1K OHM,1%,0.125W                                       | 91637          |                          |                      |
| A25R504            | 321-0409-00                |                                | RES.,FXD,FILM:178K OHM,1%,0.125W                                     | 91637          |                          |                      |
| A25R506            | 315-0332-00                |                                | RES.,FXD,CMPSN:3.3K OHM,5%,0.25W                                     |                | CB3325                   |                      |
| A25R507            | 315-0202-00                | ÷                              | RES.,FXD,CMPSN:2K OHM,5%,0.25W                                       |                | CB2025                   |                      |
| A25R509            | 315-0101-00                |                                | RES.,FXD,CMPSN:100 OHM,5%,0.25W                                      | 01121          | CB1015                   |                      |
| A25R513            | 315-0201-00                |                                | RES., FXD, CMPSN: 200 OHM, 5%, 0.25W                                 |                | CB2015                   |                      |
| A25R514            | 315-0201-00                |                                | RES., FXD, CMPSN: 200 OHM, 5%, 0.25W                                 |                | CB2015                   | and the second       |
| A25R515            | 311-1261-00                |                                | RES., VAR, NONWIR: 500 OHM, 10%, 0.50W                               |                | 3329P-L58-501            |                      |
| A25R516            | 315-0152-00                |                                | RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W                                |                | CB1525<br>CB6215         |                      |
| A25R517<br>A25R523 | 315-0621-00<br>315-0103-00 |                                | RES.,FXD,CMPSN:620 OHM,5%,0.25W<br>RES.,FXD,CMPSN:10K OHM,5%,0.25W   |                | CB1035                   |                      |
|                    |                            |                                | RES.,FXD,CMPSN:1.5K OHM,5%,0.25W                                     | 01121          | CB1525                   | newser               |
| A25R532            | 315-0152-00                |                                | RES., FXD, FILM: 1.56K OHM, 0.5%, 0.125W                             | 91637          |                          |                      |
| A25R537            | 321-0664-00                |                                | RES.,FXD,FILM:13K OHM,1%,0.125W                                      |                | MFF1816G13001F           |                      |
| A25R538            | 321-0300-00                |                                | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W                                  |                | CB1025                   |                      |
| A25R541            | 315-0102-00                |                                | RES., FXD, FILM: 1.47K OHM, 1%, 0.125W                               |                | MFF1816G14700F           | 2005                 |
| A25R542<br>A25R546 | 321-0209-00<br>315-0270-00 |                                | RES., FXD, CMPSN: 27 OHM, 5%, 0.25W                                  |                | CB2705                   |                      |
| A25R547            | 315-0270-00                |                                | RES.,FXD,CMPSN:27 OHM,5%,0.25W                                       | 01121          | CB2705                   |                      |
| A25R553            | 315-0471-00                |                                | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W                                 | 01121          | CB4715                   | abig                 |
| A25R556            | 315-0221-00                |                                | RES., FXD, CMPSN: 220 OHM, 5%, 0.25W                                 | 01121          | CB2215                   |                      |
| A25R557            | 315-0471-00                |                                | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W                                 | 01121          | CB4715                   |                      |
| A25R558            | 315-0181-00                |                                | RES., FXD, CMPSN: 180 OHM, 5%, 0.25W                                 | 01121          | CB1815                   |                      |
| A25R559            | 315-0271-00                |                                | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W                                 | 01121          | CB2715                   | 19 <b>4</b> (194     |
| A25R562            | 315-0201-00                | I.                             | RES.,FXD,CMPSN:200 OHM,5%,0.25W                                      | 01121          |                          |                      |
| A25R563            | 315-0301-00                |                                | RES., FXD, CMPSN: 300 OHM, 5%, 0.25W                                 | 01121          |                          |                      |
| A25R573            | 307-0541-00                |                                | RES,NTWK,THK FI:(7)1K OHM,10%,1W                                     | 91637          |                          |                      |
| A25R574            | 315-0102-00                |                                | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W                                  | 01121          | CB1025                   | 40 <sup>47</sup> 23- |
| A25R575            | 315-0102-00                |                                | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W                                  | 01121          |                          |                      |
| A25R599            | 315-0471-00                |                                | RES.,FXD,CMPSN:470 OHM,5%,0.25W                                      | 01121          | CB4715                   |                      |
| A25R602            | 307-0541-00                | )                              | RES, NTWK, THK FI: (7)1K OHM, 10%, 1W                                | 91637          |                          | .00146               |
| A25R603            | 307-0541-00                | )                              | RES, NTWK, THK FI: (7)1K OHM, 10%, 1W                                | 91637          |                          |                      |
| A25R608            | 315-0152-00                |                                | RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W                                | 01121          |                          |                      |
| A25R609            | 315-0121-00                |                                | RES., FXD, CMPSN: 120 OHM, 5%, 0.25W                                 | 01121<br>01121 |                          |                      |
| A25R618            | 315-0152-00                |                                | RES.,FXD,CMPSN:1.5K OHM,5%,0.25W<br>RES.,FXD,CMPSN:120 OHM,5%,0.25W  | 01121          |                          |                      |
| A25R619            | 315-0121-00                | )                              |                                                                      |                |                          | Con party            |
| A25R620            | 321-0247-00                |                                | RES.,FXD,FILM:3.65K OHM,1%,0.125W<br>RES.,FXD,CMPSN:43K OHM,5%,0.25W | 91637<br>01121 | MFF1816G36500F<br>CB4335 | · and                |
| A25R622            | 315-0433-00                | )                              | ALD., FAD, OTFOR. 45K URT, 5%, 0.25M                                 | 01121          |                          |                      |

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|           | Component No. | Tektronix<br>Part No. | Serial/Mo<br>Eff | del No.<br>Dscont | Name & Description                            | Mfr<br>Code | Mfr Part Number |
|-----------|---------------|-----------------------|------------------|-------------------|-----------------------------------------------|-------------|-----------------|
|           | A25R623       | 311-1230-00           |                  |                   | RES.,VAR,NONWIR:20K OHM,20%,0.50W             | 32997       | 3386F-T04-203   |
|           | A25T233       | 120-1279-00           |                  |                   | TRANSFORMER, RF: TOROID, 2 WINDINGS           | 80009       | 120-1279-00     |
|           | A25T237       | 120-1280-00           |                  |                   | TRANSFORMER, RF: TOROID, 2 WINDINGS           | 80009       | 120-1280-00     |
|           | A25T333       | 120-1279-00           |                  |                   | TRANSFORMER, RF: TOROID, 2 WINDINGS           | 80009       | 120-1279-00     |
|           | A25T337       | 120-1280-00           |                  |                   | TRANSFORMER, RF: TOROID, 2 WINDINGS           | 80009       | 120-1280-00     |
|           | A25T345       | 120-0444-00           |                  |                   | XFMR, TOROID: 5 TURNS, BIFILAR                | 80009       | 120-0444-00     |
| onone .   | A25T509       | 120-0444-00           |                  |                   | XFMR, TOROID: 5 TURNS, BIFILAR                | 80009       | 120-0444-00     |
|           | A25U21        | 156-1149-00           |                  |                   |                                               | 27014       | LF351N          |
|           | A25U65        | 155-0187-00           |                  |                   | MICROCIRCUIT, LI:FT DOUBLER                   | 80009       | 155-0187-00     |
|           | A25U73        | 156-0158-00           |                  |                   | MICROCIRCUIT, LI: DUAL OPERATIONAL AMPLIFIER  | 18324       | MC1458V         |
|           | A25U503       | 156-0690-03           |                  |                   | MICROCIRCUIT, DI:QUAD 2 INP NOR GATE, BURN IN | 01295       | SN74S02         |
|           | A25U510       | 156-0362-00           |                  |                   | MICROCIRCUIT, LI:ECL COMPARATOR               | 34335       | AM685HL         |
|           | A25U519       | 156-0480-02           |                  |                   | MICROCIRCUIT, DI: QUAD 2 INP & GATE           | 01295       | SN74LS08NP3     |
|           | A25U520       | 156-0497-00           |                  |                   | MICROCIRCUIT, DI: 10-BIT SHIFT REGISTER       | 18324       | N8273B          |
|           | A25U521       | 156-0982-03           |                  |                   | MICROCIRCUIT, DI: OCTAL-D-EDGE FF, SCRN       | 07263       | 74LS374         |
|           | A25U522       | 156-0982-03           |                  |                   | MICROCIRCUIT, DI: OCTAL-D-EDGE FF, SCRN       | 07263       | 74LS374         |
|           | A25U533       | 156-0067-12           |                  |                   | MICROCIRCUIT, LI: OPERATIONAL AMPLIFIER       | 04713       | MC1741CU        |
|           | A25U554       | 156-0385-02           |                  |                   | MICROCIRCUIT, DI: HEX INVERTER                | 01295       | SN74LS04        |
| 000 M/ 2  | A25U569       | 156-0388-03           |                  |                   | MICROCIRCUIT, DI: DUAL D FLIP-FLOP            | 07263       | 74LS74A         |
|           | A25U570       | 156-0497-00           |                  |                   | MICROCIRCUIT, DI: 10-BIT SHIFT REGISTER       | 18324       | N8273B          |
|           | A25U575       | 156-0230-00           |                  |                   | MICROCIRCUIT, DI: DUAL D MA-SLAVE FLIP-FLOP   | 80009       | 156-0230-00     |
|           | A25U580       | 156-0230-00           |                  |                   | MICROCIRCUIT, DI: DUAL D MA-SLAVE FLIP-FLOP   | 80009       | 156-0230-00     |
|           | A25U585       | 156-0230-00           |                  |                   | MICROCIRCUIT, DI: DUAL D MA-SLAVE FLIP-FLOP   | 80009       | 156-0230-00     |
|           | A25U590       | 156-0230-00           |                  |                   | MICROCIRCUIT, DI: DUAL D MA-SLAVE FLIP-FLOP   | 80009       | 156-0230-00     |
|           | A25U595       | 156-0230-00           |                  |                   | MICROCIRCUIT, DI: DUAL D MA-SLAVE FLIP-FLOP   | 80009       | 156-0230-00     |
|           | A25U610       | 155-0167-01           |                  |                   | MICROCIRCUIT, LI:4BIT D/A CONVERTER           | 80009       | 155-0167-01     |
|           | A25U620       | 155-0167-01           |                  |                   | MICROCIRCUIT, LI: 4BIT D/A CONVERTER          | 80009       | 155-0167-01     |
|           | A25U621       | 156-0158-00           |                  |                   | MICROCIRCUIT, LI: DUAL OPERATIONAL AMPLIFIER  | 18324       |                 |
|           | A25U630       | 156-0388-03           |                  |                   | MICROCIRCUIT, DI: DUAL D FLIP-FLOP            | 07263       | 74LS74A         |
|           | A25VR85       | 152-0217-00           |                  |                   | SEMICOND DEVICE:ZENER,0.4W,8.2V,5%            | 04713       | SZG20           |
| Neitle (L | A25VR284      | 152-0227-00           |                  |                   | SEMICOND DEVICE:ZENER,0.4W,6.2V,5%            | 04713       | SZ13903         |

|                    | Tektronix                                | Serial/Model No.                                                                                                |                                                                                                   | Mfr   |                  |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-------|------------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Component No.      | Part No.                                 | Eff Dscont                                                                                                      | Name & Description                                                                                |       | Mfr Part Number  |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26                | n an | n 1980 and a function and a state of the factor of the factor of the factor of the factor of the state of the f | CKT BOARD ASSY: CONTROL LOGIC                                                                     |       |                  |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C110            | 281-0786-00                              |                                                                                                                 | CAP., FXD, CER DI: 150PF, 10%, 100V                                                               | 72982 | 8035D2AADX5P151K |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C120            | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C130            | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| A26C230            | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.10F, 20%, 50V                                                                 |       | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C320            | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.10F, 20%, 50V                                                                 | 72982 |                  |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                    |                                          |                                                                                                                 |                                                                                                   |       |                  |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C330<br>A26C410 | 281-0775-00<br>281-0775-00               |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       | -9 <b>6</b> 895                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C430            | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C610            |                                          |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 |                  |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C611            | 281-0775-00<br>281-0775-00               |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 |                  |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C620            | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 |                  |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A200020            | 281-0775-00                              |                                                                                                                 | CAP.,FXD,CER DI:0.1UF,20%,50V                                                                     | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C720            | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C820            | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C920            | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1010           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 |                  |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1020           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1030           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1120           | 281 0775 00                              |                                                                                                                 |                                                                                                   |       |                  |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1210           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       | and the second s |
| A26C1210           | 281-0775-00<br>281-0775-00               |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1220           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1310           |                                          |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1311           | 281-0775-00<br>281-0775-00               |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| M2001311           | 201-0775-00                              |                                                                                                                 | CAP.,FXD,CER DI:0.1UF,20%,50V                                                                     | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1330           | 281-0809-00                              |                                                                                                                 | CAP.,FXD,CER DI:200PF,5%,100V                                                                     | 72982 | 8013T2ADDC1G201J |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1410           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1411           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M | -mar. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1421           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1520           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1600           | 281-0775-00                              |                                                                                                                 | CAP.,FXD,CER DI:0.1UF,20%,50V                                                                     | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1610           | 281-0788-00                              |                                                                                                                 | CAP., FXD, CER DI: 470PF, 10%, 100V                                                               | 72982 | 8005H9AADW5R471K |       | 10.14 <sup>°</sup> (1988)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| A26C1620           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1631           | 281-0809-00                              |                                                                                                                 | CAP., FXD, CER DI:200PF, 5%, 100V                                                                 | 72982 | 8013T2ADDC1G201J |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1700           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1720           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1800           | 281-0772-00                              |                                                                                                                 | CAP., FXD, CER DI:0.0047UF, 10%, 100V                                                             | 04222 | GC701C472K       |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 12601010           | 001 0775 00                              |                                                                                                                 |                                                                                                   |       |                  |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1810           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C1830           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       | alignet in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| A26C1920           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C2010           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C2012           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 |       | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C2110           | 281-0775-00                              |                                                                                                                 | CAP.,FXD,CER DI:0.1UF,20%,50V                                                                     | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C2120           | 283-0638-00                              |                                                                                                                 | CAP., FXD, MICA D:130PF, 1%, 100V                                                                 | 00853 | D151F131F0       |       | 10000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| A26C2127           | 281-0812-00                              |                                                                                                                 | CAP., FXD, CER DI: 1000PF, 10%, 100V                                                              | 72982 | 8035D9AADX7R102K |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C2130           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C2201           | 283-0698-00                              |                                                                                                                 | CAP., FXD, MICA D: 390PF. 1%, 500V                                                                | 09023 | CD15ED391F03     |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C2220           | 283-0668-00                              |                                                                                                                 | CAP., FXD, MICA D:184PF, 1%, 500V                                                                 | 00853 | D155F1840F0      |       | n. 1605.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| A26C2223           | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26C2225           | 191.0775.00                              |                                                                                                                 |                                                                                                   |       |                  |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                    | 281-0775-00                              |                                                                                                                 | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                 | 72982 | 8005D9AABZ5U104M |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26CR1800          | 152-0322-00                              |                                                                                                                 | SEMICOND DEVICE: SILICON, 15V, HOT CARRIER                                                        | 50434 | 5082-2672        |       | 2 -T TWO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| A26L2224           | 108-0245-00                              |                                                                                                                 | COIL, RF: 3.9UH                                                                                   | 76493 | B6310-1          |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26Q2010           | 151-0188-03                              |                                                                                                                 | TRANSISTOR: SILICON, PNP, SEL                                                                     | 80009 | 151-0188-03      |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26Q2020           | 151-0333-00                              |                                                                                                                 | TRANSISTOR: SILICON, NPN, SEL FROM MPS918                                                         | 04713 | SPS1752          |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26Q2021           | 151-0333-00                              |                                                                                                                 | TRANSISTOR: SILICON, NPN, SEL FROM MPS918                                                         | 04713 | SPS1752          |       | a), in Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| A26R111            | 315-0101-00                              |                                                                                                                 | RES.,FXD,CMPSN:100 OHM,5%,0.25W                                                                   | 01121 | CB1015           |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| A26R130            | 307-1096-00                              |                                                                                                                 | RES NTWK, FXD, F1:7,2 OHM, 2%, 1W                                                                 | 91637 | MSP08A01202G     |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                    |                                          |                                                                                                                 | ····· , · ··· , · ··· , · ··· , ··· · ··· , ··· · · ··· , ··· · · · · · · · · · · · · · · · · · · | 1031  | 101 00h012020    |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

|        | Component No.        | Tektronix<br>Part No.      | Serial/Model No.<br>Eff Dscont | Name & Description                                                                    | Mfr            | Mfr. Dort Number           |
|--------|----------------------|----------------------------|--------------------------------|---------------------------------------------------------------------------------------|----------------|----------------------------|
|        |                      |                            | LII DSCOIIL                    |                                                                                       | LOUE           | Mfr Part Number            |
|        | A26R1110             | 315-0472-00                |                                | RES.,FXD,CMPSN:4.7K OHM,5%,0.25W                                                      | 01121          | CB4725                     |
|        | A26R1320             | 315-0471-00                |                                | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W                                                  |                | CB4715                     |
|        | A26R1630             | 315-0471-00                | ,                              | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W                                                  |                | CB4715                     |
|        | A26R1700             | 315-0223-00                |                                | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W                                                  |                | CB2235                     |
|        | A26R1803<br>A26R1805 | 315-0470-00                |                                | RES., FXD, CMPSN: 47 OHM, 5%, 0.25W                                                   |                | CB4705                     |
|        | AZORIOUJ             | 315-0472-00                |                                | RES.,FXD,CMPSN:4.7K OHM,5%,0.25W                                                      | 01121          | CB4725                     |
|        | A26R2000             | 315-0201-00                |                                | RES.,FXD,CMPSN:200 OHM,5%,0.25W                                                       | 01121          | CB2015                     |
|        | A26R2020             | 315-0511-00                |                                | RES., FXD, CMPSN: 510 OHM, 5%, 0.25W                                                  |                | CB5115                     |
|        | A26R2111             | 315-0512-00                |                                | RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W                                                 |                | CB5125                     |
|        | A26R2112             | 315-0391-00                |                                | RES., FXD, CMPSN: 390 OHM, 5%, 0.25W                                                  |                | CB3915                     |
|        | A26R2113             | 315-0132-00                |                                | RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W                                                 |                | CB1325                     |
|        | A26R2121             | 315-0112-00                |                                | RES., FXD, CMPSN: 1.1K OHM, 5%, 0.25W                                                 |                | CB1125                     |
|        | 40(00100             |                            |                                |                                                                                       |                |                            |
|        | A26R2122             | 315-0132-00                |                                | RES., FXD, CMPSN: 1.3K OHM, 5%, 0.25W                                                 |                | CB1325                     |
|        | A26R2123             | 315-0271-00                |                                | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W                                                  |                | CB2715                     |
|        | A26R2124             | 315-0391-00                |                                | RES., FXD, CMPSN: 390 OHM, 5%, 0.25W                                                  |                | CB3915                     |
|        | A26R2125<br>A26R2126 | 315-0512-00                |                                | RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W                                                 |                | CB5125                     |
|        | A26R2200             | 315-0512-00<br>315-0153-00 |                                | RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W                                                 |                | CB5125                     |
|        | A2012200             | 515-0155-00                |                                | RES.,FXD,CMPSN:15K OHM,5%,0.25W                                                       | 01121          | CB1535                     |
|        | A26R2201             | 315-0103-00                |                                | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W                                                  | 01121          | CB1035                     |
|        | A26R2224             | 315-0100-00                | XB010151                       | RES., FXD, CMPSN:10 OHM, 5%, 0.25W                                                    |                | CB1005                     |
|        | A26R2230             | 315-0122-00                |                                | RES., FXD, CMPSN:1.2K OHM, 5%, 0.25W                                                  |                | CB1005                     |
|        | A26U100              | 156-0481-02                |                                | MICROCIRCUIT, DI:TRIPLE 3 INP & GATE                                                  |                | DM74LS11NA+                |
|        | A26U110              | 156-0304-02                |                                | MICROCIRCUIT, DI: DUAL 4 INP NAND GATE                                                |                | SN74S20                    |
|        | A26U120              | 156-0219-00                |                                | MICROCIRCUIT, DI:8-INPUT PRIORITY DCDR                                                |                | 9318DC                     |
|        |                      |                            |                                | ,                                                                                     |                |                            |
|        | A26U130              | 156-0738-04                |                                | MICROCIRCUIT, DI: HEX D FF W/CLEAR, BURN-IN                                           | 01295          | SN74S174(JP4)              |
|        | A26U200              | 156-0479-02                |                                | MICROCIRCUIT, DI:QUAD 2-INP ORGATE                                                    | 01295          | SN74LS32NP3                |
|        | A26U210              | 156-0388-03                |                                | MICROCIRCUIT, DI: DUAL D FLIP-FLOP                                                    | 07263          | 74LS74A                    |
|        | A26U220              | 156-0469-02                |                                | MICROCIRCUIT, DI: 3/8 LINE DCDR                                                       | 01295          | SN74LS138NP3               |
|        | A26U230              | 156-0735-02                |                                | MICROCIRCUIT, DI:4 BIT BISTABLE LCH, BURN-IN                                          | 80009          | 156-0735-02                |
|        | A26U300              | 156-0385-02                |                                | MICROCIRCUIT, DI: HEX INVERTER                                                        | 01295          | SN74LS04                   |
|        | A26U310              | 156-0720-02                |                                | MICROCIRCUIT, DI: HEX DRVR, 4 TO2 LINE                                                | 01295          | CN7/1 C269                 |
|        | A26U320              | 156-0388-03                |                                | MICROCIRCUIT, DI:DUAL D FLIP-FLOP                                                     | 07263          | SN74LS368<br>74LS74A       |
|        | A26U400              | 156-0383-02                |                                | MICROCIRCUIT, DI:QUAD 2-INP NOR GATE                                                  | 01205          | SN74LS02                   |
|        | A26U600              | 156-0412-02                |                                | MICROCIRCUIT, DI:SYN 4 BIT UP-DOWN CNTR                                               | 80009          | 156-0412-02                |
|        | A26U620              | 156-0916-02                |                                | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN                                            | 27014          | DM81LS97                   |
|        | A26U630              | 156-0865-02                |                                | MICROCIRCUIT, DI:OCTAL D-TYPE FF W/CLEAR                                              | 01295          | SN74LS273NP3               |
|        |                      |                            |                                |                                                                                       |                |                            |
|        | A26U700              | 156-0470-02                |                                | MICROCIRCUIT, DI:8 INP DATA SEL W/3 STATE                                             | 01295          | SN74LS251                  |
|        | A26U720              | 156-0865-02                |                                | MICROCIRCUIT, DI: OCTAL D-TYPE FF W/CLEAR                                             | 01295          | SN74LS273NP3               |
|        | A26U730              | 156-0916-02                |                                | MICROCIRCUIT, DI: 8-2 INP 3-STATE BFR, BURN                                           | 27014          | DM81LS97                   |
|        | A26U800              | 156-0865-02                |                                | MICROCIRCUIT, DI:OCTAL D-TYPE FF W/CLEAR                                              | 01295          | SN74LS273NP3               |
|        | A26U820<br>A26U830   | 156-0916-02                |                                | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN                                            | 27014          | DM81LS97                   |
|        | A200030              | 156-0975-02                |                                | MICROCIRCUIT, DI: UNIV SHIFT/STORAGE RGTR                                             | 01295          | SN74LS299N3/J4             |
|        | A26U900              | 156-0412-02                |                                | MICROCIRCUIT, DI: SYN 4 BIT UP-DOWN CNTR                                              | 80000          | 156-0412-02                |
|        | A26U920              | 156-0529-02                |                                | MICROCIRCUIT, DI: DATA SELECTOR                                                       | 80009          | 156-0412-02                |
|        | A26U930              | 156-0975-02                |                                | MICROCIRCUIT, DI:UNIV SHIFT/STORAGE RGTR                                              | 80009          | 156-0529-02                |
|        | A26U1000             | 156-0412-02                |                                | MICROCIRCUIT, DI:SYN 4 BIT UP-DOWN CNTR                                               | 01295<br>80009 | SN74LS299N3/J4             |
|        | A26U1020             | 156-0529-02                |                                | MICROCIRCUIT, DI:DATA SELECTOR                                                        | 80009          | 156-0412-02<br>156-0529-02 |
|        | A26U1030             | 156-0470-02                |                                | MICROCIRCUIT, DI:8 INP DATA SEL W/3 STATE                                             | 01295          | SN74LS251                  |
|        |                      |                            |                                |                                                                                       |                |                            |
|        | A26U1100             | 156-0412-02                |                                | MICROCIRCUIT, DI: SYN 4 BIT UP-DOWN CNTR                                              | 80009          | 156-0412-02                |
|        | A26U1120             | 156-0471-02                |                                | MICROCIRCUIT, DI: DUAL 4/1 DATA SEL                                                   | 80009          | 156-0471-02                |
|        | A26U1130             | 156-0470-02                |                                | MICROCIRCUIT, DI:8 INP DATA SEL W/3 STATE                                             | 01295          | SN74LS251                  |
|        | A26U1200             | 156-0412-02                |                                | MICROCIRCUIT, DI:SYN 4 BIT UP-DOWN CNTR                                               | 80009          | 156-0412-02                |
|        | A26U1220             | 156-0412-02                |                                | MICROCIRCUIT, DI:SYN 4 BIT UP-DOWN CNTR                                               | 80009          | 156-0412-02                |
|        | A26U1230             | 156-0953-02                |                                | MICROCIRCUIT, DI:4 BIT MAGNITUDE CMPRTR                                               | 01295          | SN74LS85                   |
|        | A26U1300             | 156-0412-02                |                                | MICDOCIDCULT DI CUN ( DATE UT DOUT)                                                   | 00000          | 156 0/10                   |
|        | A2601300             | 156-0798-02                |                                | MICROCIRCUIT, DI:SYN 4 BIT UP-DOWN CNTR<br>MICROCIRCUIT, DI:DUAL 14 TO 1 LINE SEL/MUX | 80009          | 156-0412-02                |
| - mark |                      | 190 0790 02                |                                | HEADERCOIT, DI. DOAL 14 10 I LINE SEL/MUX                                             | 01295          | SN74LS153                  |

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|               | Tektronix   | Serial/I | Model No. |                                             | Mfr   |                 |
|---------------|-------------|----------|-----------|---------------------------------------------|-------|-----------------|
| Component No. | Part No.    | Eff      | Dscont    | Name & Description                          | Code  | Mfr Part Number |
| A26U1330      | 156-0645-02 |          |           | MICROCIRCUIT, DI:SCHMITT-TRIG POS-NAND      | 01295 | SN74LS14        |
| A26U1400      | 156-0480-02 |          |           | MICROCIRCUIT, DI: QUAD 2 INP & GATE         | 01295 |                 |
| A26U1420      | 156-0388-03 |          |           | MICROCIRCUIT, DI: DUAL D FLIP-FLOP          | 07263 | 74LS74A         |
| A26U1430      | 156-0720-02 |          |           | MICROCIRCUIT, DI: HEX DRVR, 4 TO2 LINE      | 01295 | SN74LS368       |
| A26U1510      | 156-0388-03 |          |           | MICROCIRCUIT, DI: DUAL D FLIP-FLOP          | 07263 | 74LS74A         |
| 2601520       | 156-0388-03 |          |           | MICROCIRCUIT, DI: DUAL D FLIP-FLOP          | 07263 | 74LS74A         |
| 2601530       | 156-0382-02 |          |           | MICROCIRCUIT, DI: QUAD 2-INP NAND GATE      | 01295 | SN74LS00        |
| .2601610      | 156-0388-03 |          |           | MICROCIRCUIT, DI: DUAL D FLIP-FLOP          | 07263 | 74LS74A         |
| 2601620       | 156~0479-02 |          |           | MICROCIRCUIT, DI:QUAD 2-INP ORGATE          | 01295 | SN74LS32NP3     |
| 2601630       | 156-0381-02 |          |           | MICROCIRCUIT, DI:QUAD 2-INP EXCL OR GATE    | 01295 | SN74LS86        |
| .26U1710      | 156-0481-02 |          |           | MICROCIRCUIT, DI: TRIPLE 3 INP & GATE       | 27014 | DM74LS11NA+     |
| 2601720       | 156-0471-02 |          |           | MICROCIRCUIT, DI: DUAL 4/1 DATA SEL         | 80009 | 156-0471-02     |
| .26U1730      | 156-0388-03 |          |           | MICROCIRCUIT, DI: DUAL D FLIP-FLOP          | 07263 | 74LS74A         |
| 26U1820       | 156-0865-02 |          |           | MICROCIRCUIT, DI: OCTAL D-TYPE FF W/CLEAR   | 01295 | SN74LS273NP3    |
| 2601830       | 156-0388-03 |          |           | MICROCIRCUIT, DI: DUAL D FLIP-FLOP          | 07263 | 74LS74A         |
| 2601900       | 156-0413-02 |          |           | MICROCIRCUIT, DI:QUAD 2-INP SCHMIT TRIG     | 80009 | 156-0413-02     |
| 2601910       | 156-0798-02 |          |           | MICROCIRCUIT, DI: DUAL 14 TO 1 LINE SEL/MUX | 01295 | SN74LS153       |
| 26U1920       | 156-0388-03 |          |           | MICROCIRCUIT, DI: DUAL D FLIP-FLOP          | 07263 | 74LS74A         |
| 2601930       | 156-0798-02 |          |           | MICROCIRCUIT, DI: DUAL 14 TO 1 LINE SEL/MUX | 01295 | SN74LS153       |
| 26U2000       | 156-0412-02 |          |           | MICROCIRCUIT, DI: SYN 4 BIT UP-DOWN CNTR    | 80009 | 156-0412-02     |
| .26U2O3O      | 156-0388-03 |          |           | MICROCIRCUIT, DI: DUAL D FLIP-FLOP          | 07263 | 74LS74A         |
| 26U2100       | 156-0798-02 |          |           | MICROCIRCUIT, DI: DUAL 14 TO 1 LINE SEL/MUX | 01295 | SN74LS153       |
| 26U2130       | 156-0412-02 |          |           | MICROCIRCUIT, DI:SYN 4 BIT UP-DOWN CNTR     | 80009 | 156-0412-02     |
| 2602210       | 156-0172-02 |          |           | MICROCIRCUIT, DI: DUAL RETRIG MONOSTABLE MV | 01295 | SN74123         |
| 2602220       | 156-0383-02 |          |           | MICROCIRCUIT, DI: QUAD 2-INP NOR GATE       | 01295 | SN74LS02        |
| 2602230       | 156-0385-02 |          |           | MICROCIRCUIT, DI: HEX INVERTER              | 01295 | SN74LS04        |
| A26W1920      | 131-0566-00 |          |           | BUS CONDUCTOR: DUMMY RES, 2.375, 22 AWG     | 55210 | L-2007-1        |
| 26W1931       | 131-0566-00 |          |           | BUS CONDUCTOR: DUMMY RES, 2, 375, 22 AWG    | 55210 | L-2007-1        |
|               |             |          |           |                                             |       |                 |

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| Component No.      | Tektronix<br>Part No. | Serial/Model No.<br>Eff Dscont | Name & Description                       | Mfr<br>Code | Mfr Part Number                             |
|--------------------|-----------------------|--------------------------------|------------------------------------------|-------------|---------------------------------------------|
| A27                |                       |                                | CKT BOARD ASSY:M.P.U.                    |             | an in an ann an ann an ann an ann an ann an |
| A27C101            | 283-0203-00           |                                | CAP., FXD, CER DI:0.47UF, 20%, 50V       | 72982       | 8131N075E474M                               |
| A27C102            | 281-0775-00           |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V        | 72982       | 8005D9AABZ5U104M                            |
| A27C103            | 283-0212-00           |                                | CAP., FXD, CER DI: 20F, 20%, 50V         |             | 8141N064Z5U205M                             |
|                    |                       | ¥8010200                       |                                          |             |                                             |
| A27C105            | 281-0620-00           | XB010300                       | CAP., FXD, CER DI:21PF, 1%, 500V         | 72982       |                                             |
| A27C120            | 281-0814-00           |                                | CAP.,FXD,CER DI:100PF,10%,100V           | 04222       | GC70-1-A101K                                |
| A27C200            | 290-0782-00           |                                | CAP., FXD, ELCTLT: 4.7UF, +75-10%, 35V   | 55680       | 35ULA4R7V-T                                 |
| A27C202            | 281-0775-00           |                                | CAP.,FXD,CER DI:0.1UF,20%,50V            |             | 8005D9AABZ5U104M                            |
| A27C210            | 281-0775-00           |                                | CAP.,FXD,CER DI:0.1UF,20%,50V            | 72982       | 8005D9AABZ5U104M                            |
| A27C320            | 281-0775-00           |                                | CAP.,FXD,CER DI:0.1UF,20%,50V            | 72982       | 8005D9AABZ5U104M                            |
| A27C321            | 290-0782-00           |                                | CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V        | 55680       | 35ULA4R7V-T                                 |
| A27C410            | 281-0775-00           |                                | CAP.,FXD,CER DI:0.1UF,20%,50V            | 72982       | 8005D9AABZ5U104M                            |
| A27C510            | 281-0775-00           |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V        | 72982       | 8005D9AABZ5U104M                            |
| A27C600            | 281-0775-00           |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V        | 72982       | 8005D9AABZ5U104M                            |
| A27C610            | 281-0775-00           |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V        | 72982       | 8005D9AABZ5U104M                            |
| A27C620            | 281-0775-00           |                                | CAP., FXD, CER DI:0.10F, 20%, 50V        | 72982       |                                             |
| A27C800            |                       |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V        |             | 8005D9AABZ5U104M                            |
|                    | 281-0775-00           |                                |                                          |             |                                             |
| A27C801            | 281-0775-00           |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V        | 72982       | 8005D9AABZ5U104M                            |
| A27C810            | 281-0775-00           |                                | CAP.,FXD,CER DI:0.1UF,20%,50V            | 72982       | 8005D9AABZ5U104M                            |
| A27C825            | 283-0615-00           |                                | CAP.,FXD,MICA D:33PF,5%,500V             | 00853       | D155E330J0                                  |
| A27C826            | 281-0775-00           |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V        | 72982       | 8005D9AABZ5U104M                            |
| A27C827            | 281-0775-00           |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V        | 72982       | 8005D9AABZ5U104M                            |
| A27C900            | 281-0775-00           |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V        | 72982       | 8005D9AABZ5U104M                            |
| A27C910            | 281-0775-00           |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V        | 72982       |                                             |
| 1070000            | 281 0775 00           |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V        | 72982       | 900500440751110/M                           |
| A27C920            | 281-0775-00           |                                |                                          |             | 8005D9AABZ5U104M                            |
| A27C921            | 290-0782-00           |                                | CAP., FXD, ELCTLT: 4.7UF, +75-10%, 35V   | 55680       | 35ULA4R7V-T                                 |
| A27C922            | 290-0782-00           |                                | CAP., FXD, ELCTLT: 4.7UF, +75-10%, 35V   | 55680       | 35ULA4R7V-T                                 |
| A27C923            | 290-0782-00           |                                | CAP., FXD, ELCTLT: 4.7UF, +75-10%, 35V   | 55680       | 35ULA4R7V-T                                 |
| A27C1200           | 281-0775-00           |                                | CAP.,FXD,CER DI:0.1UF,20%,50V            | 72982       |                                             |
| A27C1210           | 281-0775-00           |                                | CAP.,FXD,CER DI:0.1UF,20%,50V            | 72982       | 8005D9AABZ5U104M                            |
| A27C1310           | 281-0775-00           |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V        | 72982       | 8005D9AABZ5U104M                            |
| A27C1320           | 281-0775-00           |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V        | 72982       | 8005D9AABZ5U104M                            |
| A27L825            | 108-0436-00           |                                | COIL, RF: FIXED, 240NH                   | 80009       | 108-0436-00                                 |
| A27Q100            | 151-0188-03           |                                | TRANSISTOR: SILICON, PNP, SEL            |             | 151-0188-03                                 |
| A27R101            | 315-0101-00           |                                | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W     | 01121       |                                             |
| A27R101<br>A27R102 | 315-0202-00           |                                | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W     |             | CB2025                                      |
| 4070100            |                       |                                |                                          | 01101       |                                             |
| A27R103            | 315-0752-00           |                                | RES., FXD, CMPSN: 7.5K OHM, 5%, 0.25W    |             | CB7525                                      |
| A27R104            | 315-0103-00           |                                | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W     |             | CB1035                                      |
| A27R105            | 315-0512-00           |                                | RES.,FXD,CMPSN:5.1K OHM,5%,0.25W         |             | CB5125                                      |
| A27R106            | 315-0243-00           |                                | RES.,FXD,CMPSN:24K OHM,5%,0.25W          |             | CB2435                                      |
| A27R108            | 315-0102-00           |                                | RES.,FXD,CMPSN:1K OHM,5%,0.25W           |             | CB1025                                      |
| A27R109            | 315-0103-00           |                                | RES.,FXD,CMPSN:10K OHM,5%,0.25W          | 01121       | CB1035                                      |
| A27R301            | 315-0511-00           |                                | RES.,FXD,CMPSN:510 OHM,5%,0.25W          | 01121       | CB5115                                      |
| A27R302            | 315-0511-00           |                                | RES., FXD, CMPSN: 510 OHM, 5%, 0.25W     | 01121       |                                             |
| A27R302            | 315-0511-00           |                                | RES., FXD, CMPSN: 510 OHM, 5%, 0.25W     |             | CB5115                                      |
| A27R304            | 315-0511-00           |                                | RES., FXD, CMPSN: 510 OHM, 5%, 0.25W     | 01121       |                                             |
|                    |                       |                                |                                          | 01121       | CB5115<br>CB5115                            |
| A27R305            | 315-0511-00           | ·                              | RES., FXD, CMPSN: 510 OHM, 5%, 0.25W     |             |                                             |
| A27R306            | 315-0511-00           |                                | RES.,FXD,CMPSN:510 OHM,5%,0.25W          | 01121       | CB5115                                      |
| A27R310            | 307-0445-00           |                                | RES NTWK, FXD, FI:4.7K OHM, 20%, (9) RES | 91637       |                                             |
| A27R401            | 315-0511-00           |                                | RES.,FXD,CMPSN:510 OHM,5%,0.25W          | 01121       | CB5115                                      |
| A27R420            | 307-0445-00           |                                | RES NTWK, FXD, FI:4.7K OHM, 20%, (9) RES | 91637       | MSP10A01-472M                               |
| A27R821            | 315-0100-00           |                                | RES.,FXD,CMPSN:10 OHM,5%,0.25W           | 01121       | CB1005                                      |
| A27R822            | 315-0100-00           |                                | RES., FXD, CMPSN: 10 OHM, 5%, 0.25W      | 01121       | CB1005                                      |
| A27R823            | 315-0100-00           |                                | RES.,FXD,CMPSN:10 OHM,5%,0.25W           | 01121       |                                             |
| A27R824            | 315-0100-00           |                                | RES., FXD, CMPSN: 10 OHM, 5%, 0.25W      | 01121       | CB1005                                      |
| A27R825            | 315-0102-00           |                                | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W      | 01121       |                                             |
| 114 / NUL J        | 515-0102-00           |                                |                                          | 01121       | ~D+VEJ                                      |
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|               | Tektronix   |     | lodel No. |                                               | Mfr   |                 |             |
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| Component No. | Part No.    | Eff | Dscont    | Name & Description                            | Code  | Mfr Part Number |             |
| A27R1000      | 307-0445-00 |     |           | RES NTWK, FXD, FI: 4.7K OHM, 20%, (9) RES     | 91637 | MSP10A01-472M   |             |
| A27R1200      | 307-0445-00 |     |           | RES NTWK, FXD, FI:4.7K OHM, 20%, (9) RES      | 91637 |                 |             |
| A27U110       | 156-0388-03 |     |           | MICROCIRCUIT, DI: DUAL D FLIP-FLOP            | 07263 | 74LS74A         |             |
| A27U120       | 156-1172-01 |     |           | MICROCIRCUIT, DI: DUAL 4 BIT CNTR, BURN IN    | 01295 | SN74LS393       |             |
| A27U200       | 156-0405-00 |     |           | MICROCIRCUIT, DI: DUAL RETRIG MONOSTABLE MV   | 07263 | 9602 (PC OR DC) |             |
| A27U210       | 156-0874-02 |     |           | MICROCIRCUIT, DI:8 BIT ADDRESSABLE LCH        | 80009 | 156-0874-02     |             |
| A27U220       | 156-0386-02 |     |           | MICROCIRCUIT, DI: TRIPLE 3 INP NAND GATE      | 01295 | SN74LS10NP3     |             |
| A27U310       | 156-0916-02 |     |           | MICROCIRCUIT, DI: 8-2 INP 3-STATE BFR, BURN   | 27014 | DM81LS97        |             |
| A27U320       | 156-0388-03 |     |           | MICROCIRCUIT, DI: DUAL D FLIP-FLOP            | 07263 | 74LS74A         |             |
| A27U400       | 156-0479-02 |     |           | MICROCIRCUIT, DI: QUAD 2-INP ORGATE           | 01295 | SN74LS32NP3     |             |
| A27U410       | 156-0916-02 |     |           | MICROCIRCUIT, DI: 8-2 INP 3-STATE BFR, BURN   | 27014 | DM81LS97        |             |
| A27U420       | 156-1172-01 |     |           | MICROCIRCUIT, DI: DUAL 4 BIT CNTR, BURN IN    | 01295 | SN74LS393       |             |
| A27U500       | 156-0916-02 |     |           | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN    | 27014 | DM81LS97        |             |
| A27U510       | 156-0916-02 |     |           | MICROCIRCUIT, DI: 8-2 INP 3-STATE BFR, BURN   | 27014 | DM81LS97        |             |
| A27U520       | 156-0645-02 |     |           | MICROCIRCUIT, DI: SCHMITT-TRIG POS-NAND       | 01295 | SN74LS14        |             |
| A27U600       | 156-0916-02 |     |           | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN    | 27014 | DM81LS97        |             |
| A27U610       | 156-0916-02 |     |           | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN    | 27014 | DM81LS97        |             |
| A27U620       | 156-0916-02 |     |           | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN    | 27014 | DM81LS97        |             |
| A27U700       | 156-0935-00 |     |           | MICROCIRCUIT, DI:MICROPROCESSOR, 16 BIT       | 80009 | 156-0935-00     |             |
| A27U800       | 156-0916-02 |     |           | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN    | 27014 | DM81LS97        |             |
| A27U810       | 156-0916-02 |     |           | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN    | 27014 | DM81LS97        |             |
| A27U900       | 156~0865-02 |     |           | MICROCIRCUIT, DI: OCTAL D-TYPE FF W/CLEAR     | 01295 | SN74LS273NP3    |             |
| A27U910       | 156-0736-02 |     |           | MICROCIRCUIT, DI: BCD TO DECIMAL DCDR         | 80009 | 156-0736-02     |             |
| A27U920       | 156-0993-00 |     |           | MICROCIRCUIT, INTFC: FOUR PH CLOCK GEN/DRIVER | 80009 | 156-0993-00     |             |
| A27U1000      | 156-0480-02 |     |           | MICROCIRCUIT, DI: QUAD 2 INP & GATE           | 01295 | SN74LS08NP3     |             |
| A27U1010      | 156-0736-02 |     |           | MICROCIRCUIT, DI: BCD TO DECIAML DCDR         | 80009 | 156-0736-02     |             |
| A27U1100      | 156-0480-02 |     |           | MICROCIRCUIT, DI: QUAD 2 INP & GATE           | 01295 | SN74LS08NP3     | " man and a |
| A27U1110      | 156-0479-02 |     |           | MICROCIRCUIT, DI:QUAD 2-INP ORGATE            | 01295 | SN74LS32NP3     |             |
| A27U1120      | 156-0720-02 |     |           | MICROCIRCUIT, DI: HEX DRVR, 4 TO2 LINE        | 01295 | SN74LS368       |             |
| A27U1200      | 156-1176-01 |     |           | MICROCIRCUIT, DI:8/3 LINE PRIORITY ENCODER    | 80009 | 156-1176-01     |             |
| A27U1210      | 156-0541-02 |     |           | MICROCIRCUIT, DI: DUAL 2 TO 4 LINE DCDR       | 01295 | SN74LS139NP3    |             |
| A27U1220      | 156-0479-02 |     |           | MICROCIRCUIT, DI: QUAD 2-INP ORGATE           | 01295 | SN74LS32NP3     |             |
| A27U1310      | 156-0874-02 |     |           | MICROCIRCUIT, DI:8 BIT ADDRESSABLE LCH        | 80009 | 156-0874-02     |             |
| A27U1320      | 156-1026-02 |     |           | MICROCIRCUIT, DI: 4/1 LINE DECODER, BURN-IN   | 80009 | 156-1026-02     |             |
| A27U1400      | 156-0469-02 |     |           | MICROCIRCUIT, DI: 3/8 LINE DCDR               | 01295 | SN74LS138NP3    |             |
| A27U1410      | 156-0479-02 |     |           | MICROCIRCUIT, DI: QUAD 2-INP ORGATE           | 01295 | SN74LS32NP3     |             |
| A27Y1020      | 158-0152-00 |     |           | XTAL UNIT,QTZ:48.0 MHZ,0.015%                 | 88407 | 80AX-1232       |             |

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| Component No. | Tektronix<br>Part No.                                                                                          | Serial/Model No.<br>Eff Dscont                        | Name & Description                                                      | Mfr<br>Code | Mfr Part Number                                     |
|---------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------|-------------|-----------------------------------------------------|
| A28           | ۵۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - | <b>1996 1999 I II I</b> | CKT BOARD ASSY:RAM                                                      |             | n de la ser anna anna anna ann an an an an an an an |
| A28C120       | 283-0178-00                                                                                                    |                                                       |                                                                         |             |                                                     |
| A28C140       | 283-0178-00                                                                                                    |                                                       | CAP., FXD, CER DI:0.1UF, +80-20%, 100V                                  | 72982       |                                                     |
|               |                                                                                                                |                                                       | CAP., FXD, CER DI:0.1UF, +80-20%, 100V                                  | 72982       |                                                     |
| A28C150       | 290-0580-00                                                                                                    |                                                       | CAP.,FXD,ELCTLT:0.27UF,20%,50V                                          | 56289       | 196D274X0050HA1                                     |
| A28C251       | 283-0178-00                                                                                                    |                                                       | CAP., FXD, CER DI:0.1UF, +80-20%, 100V                                  | 72982       | 8131N145651 104Z                                    |
| A28C260       | 283-0178-00                                                                                                    |                                                       | CAP., FXD, CER DI:0.1UF, +80-20%, 100V                                  | 72982       | 8131N145651 104Z                                    |
| A28C310       | 283-0178-00                                                                                                    |                                                       | CAP., FXD, CER DI:0.1UF, +80-20%, 100V                                  | 72982       | 8131N145651 104Z                                    |
| A28C330       | 283-0178-00                                                                                                    |                                                       | CAP., FXD, CER DI:0.1UF, +80-20%, 100V                                  |             | 8131N145651 104Z                                    |
| A28C420       | 283-0178-00                                                                                                    |                                                       | CAP., FXD, CER DI:0.1UF, +80-20%, 100V                                  |             | 8131N145651 104Z                                    |
| A28C440       | 283-0178-00                                                                                                    |                                                       | CAP., FXD, CER DI:0.1UF, +80-20%, 100V                                  |             | 8131N145651 104Z                                    |
| A28C460       | 283-0178-00                                                                                                    |                                                       | CAP., FXD, CER DI:0.1UF, +80-20%, 100V                                  | 72902       | 8131N145651 104Z                                    |
| A28C510       | 283-0178-00                                                                                                    |                                                       | CAP., FXD, CER DI:0.1UF, +80-20%, 100V                                  |             | 8131N145651 104Z                                    |
| A28C530       | 283-0178-00                                                                                                    |                                                       | CAP., FXD, CER DI:0.1UF, +80-20%, 100V                                  | 72082       | 012101/5/51 10/2                                    |
| A28C550       | 283-0178-00                                                                                                    |                                                       |                                                                         | 72962       | 8131N145651 104Z                                    |
| A28C620       | 283-0178-00                                                                                                    |                                                       | CAP., FXD, CER DI:0.1UF, +80-20%, 100V                                  | 72982       | 8131N145651 104Z                                    |
|               |                                                                                                                |                                                       | CAP., FXD, CER DI:0.1UF, +80-20%, 100V                                  | 72982       | 8131N145651 104Z                                    |
| A28C640       | 283-0178-00                                                                                                    |                                                       | CAP.,FXD,CER DI:0.1UF,+80-20%,100V                                      | 72982       | 8131N145651 104Z                                    |
| A28C660       | 283-0178-00                                                                                                    |                                                       | CAP.,FXD,CER DI:0.1UF,+80-20%,100V                                      | 72982       | 8131N145651 104Z                                    |
| A28C710       | 283-0178-00                                                                                                    |                                                       | CAP.,FXD,CER DI:0.1UF,+80-20%,100V                                      | 72982       | 8131N145651 104Z                                    |
| A28C730       | 283-0178-00                                                                                                    |                                                       | CAP., FXD, CER DI:0.1UF, +80-20%, 100V                                  | 72987       | 8131N145651 104Z                                    |
| A28C800       | 290-0755-00                                                                                                    |                                                       | CAP., FXD, ELCTLT: 100UF, +50-10%, 10V                                  | 56289       | 502D223                                             |
| A28C820       | 283-0178-00                                                                                                    |                                                       | CAP., FXD, CER DI:0.1UF, +80-20%, 100V                                  |             | 8131N145651 104Z                                    |
| A28C840       | 283-0178-00                                                                                                    |                                                       | CAP., FXD, CER DI:0.1UF, +80-20%, 100V                                  |             |                                                     |
| A28C862       | 283-0178-00                                                                                                    |                                                       |                                                                         |             | 8131N145651 104Z                                    |
| A28CR160      | 152-0141-02                                                                                                    |                                                       | CAP.,FXD,CER DI:0.1UF,+80-20%,100V<br>SEMICOND DEVICE:SILICON,30V,150MA |             | 8131N145651 104Z<br>1N4152R                         |
| 12000000      | 150 01/1 00                                                                                                    |                                                       |                                                                         |             |                                                     |
| A28CR260      | 152-0141-02                                                                                                    |                                                       | SEMICOND DEVICE:SILICON, 30V, 150MA                                     | 01295       | 1N4152R                                             |
| A28Q150       | 151-0190-05                                                                                                    |                                                       | TRANSISTOR: SILICON, NPN                                                | 80009       | 151-0190-05                                         |
| A28Q151       | 151-0190-05                                                                                                    |                                                       | TRANSISTOR: SILICON, NPN                                                | 80009       | 151-0190-05                                         |
| A28Q160       | 151-0190-05                                                                                                    |                                                       | TRANSISTOR: SILICON, NPN                                                | 80009       | 151-0190-05                                         |
| A28Q161       | 151-0302-01                                                                                                    |                                                       | TRANSISTOR: SILICON, NPN, SEL                                           | 80009       | 151-0302-01                                         |
| A28Q162       | 151-0302-01                                                                                                    |                                                       | TRANSISTOR: SILICON, NPN, SEL                                           |             | 151-0302-01                                         |
| A28Q163       | 151-0190-05                                                                                                    |                                                       | TRANSISTOR: SILICON, NPN                                                | 80000       | 151 0100 05                                         |
| A280760       | 151-0625-00                                                                                                    |                                                       |                                                                         | 80009       | 151-0190-05                                         |
| A28Q855       | 151-0188-03                                                                                                    |                                                       | TRANSISTOR: SILICON, PNP                                                | 03508       | D45H11                                              |
| A28Q860       |                                                                                                                |                                                       | TRANSISTOR: SILICON, PNP, SEL                                           | 80009       | 151-0188-03                                         |
|               | 151-0625-00                                                                                                    |                                                       | TRANSISTOR: SILICON, PNP                                                | 03508       | D45H11                                              |
| A28R150       | 315-0203-00                                                                                                    |                                                       | RES.,FXD,CMPSN:20K OHM,5%,0.25W                                         | 01121       | CB2035                                              |
| A28R151       | 315-0303-00                                                                                                    |                                                       | RES.,FXD,CMPSN:30K OHM,5%,0.25W                                         | 01121       | СВ3035                                              |
| A28R160       | 315-0332-00                                                                                                    |                                                       | RES.,FXD,CMPSN:3.3K OHM,5%,0.25W                                        | 01121       | CB3325                                              |
| A28R161       | 315-0122-00                                                                                                    |                                                       | RES., FXD, CMPSN: 1.2K OHM, 5%, 0.25W                                   |             | CB1225                                              |
| A28R162       | 315-0272-00                                                                                                    |                                                       | RES., FXD, CMPSN: 2.7K OHM, 5%, 0.25W                                   |             | CB2725                                              |
| A28R163       | 315-0300-00                                                                                                    |                                                       | RES., FXD, CMPSN: 30 OHM, 5%, 0.25W                                     |             | CB3005                                              |
| A28R164       | 315-0240-00                                                                                                    |                                                       | RES., FXD, CMPSN:24 OHM, 5%, 0.25W                                      |             |                                                     |
| A28R165       | 315-0620-00                                                                                                    |                                                       | RES., FXD, CMPSN: 62 OHM, 5%, 0.25W                                     |             | CB2405<br>CB6205                                    |
| A28R166       | 315-0681-00                                                                                                    |                                                       | DEC BYD CUDCH (00 cm/ cm c cr-                                          |             |                                                     |
|               | 315-0681-00                                                                                                    |                                                       | RES., FXD, CMPSN: 680 OHM, 5%, 0.25W                                    |             | CB6815                                              |
| A28R250       | 315-0622-00                                                                                                    |                                                       | RES.,FXD,CMPSN:6.2K OHM,5%,0.25W                                        | 01121       | CB6225                                              |
| A28R260       | 315-0472-00                                                                                                    |                                                       | RES.,FXD,CMPSN:4.7K OHM,5%,0.25W                                        | 01121       | CB4725                                              |
| A28R750       | 315-0103-00                                                                                                    |                                                       | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W                                    | 01121       | CB1035                                              |
| A28R770       | 301-0471-00                                                                                                    |                                                       | RES., FXD, CMPSN: 470 OHM, 5%, 0.50W                                    |             | EB4715                                              |
| A28R862       | 315-0102-00                                                                                                    |                                                       | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W                                     | 01121       | CB1025                                              |
| A28R865       | 315-0472-00                                                                                                    |                                                       | RES.,FXD,CMPSN:4.7K OHM,5%,0.25W                                        | 01121       | CB4725                                              |
| A28U110       | 156-1323-01                                                                                                    |                                                       |                                                                         |             |                                                     |
|               | 100-1020-01                                                                                                    |                                                       | MICROCIRCUIT,DI:1024 X 4 STATIC RAM<br>(OPTION 2D ONLY)                 | 80009       | 156~1323-01                                         |
| A28U120       | 156-1323-01                                                                                                    |                                                       | MICROCIRCUIT, DI:1024 X 4 STATIC RAM                                    | 80009       | 156-1323-01                                         |
| A28U130       | 156-1323-01                                                                                                    |                                                       | (OPTION 2D ONLY)<br>MICROCIRCUIT,DI:1024 X 4 STATIC RAM                 | 80000       | 156 1202 01                                         |
|               |                                                                                                                |                                                       | (OPTION 2D ONLY)                                                        | 80009       | 156-1323-01                                         |
| A28U140       | 156-1323-01                                                                                                    |                                                       | MICROCIRCUIT,DI:1024 X 4 STATIC RAM<br>(OPTION 2D ONLY)                 | 80009       | 156-1323-01                                         |

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| Component No. | Tektronix<br>Part No. | Serial/Model No.<br>Eff Dscont           | Name & Description                                                               | Mfr<br>Code | Mfr Part Number |
|---------------|-----------------------|------------------------------------------|----------------------------------------------------------------------------------|-------------|-----------------|
| A28U210       | 156-1323-01           | n an ann an a | MICROCIRCUIT, DI: 1024 X 4 STATIC RAM<br>(OPTION 2D ONLY)                        | 80009       | 156-1323-01     |
| A28U220       | 156-1323-01           |                                          | MICROCIRCUIT, DI:1024 X 4 STATIC RAM<br>(OPTION 2D ONLY)                         | 80009       | 156-1323-01     |
| A28U230       | 156-1323-01           |                                          | MICROCIRCUIT, DI:1024 X 4 STATIC RAM<br>(OPTION 2D ONLY)                         | 80009       | 156-1323-01     |
| A28U240       | 156-1323-01           |                                          | MICROCIRCUIT,DI:1024 X 4 STATIC RAM<br>(OPTION 2D ONLY)                          | 80009       | 156-1323-01     |
| A28U250       | 156-0721-02           |                                          | MICROCIRCUIT, DI:QUAD 2-IN NAND SCHMITT TRI                                      | 04713       | SN74LS132NDS    |
| A28U260       | 156-0381-02           |                                          | MICROCIRCUIT, DI:QUAD 2-INP EXCL OR GATE                                         | 01295       |                 |
| A28U310       | 156-1323-01           |                                          | MICROCIRCUIT, DI: 1024 X 4 STATIC RAM                                            | 80009       | 156-1323-01     |
| A28U320       | 156-1323-01           |                                          | MICROCIRCUIT, DI: 1024 X 4 STATIC RAM                                            | 80009       | 156-1323-01     |
| A28U330       | 156-1323-01           |                                          | MICROCIRCUIT, DI:1024 X 4 STATIC RAM                                             | 80009       | 156-1323-01     |
| A28U340       | 156-1323-01           |                                          | MICROCIRCUIT, DI:1024 X 4 STATIC RAM                                             |             | 156-1323-01     |
| A28U350       | 156-0916-02           |                                          | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN                                       | 27014       |                 |
| A28U360       | 156-0916-02           |                                          | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN                                       | 27014       | DM81LS97        |
| A28U410       | 156-1323-01           |                                          | MICROCIRCUIT, DI: 1024 X 4 STATIC RAM                                            | 80009       | 156-1323-01     |
| A28U420       | 156-1323-01           |                                          | MICROCIRCUIT, DI:1024 X 4 STATIC RAM                                             | 80009       | 156-1323-01     |
| A28U430       | 156-1323-01           |                                          | MICROCIRCUIT, DI: 1024 X 4 STATIC RAM                                            | 80009       | 156-1323-01     |
| A28U440       | 156-1323-01           |                                          | MICROCIRCUIT, DI: 1024 X 4 STATIC RAM                                            | 80009       | 156-1323-01     |
| A28U450       | 156-0916-02           |                                          | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN                                       | 27014       |                 |
| A28U460       | 156-0916-02           |                                          | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN                                       | 27014       |                 |
| A28U510       | 156-1323-01           |                                          | MICROCIRCUIT, DI: 1024 X 4 STATIC RAM                                            | 80009       | 156-1323-01     |
| A28U520       | 156-1323-01           |                                          | MICROCIRCUIT, DI:1024 X 4 STATIC RAM                                             | 80009       |                 |
| A28U530       | 156-1323-01           |                                          | MICROCIRCUIT, DI:1024 X 4 STATIC RAM                                             | 80009       | 156-1323-01     |
| A28U540       | 156-1323-01           |                                          | MICROCIRCUIT, DI: 1024 X 4 STATIC RAM                                            |             | 156-1323-01     |
| A28U550       | 156-0481-02           |                                          | MICROCIRCUIT, DI: TRIPLE 3 INP & GATE                                            | 27014       |                 |
| A28U560       | 156-0736-02           |                                          | MICROCIRCUIT, DI: BCD TO DECIMAL DCDR                                            | 80009       | 156-0736-02     |
| A28U610       | 156-1323-01           |                                          | MICROCIRCUIT, DI: 1024 X 4 STATIC RAM                                            | 80009       | 156-1323-01     |
| A28U620       | 156-1323-01           |                                          | MICROCIRCUIT, DI:1024 X 4 STATIC RAM                                             | 80009       | 156-1323-01     |
| A28U630       | 156-1323-01           |                                          | MICROCIRCUIT, DI: 1024 X 4 STATIC RAM                                            | 80009       | 156-1323-01     |
| A28U640       | 156-1323-01           |                                          | MICROCIRCUIT, DI: 1024 X 4 STATIC RAM                                            | 80009       | 156-1323-01     |
| A28U650       | 156-0916-02           |                                          | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN                                       | 27014       | DM81LS97        |
| A28U660       | 156-0720-02           |                                          | MICROCIRCUIT, DI: HEX DRVR, 4 TO2 LINE                                           | 01295       | SN74LS368       |
| A28U710       | 156-1323-01           |                                          | MICROCIRCUIT,DI:1024 X 4 STATIC RAM<br>(OPTION 2D ONLY)                          | 80009       | 156-1323-01     |
|               |                       |                                          |                                                                                  |             |                 |
| A28U720       | 156-1323-01           |                                          | MICROCIRCUIT, DI: 1024 X 4 STATIC RAM<br>(OPTION 2D ONLY)                        | 80009       | 156-1323-01     |
| A28U730       | 156-1323-01           |                                          | MICROCIRCUIT, DI:1024 X 4 STATIC RAM                                             | 80009       | 156-1323-01     |
| A28U740       | 156-1323-01           |                                          | (OPTION 2D ONLY)<br>MICROCIRCUIT,DI:1024 X 4 STATIC RAM<br>(OPTION 2D ONLY)      | 80009       | 156-1323-01     |
| A28U750       | 156-0382-02           | B010100 B010380                          | MICROCIRCUIT, DI: QUAD 2-INP NAND GATE                                           | 01295       | SN74LS00        |
| A28U750       | 156-0030-03           | B010381                                  | MICROCIRCUIT, DI:QUAD 2-INF NAND GATE<br>MICROCIRCUIT, DI:QUAD 2-INFUT NAND GATE | 27014       |                 |
| A28U810       | 156-1323-01           | 5010501                                  | MICROCIRCUIT, DI: 1024 X 4 STATIC RAM                                            | 80009       |                 |
|               |                       |                                          | (OPTION 2D ONLY)                                                                 |             |                 |
| A28U820       | 156-1323-01           |                                          | MICROCIRCUIT, DI:1024 X 4 STATIC RAM<br>(OPTION 2D ONLY)                         | 80009       | 156-1323-01     |
| A28U830       | 156-1323-01           |                                          | MICROCIRCUIT, DI: 1024 X 4 STATIC RAM                                            | 80009       | 156-1323-01     |
| A28U840       | 156-1323-01           |                                          | (OPTION 2D ONLY)<br>MICROCIRCUIT,DI:1024 X 4 STATIC RAM                          | 80009       | 156-1323-01     |
| A28VR870      | 152-0175-01           |                                          | (OPTION 2D ONLY)<br>SEMICOND DEVICE:ZENER,0.4W,5.6V,5%                           | 80009       | 152-0175-01     |
|               |                       |                                          | · · ·                                                                            |             |                 |

| - 1, 1977 Sp. | Component No.        | Tektronix<br>Part No.      | Serial/Model No.<br>Eff Dscont | Name & Description                                                                                                                                                      | Mfr<br>Code | Mfr Part Number                      |
|---------------|----------------------|----------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------------------------------|
|               | A29                  |                            |                                |                                                                                                                                                                         |             |                                      |
|               |                      |                            |                                | CKT BOARD ASSY:DISPLAY                                                                                                                                                  |             | 000 <b>7</b> -0                      |
|               | A29C210<br>A29C230   | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
| a             |                      | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
|               | A29C300              | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       |                                      |
|               | A29C320              | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
|               | A29C330              | 290-0782-00                |                                | CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V                                                                                                                                       | 55680       | 35ULA4R7V-T                          |
|               | A29C410              | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
|               | A29C430              | 281-0775-00                |                                | CAP., FXD, CER DI:0.10F, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
|               | A29C520              | 281-0775-00                |                                | CAP., FXD, CER DI:0.10F, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
|               | A29C701              | 281-0775-00                |                                | CAP., FXD, CER D1:0.10F, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M<br>8005D9AABZ5U104M |
|               | A29C720              | 281-0775-00                |                                | CAP., FXD, CER DI:0.10F, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
|               | A29C810              | 281-0775-00                |                                | CAP., FXD, CER DI:0.10F, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
|               | A290010              | 201 0775-00                |                                | CRI., FXD, CER DI.0.10F, 20%, 90V                                                                                                                                       | 12902       | 500 JD JAAD2 J0 1041                 |
|               | A29C830              | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
|               | A29C900              | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
|               | A29C920              | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
|               | A29C930              | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
|               | A29C1030             | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
|               | A29C1120             | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
|               | 112/01120            | 201 0775 00                |                                | MI., IND, OLK DI. 0.101, 20%, 904                                                                                                                                       | 72902       | 000909111009010411                   |
| 9. m.m.       | A29C1130             | 290-0782-00                |                                | CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V                                                                                                                                       | 55680       | 35ULA4R7V-T                          |
|               | A29C1201             | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
|               | A29C1202             | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
|               | A29C1320             | 281-0815-00                |                                | CAP., FXD, CER DI:0.027UF, 20%, 50V                                                                                                                                     | 72982       | 8005D9AABW5R273M                     |
|               | A29C1321             | 290-0745-00                |                                | CAP., FXD, ELCTLT: 22UF, +50-10%, 25V                                                                                                                                   | 56289       | 502D225                              |
| ~1.0          | A29C1322             | 283-0594-00                |                                | CAP., FXD, MICA D:0.001UF, 1%, 100V                                                                                                                                     | 00853       | D151F102F0                           |
|               |                      |                            |                                | , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , |             |                                      |
|               | A29C1330             | 281-0814-00                |                                | CAP., FXD, CER DI: 100PF, 10%, 100V                                                                                                                                     | 04222       | GC70-1-A101K                         |
|               | A29C1400             | 283-0177-00                |                                | CAP., FXD, CER DI: 1UF, +80-20%, 25V                                                                                                                                    | 56289       | 273C5                                |
| me process    | A29C1401             | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
|               | A29C1410             | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
|               | A29C1411             | 283-0177-00                |                                | CAP., FXD, CER DI: 1UF, +80-20%, 25V                                                                                                                                    | 56289       | 273C5                                |
|               | A29C1500             | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
| va Va         |                      |                            |                                |                                                                                                                                                                         |             |                                      |
|               | A29C1510             | 281-0775-00                |                                | CAP.,FXD,CER DI:0.1UF,20%,50V                                                                                                                                           |             | 8005D9AABZ5U104M                     |
|               | A29C1511             | 283-0260-00                |                                | CAP.,FXD,CER DI:5.6PF,5%,200V                                                                                                                                           |             | 8111B200C0G569C                      |
|               | A29C1512             | 283-0645-00                |                                | CAP.,FXD,MICA D:790PF,1%,100V                                                                                                                                           | 00853       | D151E791F0                           |
|               | A29C1520             | 281-0815-00                |                                | CAP.,FXD,CER DI:0.027UF,20%,50V                                                                                                                                         |             | 8005D9AABW5R273M                     |
|               | A29C1600             | 281-0775-00                |                                | CAP.,FXD,CER DI:0.1UF,20%,50V                                                                                                                                           | 72982       | 8005D9AABZ5U104M                     |
|               | A29C1601             | 283-0752-00                |                                | CAP.,FXD,MICA D:345PF,1%,500V                                                                                                                                           | 00853       | D155E3450F0                          |
|               | 10001(00             | 000 0750 00                |                                |                                                                                                                                                                         | 00050       | D15502/5000                          |
|               | A29C1602             | 283-0752-00                |                                | CAP., FXD, MICA D: 345PF, 1%, 500V                                                                                                                                      |             | D155E3450F0                          |
|               | A29C1610             | 283-0625-00                |                                | CAP., FXD, MICA D: 220PF, 1%, 500V                                                                                                                                      |             | D105F221F0                           |
|               | A29C1611             | 283-0625-00                |                                | CAP., FXD, MICA D: 220PF, 1%, 500V                                                                                                                                      |             | D105F221F0                           |
|               | A29C1612             | 283-0696-00                |                                | CAP., FXD, MICA D:2300PF, 1%, 500V                                                                                                                                      |             | D19-5E232F0                          |
|               | A29C1613             | 283-0696-00                |                                | CAP., FXD, MICA D:2300PF, 1%, 500V                                                                                                                                      |             | D19-5E232F0                          |
|               | A29C1620             | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
| mer           | 10001700             |                            |                                |                                                                                                                                                                         | 70000       | 91110000005600                       |
|               | A29C1700             | 283-0260-00                |                                | CAP., FXD, CER DI: 5.6PF, 5%, 200V                                                                                                                                      | 72982       | 8111B200C0G569C                      |
|               | A29C1710             | 283-0645-00                |                                | CAP., FXD, MICA D: 790PF, 1%, 100V                                                                                                                                      | 00853       | D151E791F0                           |
|               | A29C1720             | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
| urber         | A29C1820             | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8C05D9AABZ5U104M                     |
|               | A29C1900             | 281-0775-00                |                                | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                       | 72982       | 8005D9AABZ5U104M                     |
|               | A29C2010             | 281-0775-00                |                                | CAP.,FXD,CER DI:0.1UF,20%,50V                                                                                                                                           | 72982       | 8005D9AABZ5U104M                     |
|               | A29C2100             | 281-0775-00                |                                | CAP.,FXD,CER DI:0.1UF,20%,50V                                                                                                                                           | 72982       | 8005D9AABZ5U104M                     |
|               | A29C2210             | 281-0797-00                |                                |                                                                                                                                                                         | 72982       | 8035D9AADC0G150K                     |
| 90° )         | A29C2210<br>A29C2300 | 281-0797-00                |                                | CAP., FXD, CER DI: 15PF, 10%, 100V                                                                                                                                      | 00853       | D155E151F0                           |
|               |                      |                            |                                | CAP., FXD, MICA D:150PF, 1%, 500V                                                                                                                                       |             |                                      |
|               | A29C2310             | 283-0629-00<br>283-0769-00 |                                | CAP., FXD, MICA D:62PF, 1%, 500V                                                                                                                                        | 00853       | D105E620F0                           |
|               | A29C2400             |                            |                                | CAP., FXD MICA D:278PF, 1%, 500V                                                                                                                                        | 00853       | D15-5F2780F0                         |
| ΨL4           | A29C2610             | 283-0177-00                |                                | CAP.,FXD,CER DI:1UF,+80-20%,25V                                                                                                                                         | 56289       | 27305                                |
|               | A29C2611             | 281-0788-00                |                                | CAP., FXD, CER DI: 470PF, 10%, 100V                                                                                                                                     | 72982       | 8005H9AADW5R471K                     |
|               | A29C2612             | 285-0685-00                |                                | CAP., FXD, PLSTC:0.0068UF, 10%, 100V                                                                                                                                    | 56289       | 292P68292                            |
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|                        | Tektronix                  | Serial/Model No. |                                                                            | Mfr   |                  |      |
|------------------------|----------------------------|------------------|----------------------------------------------------------------------------|-------|------------------|------|
| Component No.          | Part No.                   | Eff Dscont       | Name & Description                                                         |       | Mfr Part Number  | ***  |
| A29C2620               | 281-0775-00                |                  | CAR EVE CER DI.O LUE 20% FOU                                               |       | 000700           |      |
| A29C2630               | 281-0775-00                |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V                                          |       | 8005D9AABZ5U104M |      |
| A29C2700               |                            |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V                                          |       | 8005D9AABZ5U104M |      |
| A29C2720               | 281-0788-00                |                  | CAP., FXD, CER DI: 470PF, 10%, 100V                                        |       | 8005H9AADW5R471K | -    |
|                        | 281-0810-00                |                  | CAP., FXD, CER DI:5.6PF, 0.5%, 100V                                        |       | 1035D2ADC0G569D  |      |
| A29C2730               | 290-0745-00                |                  | CAP., FXD, ELCTLT: 22UF, +50-10%, 25V                                      | 56289 |                  |      |
| A29C2731               | 290-0745-00                |                  | CAP., FXD, ELCTLT: 22UF, +50-10%, 25V                                      | 56289 | 502D225          |      |
| A29C2830               | 290-0745-00                |                  | CAP.,FXD,ELCTLT:22UF,+50-10%,25V                                           | 56289 | 502D225          | ~    |
| A29C2831               | 290-0745-00                |                  | CAP., FXD, ELCTLT: 22UF, +50-10%, 25V                                      | 56289 | 502D225          |      |
| A29CR1000              | 152-0141-02                |                  | SEMICOND DEVICE: SILICON, 30V, 150MA                                       |       | 1N4152R          |      |
| A29CR1100              | 152-0141-02                |                  | SEMICOND DEVICE: STLICON, 30V, 150MA                                       |       | 1N4152R          |      |
| A29CR1101              | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                                        |       |                  | ~    |
| A29CR1110              | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                                        |       | 1N4152R          |      |
| A29CR1111              | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                                        | 01295 | 1N4152R          |      |
| A29CR1210              | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                                        |       |                  |      |
| A29CR1710              | 152-0075-00                |                  | SEMICOND DEVICE:GE,25V,40MA                                                | 01295 | 1N4152R          |      |
| A29CR1810              | 152-0141-02                |                  | SEMICOND DEVICE.GE, 25V, 40MA                                              | 14433 |                  |      |
| A29CR2130              | 152-0322-00                |                  | SEMICOND DEVICE: SILICON, 30V, 150MA                                       | 01295 | 1N4152R          |      |
| A29CR2130              | 152-0141-02                |                  | SEMICOND DEVICE: SILICON, 15V, HOT CARRIER                                 | 50434 |                  |      |
| A2 70A21 J1            | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                                        | 01295 | 1N4152R          |      |
| A29CR2301              | 152-0322-00                |                  | SEMICOND DEVICE:SILICON, 15V, HOT CARRIER                                  | 50434 | 5082-2672        |      |
| A29CR2332              | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                                        |       | 1N4152R          |      |
| A29CR2430              | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, SOV, 150MA                                        |       |                  |      |
| A29CR2431              | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA<br>SEMICOND DEVICE:SILICON, 30V, 150MA | 01295 | 1N4152R          |      |
| A29CR2433              | 152-0141-02                |                  | SEMICOND DEVICE: SILICON, SUV, ISOMA                                       | 01295 |                  |      |
| A29CR2434              | 152-0141-02                |                  | SEMICOND DEVICE: SILICON, 30V, 150MA                                       | 01295 | 1N4152R          |      |
| 112 )012 4 5 4         | 192 0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                                        | 01295 | 1N4152R          |      |
| A29CR2435              | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                                        | 01295 | 1N4152R          |      |
| A29CR2436              | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                                        | 01295 | 1N4152R          |      |
| A29CR2437              | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                                        | 01295 | 1N4152R          |      |
| A29CR2620              | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        | 07263 | FDH-6012         |      |
| A29CR2621              | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        | 07263 | FDH-6012         |      |
| A29CR2622              | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        | 07263 | FDH-6012         |      |
| A29CR2623              | 152-0333-00                |                  |                                                                            |       |                  |      |
| A29CR2624              |                            |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        | 07263 | FDH-6012         |      |
|                        | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        |       | FDH-6012         |      |
| A29CR2625              | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        | 07263 |                  |      |
| A29CR2626              | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        | 07263 |                  | is.  |
| A29CR2627              | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        |       | FDH-6012         |      |
| A29CR2630              | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        | 07263 | FDH-6012         |      |
| A29CR2631              | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        | 07263 | FDH-6012         |      |
| A29CR2632              | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        | 07263 | FDH-6012         |      |
| A29CR2633              | 152-0333-00                |                  | SEMICOND DEVICE: SILICON, 55V, 200MA                                       | 07263 | FDH-6012         |      |
| A29CR2710              | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                                        |       | 1N4152R          |      |
| A29CR2720              | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        |       | FDH-6012         |      |
| A29CR2721              | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        |       | FDH-6012         | e    |
| A29CR2722              | 152-0333-00                |                  | SEMICOND DEVICE:SILICON,55V,200MA                                          | 07263 | FDH-6012         |      |
| A29CR2723              | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        | 07263 | FDH-6012         |      |
| A29CR2724              | 152-0333-00                |                  | · · ·                                                                      |       |                  |      |
| A29CR2725              | 152-0333-00                |                  | SEMICOND DEVICE: SILICON, 55V, 200MA                                       | 07263 | FDH-6012         |      |
| A29CR2725              |                            |                  | SEMICOND DEVICE: SILICON, 55V, 200MA                                       | 07263 | FDH-6012         |      |
| A29CR2727              | 152-0333-00                |                  | SEMICOND DEVICE: SILICON, 55V, 200MA                                       | 07263 | FDH-6012         |      |
| 112 JUNE / 2 /         | 152-0333-00                |                  | SEMICOND DEVICE:SILICON,55V,200MA                                          | 07263 | FDH-6012         |      |
| A29CR2730              | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        | 07263 | FDH-6012         |      |
| A29CR2731              | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        | 07263 | FDH-6012         | **   |
| A29CR2732              | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        | 07263 | FDH-6012         |      |
| A29CR2733              | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        | 07263 | FDH-6012         |      |
| A29CR2810              | 152-0141-02                |                  | SEMICOND DEVICE:SILICON, 30V, 150MA                                        | 01295 | 1N4152R          |      |
| A29CR2820              | 152-0333-00                |                  | SEMICOND DEVICE:SILICON, 55V, 200MA                                        | 07263 | FDH-6012         | -    |
| 100000000              | 154                        |                  |                                                                            |       |                  |      |
| A29CR2821<br>A29CR2822 | 152-0333-00<br>152-0333-00 |                  | SEMICOND DEVICE: SILICON, 55V, 200MA                                       | 07263 | FDH-6012         | ~~~~ |
|                        |                            |                  | SEMICOND DEVICE:SILICON,55V,200MA                                          | 07263 | FDH-6012         |      |

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| Component No.        | Tektronix<br>Part No.                     | Serial/Model No.<br>Eff Dscont                                                                                 | Name & Description                                                                | Mfr<br>Code    | Mfr Part Number            |
|----------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------|----------------------------|
| A29CR2823            | 152-0333-00                               | angaran uru maran kanan ka | SEMICOND DEVICE:SILICON, 55V, 200MA                                               | 07263          | EDIL 6010                  |
| A29CR2824            | 152-0333-00                               |                                                                                                                | SEMICOND DEVICE:SILICON, 55V, 200MA                                               |                |                            |
| A29CR2830            | 152-0333-00                               |                                                                                                                | SEMICOND DEVICE:SILICON, 55V, 200MA                                               |                | FDH-6012                   |
| A29CR2831            | 152-0333-00                               |                                                                                                                | SEMICOND DEVICE: SILICON, 55V, 200MA                                              | 07263          |                            |
| A29CR2832            |                                           |                                                                                                                | SEMICOND DEVICE:SILICON, 55V, 200MA                                               |                | FDH-6012                   |
|                      | 152-0333-00                               |                                                                                                                | SEMICOND DEVICE: SILICON, 55V, 200MA                                              |                | FDH~6012                   |
| A29L1320             | 108-0245-00                               |                                                                                                                | COIL, RF: 3.9UH                                                                   | 76493          | B6310-1                    |
| A29L1601             | 108-0800-00                               |                                                                                                                | COIL, RF:820MH                                                                    | 71279          | 550-3399-48                |
| A29L1610             | 108-0800-00                               |                                                                                                                | COIL, RF:820MH                                                                    | 71279          | 550-3399-48                |
| A29L1611             | 108-0800-00                               |                                                                                                                | COIL, RF: 820MH                                                                   | 71279          |                            |
| A29L1710             | 108-0800-00                               |                                                                                                                | COIL, RF: 820MH                                                                   | 71279          | 550-3399-48                |
| A29L2630             | 108-0245-00                               |                                                                                                                | COIL, RF: 3.9UH                                                                   |                | B6310-1                    |
| A29L2631             | 108-0245-00                               |                                                                                                                | COIL, RF: 3.9UH                                                                   | 76493          |                            |
| A29L2730             | 108-0245-00                               |                                                                                                                | COIL, RF: 3.9UH                                                                   | 76493          | B6310-1                    |
| A29L2731             | 108-0245-00                               |                                                                                                                | COIL, RF: 3.9UH                                                                   |                |                            |
| A29Q1820             | 151-0188-03                               |                                                                                                                |                                                                                   | 76493          |                            |
| A29Q1830             |                                           |                                                                                                                | TRANSISTOR: SILICON, PNP, SEL                                                     | 80009          |                            |
| •                    | 156-0048-00                               |                                                                                                                | MICROCIRCUIT, LI: FIVE NPN TRANSISTOR ARRAY                                       | 02735          |                            |
| A29Q1930             | 156-0048-00                               |                                                                                                                | MICROCIRCUIT, LI: FIVE NPN TRANSISTOR ARRAY                                       | 02735          | CA3046                     |
| A29Q2030             | 151-0188-03                               |                                                                                                                | TRANSISTOR: SILICON, PNP, SEL                                                     | 80009          | 151-0188-03                |
| A29Q2400             | 151-0190-05                               | B010100 B010175                                                                                                | TRANSISTOR:SILICON, NPN                                                           | 80009          | 151-0190-05                |
| A29Q2400             | 151-0192-03                               | B010176                                                                                                        | TRANSISTOR: SILICON, NPN                                                          | 80009          | 151-0192-03                |
| A29Q2500             | 151-0190-05                               |                                                                                                                | TRANSISTOR: SILICON, NPN                                                          | 80009          |                            |
| A29Q2600             | 151-0190-05                               |                                                                                                                | TRANSISTOR: SILICON, NPN                                                          | 80009          |                            |
| A29Q2601             | 151-0188-03                               |                                                                                                                | TRANSISTOR: SILICON, NPN<br>TRANSISTOR: SILICON, PNP, SEL                         |                | 151-0190-05                |
| A29Q2710             | 151-0232-00                               |                                                                                                                | TRANSISTOR: SILICON, PNP, SEL<br>TRANSISTOR: SILICON, NPN, DUAL                   | 80009<br>80009 | 151-0188-03<br>151-0232-00 |
| A29R100              | 315 0/72 00                               |                                                                                                                |                                                                                   |                |                            |
| A29R700              | 315-0472-00                               |                                                                                                                | RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W                                             |                | CB4725                     |
|                      | 315-0103-00                               |                                                                                                                | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W                                              |                | CB1035                     |
| A29R800              | 315-0244-00                               |                                                                                                                | RES.,FXD,CMPSN:240K OHM,5%,0.25W                                                  | 01121          | CB2445                     |
| A29R801              | 315-0103-00                               |                                                                                                                | RES.,FXD,CMPSN:10K OHM,5%,0.25W                                                   | 01121          | CB1035                     |
| A29R900              | 315-0105-00                               |                                                                                                                | RES., FXD, CMPSN: 1M OHM, 5%, 0.25W                                               | 01121          | CB1055                     |
| A29R901              | 315-0103-00                               |                                                                                                                | RES.,FXD,CMPSN:10K OHM,5%,0.25W                                                   | 01121          | CB1035                     |
| A29R1000             | 315-0623-00                               |                                                                                                                | RES.,FXD,CMPSN:62K OHM,5%,0.25W                                                   | 01121          | СВ6235                     |
| A29R1001             | 315-0514-00                               |                                                                                                                | RES., FXD, CMPSN: 510K OHM, 5%, 0.25W                                             |                | CB5145                     |
| A29R1002             | 321-0289-01                               |                                                                                                                | RES., FXD, FILM: 10K OHM, 0.5%, 0.125W                                            |                | MFF1816G10001D             |
| 29R1004              | 321-0306-00                               |                                                                                                                |                                                                                   |                |                            |
| A29R1005             | 321-0685-00                               |                                                                                                                | RES., FXD, F1LM: 15K OHM, 1%, 0.125W                                              |                | MFF1816G15001F             |
| A29R1100             | 311-1286-00                               |                                                                                                                | RES., FXD, FILM: 30K OHM, 0.5%, 0.125W                                            | 91637          |                            |
| N2 781100            | 511-1280-00                               |                                                                                                                | RES.,VAR,NONWIR:50K OHM,10%,0.5W                                                  | 32997          | 3329W-L58-503              |
| A29R1101             | 321-0289-01                               |                                                                                                                | RES., FXD, FILM: 10K OHM, 0.5%, 0.125W                                            | 91637          | MFF1816G10001D             |
| A29R1102             | 321-0306-00                               |                                                                                                                | RES.,FXD,FILM:15K OHM,1%,0.125W                                                   | 91637          | MFF1816G15001F             |
| A29R1103             | 321-0685-00                               |                                                                                                                | RES., FXD, FILM: 30K OHM, 0.5%, 0.125W                                            | 91637          | MFF1816D30001D             |
| A29R1104             | 321-0280-00                               |                                                                                                                | RES.,FXD,FILM:8.06K OHM,1%,0.125W                                                 | 91637          | MFF1816G80600F             |
| A29R1105             | 315-0912-00                               |                                                                                                                | RES., FXD, CMPSN: 9.1K OHM, 5%, 0.25W                                             | 01121          | CB9125                     |
| A29R1106             | 311-1286~00                               |                                                                                                                | RES.,VAR,NONWIR:50K OHM,10%,0.5W                                                  | 32997          | 3329W-L58-503              |
| A29R1110             | 321-0289-01                               |                                                                                                                | RES.,FXD,FILM:10K OHM,0.5%,0.125W                                                 | 91637          | MFF1816G10001D             |
| A29R1200             | 311-1284-00                               |                                                                                                                | RES., VAR, NONWIR: 20K OHM, 10%, 0.5W                                             | 32997          |                            |
| A29R1201             | 315-0432-00                               |                                                                                                                | RES., FXD, CMPSN: 4.3K OHM, 5%, 0.25W                                             | 01121          | 3329W-L58-203              |
| A29R1202             | 321-0306-00                               |                                                                                                                | RES., FAD, CHESN. 4. SK OHM, 56, 0.25W                                            |                | CB4325                     |
| A29R1203             |                                           |                                                                                                                | RES., FXD, FILM: 15K OHM, 1%, 0.125W                                              |                | MFF1816G15001F             |
|                      | 321-0289-01                               |                                                                                                                | RES., FXD, FILM: 10K OHM, 0.5%, 0.125W                                            |                | MFF1816G10001D             |
| A29R1204             | 315-0101-00                               |                                                                                                                | RES.,FXD,CMPSN:100 OHM,5%,0.25W                                                   | 01121          | CB1015                     |
| A29R1205             | 311-1282-00                               |                                                                                                                | RES.,VAR,NONWIR:5K OHM,10%,0.50W                                                  | 32997          | 3329W-L58-502              |
| A29R1210             | 315-0362-00                               |                                                                                                                | RES., FXD, CMPSN: 3.6K OHM, 5%, 0.25W                                             | 01121          | CB3625                     |
| A29R1211             | 315-0513-00                               |                                                                                                                | RES., FXD, CMPSN: 51K OHM, 5%, 0.25W                                              | 01121          | CB5135                     |
| A29R1300             | 311-1918-00                               |                                                                                                                | RES., VAR, NONWIR: 2K OHM, 10%, 0.50W                                             |                | 72-199-0                   |
|                      | 321-1696-07                               |                                                                                                                | RES., FXD, FILM: 6K OHM, 0.1%, 0.125W                                             |                | CEAE60000B                 |
| A29R1301             |                                           |                                                                                                                | RES., FXD, CMPSN: 4.3K OHM, 5%, 0.25W                                             |                | CB4325                     |
| A29R1301<br>A29R1310 | 315-0432-00                               |                                                                                                                |                                                                                   |                | 004525                     |
|                      |                                           |                                                                                                                |                                                                                   |                |                            |
| A29R1310             | 315-0432-00<br>315-0103-00<br>307-0445-00 |                                                                                                                | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W<br>RES. NTWK, FXD, FI:4.7K OHM, 20%, (9) RES | 01121<br>91637 | CB1035<br>MSP10A01-472M    |

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| Component No.         Part No.         Eff         Decont         Name & Description         Cond Wir Fart Number           A7991131         315-023-00         RES., FZD, CMPRS 776, 011, 78, 77, 79         01121         CE4325           A7991403         315-0452-00         RES., FZD, CMPRS 776, 014, 78, 75, 79         0121         CE4325           A7991403         315-0457-00         RES., FZD, CMPRS 77, 014, 725, 01254         91633         MF718160270010           A7991404         315-0477-00         RES., FZD, CMPS 74, 74, 70         91633         MF718160270010           A7991510         315-0477-00         RES., FZD, CMPS 74, 74, 70         91633         MF718160270010           A7991510         315-0472-00         RES., FZD, CMPS 74, 74, 74, 75, 74, 74         01121         CP4725           A7991510         315-0472-00         RES., FZD, CMPS 74, 74, 74, 75, 74, 75, 74         01121         CP4725           A7991500         315-0472-00         RES., FZD, CMPS 74, 74, 74, 75, 74, 75, 74, 75         91637         MF718160270010           A7991501         315-0472-00         RES., FZD, CMPS 74, 74, 74, 75, 74, 75, 74, 75, 74, 74, 74, 74, 74, 74, 74, 74, 74, 74                                                                                                                                                                                                                                                                                                                                  |               | Tektronix   | Serial/Model No. |                                         | Mfr   |                 |                |
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| Argeladon         315-0432-00         RES., FED. (DEFS.H., A. R. ORK, S.S., 0.259         91121         CHA125           Argeladon         321-1635-03         RES., FED., FILH: 3ZE ORK, 0.253, 0.1259         91637         MFFIESD27001C           Argeladon         315-001-00         RES., FED., FILH: 3ZE ORK, 0.253, 0.1259         91637         MFFIESD27001C           Argeladon         315-002-00         RES., FED., FULL, 3ZE ORK, 0.254, 0.1254         91637         MFFIESD27001C           Argeladon         315-042-00         RES., FED., CONSIG. 4.7, NOR, 53, 0.254         01121         CHA725           Argeladon         315-042-00         RES., FED., CONSIG. 4.7, NOR, 53, 0.254         01121         CHA725           Argeladon         315-042-00         RES., FED., CONSIG. 4.7, NOR, 53, 0.254         01121         CHA725           Argeladon         SES., FED., FILM. CONK, ORK, 13, 0.1254         91637         MFFIESC00000C           Argeladon         SES., FED., FILM. CONK, ORK, 13, 0.1254         91637         MFFIESC00000C           Argeladon         311-0256-00         RES., FED., FILM. CONK, ORK, 13, 0.1254         91637         MFFIESC00000C           Argeladon         311-0256-00         RES., FED., FULM. CONK, 0.253, 0.1254         91637         MFFIESC0000C           Argeladon         311-0256-00         RES., FE                                                                                                                                                                  | Component No. | Part No.    | Eff Dscont       | Name & Description                      | Code  | Mfr Part Number |                |
| A2981403         321-1656-03         RES., FXD, PTLN:ZZ, CHH, 0, 253, 0, 125W         91637         MFT816027001C           A2981404         331-1656-03         RES., FXD, PTLN:ZZ, CHH, 0, 253, 0, 125W         91637         MFT816027001C           A2981501         315-0427-00         RES., FXD, CMPSN, 100 OHK, 52, 0, 25W         91637         MFT816027001C           A2981510         315-0427-00         RES., FXD, CMPSN, 44, TC OHK, 55, 0, 25W         01121         C48225           A2981511         315-0427-00         RES., FXD, CMPSN, 44, TC OHK, 55, 0, 25W         01121         C48225           A2981512         310-0247-00         RES., FXD, CMPSN, 44, TC OHK, 55, 0, 125W         91637         MFT816027000C           A2981520         310-0045-00         RES., FXD, PTLN: XZ OW, 05, 0, 253, 0, 125W         91637         MFT816027000C           A2981520         310-0045-00         RES., FXD, FTLN: XZ OW, 05, 0, 253, 0, 125W         91637         MFT81602700C           A2981501         310-0445-00         RES., FXD, FTLN: XZ OW, 05, 0, 253, 0, 125W         91637         MFT81602700C           A2981601         311-0727-00         RES., FXD, FTLN: XZ OW, 05, 25, 0, 125W         91637         MFT81602700C           A2981601         311-1286-00         RES., FXD, FTLN: 7Z OWH, 05, 0, 0, 253, 0, 125W         91637         MFT81602000C                                                                                                                                                           | A29R1331      | 315-0203-00 |                  | RES., FXD, CMPSN: 20K OHM, 5%, 0.25W    | 01121 | CB2035          |                |
| A2981403         321-1656-03         RES., FXD, F1L:3272, OHP, 0.253, 0.1253         91637         MFE1816027001C           A2981404         313-1656-03         RES., FXD, F1L:327, OHP, 0.253, 0.1254         91637         MFE1816027001C           A2981410         313-1637-03         RES., FXD, CMPSN, 100 OMR, 53, 0.254         91637         MFE1816027001C           A2981501         315-0437-00         RES., FXD, CMPSN, 4.7, OMR, 53, 0.254         01121         C64725           A2981511         311-0248-00         RES., FXD, CMPSN, 4.3, CMPS, 54, 0.254         91637         MFF1816027001C           A2981512         311-0248-00         RES., FXD, CMPSN, 4.3, CMP, 53, 0.1254         91637         MFF1816027000C           A2981520         307-0445-00         RES., FXD, F114: X, XM, OMR, 520, .259         91637         MFF1816027000C           A2981501         312-0456-03         RES., FXD, F114: X, XM, OMR, 520, .253         91637         MFF181602700C           A2981601         311-027-00         RES., FXD, F114: X, XM, OMR, 520, .254         91637         MFF181602700C           A2981610         321-056-03         RES., FXD, F114: X, XM, MR, 132, .259         91637         MFF181602700C           A2981610         321-027-00         RES., FXD, F114: X, XM, MN, 132, .259         91637         MFF181602700C           A298161                                                                                                                                                                  | A29R1400      | 315-0432-00 |                  | RES., FXD, CMPSN: 4.3K OHM, 5%, 0.25W   | 01121 | CB4325          |                |
| A2981100         315-0101-00         RES., FXD_CMENN: 100 ORM, 52, 0.254         01121         CR1015           A2981500         311-054-72-00         RES., FXD_CMENN: 100 ORM, 52, 0.254         01121         CR425           A2981501         312-0248-00         RES., FXD_CMENN: 100 ORM, 52, 0.254         01121         CR425           A2981511         312-0248-00         RES., FXD_CMENN: 100 ORM, 52, 0.254         01121         CR425           A2981512         312-0248-00         RES., FXD_FUN: XA: OWN, 0.255, 0.1254         91637         MFF1816502000C           A2981513         321-0268-00         RES., FXD, FUN: XA: OWN, 0.255, 0.1254         91637         MFF181650000C           A2981503         307-0445-00         RES. FXD, FUN: X, OWN, 0.255, 0.1254         91637         MFF1816502000C           A2981500         311-165-03         RES., FXD, FUN: X, 32C OWN, 12, 0.1254         91637         MFF1816502000C           A2981600         311-1266-03         RES., FXD, FUN: X, 32C OWN, 12, 0.1254         91637         MFF18165020000C           A2981601         311-1278-00         RES., FXD, FUN: X, 32C OWN, 12, 0.574         91637         MFF18165020000C           A2981602         311-1278-00         RES., FXD, FUN: X, 32C OWN, 12, 0.574         91637         MFF18165020000C           A2981620         311-1278-00                                                                                                                                                                           | A29R1403      | 321-1656-03 |                  |                                         | 91637 | MFF1816D27001C  |                |
| A2981500         321-1656-03         RES., FXD, FLUX:27C ONN, 0.223, 0.125W         91637         MTF1816027001C           A2981501         315-0472-00         RES., FXD, CMTSK: 4.7K, ONN, 52, 0.25W         91637         MTF1816027001C           A2981510         315-0432-00         RES., FXD, CMTSK: 4.7K, ONN, 52, 0.25W         91637         MTF1816027000F           A2981512         317-0222-03         RES., FXD, FUNIXK, ONN, 0.253, 0.125W         91637         MTF1816020000C           A2981520         307-0445-00         RES., FXD, FUNIXK, ONN, 0.253, 0.125W         91637         MSF1816020001C           A2981500         312-0626-03         RES., FXD, FUNIX, FX, ONN, 0.253, 0.125W         91637         MSF1816027001C           A2981601         312-0427-00         RES., FXD, FUNIX, FX, ONN, 0.253, 0.125W         91637         MSF1816027001C           A2981601         312-0227-03         RES., FXD, FUNIX-1X, CONN, 152, 0.125W         91637         MFF1816027001C           A2981620         311-1286-00         RES., FXD, FUNIX-1X, CONN, 152, 0.125W         91637         MFF1816027001C           A2981620         311-1286-00         RES., FXD, FUNIX-1X, CONN, 152, 0.125W         91637         MFF1816027001C           A2981620         311-1286-00         RES., FXD, FUNIX-1X, CONN, 152, 0.125W         91637         MFF1816027000C <tr< td=""><td>A29R1404</td><td>321-1656-03</td><td></td><td>RES., FXD, FILM: 27K OHM, 0.25%, 0.125W</td><td>91637</td><td>MFF1816D27001C</td><td></td></tr<> | A29R1404      | 321-1656-03 |                  | RES., FXD, FILM: 27K OHM, 0.25%, 0.125W | 91637 | MFF1816D27001C  |                |
| A2981500         321-1656-03         RES., FXD, FLUX:27C ONN, 0.223, 0.125W         91637         MTF1816027001C           A2981501         315-0472-00         RES., FXD, CMTSK: 4.7K, ONN, 52, 0.25W         91637         MTF1816027001C           A2981510         315-0432-00         RES., FXD, CMTSK: 4.7K, ONN, 52, 0.25W         91637         MTF1816027000F           A2981512         317-0222-03         RES., FXD, FUNIXK, ONN, 0.253, 0.125W         91637         MTF1816020000C           A2981520         307-0445-00         RES., FXD, FUNIXK, ONN, 0.253, 0.125W         91637         MSF1816020001C           A2981500         312-0626-03         RES., FXD, FUNIX, FX, ONN, 0.253, 0.125W         91637         MSF1816027001C           A2981601         312-0427-00         RES., FXD, FUNIX, FX, ONN, 0.253, 0.125W         91637         MSF1816027001C           A2981601         312-0227-03         RES., FXD, FUNIX-1X, CONN, 152, 0.125W         91637         MFF1816027001C           A2981620         311-1286-00         RES., FXD, FUNIX-1X, CONN, 152, 0.125W         91637         MFF1816027001C           A2981620         311-1286-00         RES., FXD, FUNIX-1X, CONN, 152, 0.125W         91637         MFF1816027001C           A2981620         311-1286-00         RES., FXD, FUNIX-1X, CONN, 152, 0.125W         91637         MFF1816027000C <tr< td=""><td>A29R1410</td><td>315-0101-00</td><td></td><td>RES., FXD, CMPSN: 100 OHM, 5%, 0.25W</td><td>01121</td><td>CB1015</td><td></td></tr<>            | A29R1410      | 315-0101-00 |                  | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W    | 01121 | CB1015          |                |
| A2981510         315-0432-00         RES., FXD, GMNSH, 4. 36 OHK, 5X, 0.25W         01121         CF8425           A2981511         321-0222-03         RES., FXD, FILM: 3X, ORM, 12, 0.125W         91637         MF781663400P           A2981512         321-0222-03         RES., FXD, FILM: 3X, ORM, 10, 25X, 0.125W         91637         MF71816663400P           A2981510         307-0445-00         RES., FXD, FILM: 5X, ORM, 0.25X, 0.125W         91637         MF71816664400P           A2981500         307-0445-00         RES., FXD, FILM: 5X, ORM, 0.25X, 0.125W         91637         MF7181662400P           A2981600         311-0155-03         RES., FXD, ORMSN, 4X, ORMS, 37, 0.25W         01121         CB7255           A2981601         321-0225-00         RES., FXD, ORMSN, 4X, ORMS, 37, 0.25W         01121         CB7255           A2981603         311-1286-00         RES., FXD, ORMSN, 4X, ORM, 53, 0.125W         91637         MF71816624300P           A2981603         311-1286-00         RES., FXD, ORMSN, 4X, ORM, 107, 0.5W         91637         MF71816624300P           A2981603         311-1286-00         RES., FXD, FILM: 4X, ORM, 0.15X, 0.15W         91637         MF71816624300P           A2981623         311-0128-00         RES., FXD, FILM: 100, 0.15W         91637         MF71816664300P           A2981623         31                                                                                                                                                                           | A29R1500      | 321-1656-03 |                  |                                         | 91637 | MFF1816D27001C  |                |
| A2981511         321-0228-00         RES., FXD, FILM: 3, 74C, OHM, 12, 0, 125W         91637         MFT1816637400F           A2981513         321-0228-00         RES., FXD, FILM: 5, OKR (0), 253, 0, 125W         91637         MFT1816660400F           A2981530         307-0463-00         RES., FXD, FILM: 5, OKR (0), 253, 0, 125W         91637         MST10401-472H           A2981530         307-0463-00         RES., FXD, FILM: 7K, ORM, 203, (9), RES         91637         MST10401-472H           A2981500         311-0254-00         RES., FXD, FILM: 7K, ORM, 203, (9), RES         91637         MST10401-472H           A2981600         311-0254-00         RES., FXD, FILM: 7K, ORM, 203, C53, 0, 125W         91637         MFT816643200F           A2981601         311-1278-00         RES., FXD, FILM: 4, 20K, ORM, 103, 0, 5W         3297         33394-158-503           A2981620         311-1286-00         RES., FXD, FILM: 4, 20K, ORM, 103, 0, 5W         3297         33394-158-503           A2981624         321-0228-00         RES., FXD, FILM: 13K, ORM, 103, 0, 15W         91637         MFT8186020000C           A2981625         311-1286-00         RES., FXD, FILM: 13K, ORM, 13, 0, 125W         91637         MFT818616000F           A2981624         311-028-00         RES., FXD, FILM: 14K, ORM, 13, 0, 125W         91637         MFT8181616000F                                                                                                                                                       | A29R1501      | 315-0472-00 |                  | RES.,FXD,CMPSN:4.7K OHM,5%,0.25W        | 01121 | CB4725          |                |
| argenisiz         izi-ozzz-oi         RES. FEW, FILM: 2K OHM, 0.25%, 0.125W         91637         MFP1816020000C           Argenisiz         Sizi-ozza-oi         RES. FEW, FILM: 6A OK OHM, 1X, 0.125W         91637         MFP1816020000C           Argenisiz         Sizi-ozza-oi         RES. NTWK, FKD, FIL-4, 7K, OHM, 202, (9) RES         91637         MFP1816020000C           Argenisiz         Sizi-ozza-oi         RES. NTWK, FKD, FIL-4, 7K, OHM, 202, (9) RES         91637         MFP181602000C           Argenisoi         Sizi-ozza-oi         RES. NTWK, FKD, FIL-4, 7K, OHM, 202, (9) RES         91637         MFP181602000C           Argenisoi         Sizi-ozza-oi         RES. FKD, OFNEN - 7K OHM, 530, 0.25W         01121         CB-2723           Argenisoi         Sizi-ozza-oi         RES. FKD, OFNEN - 7K OHM, 530, 0.25W         91637         MFP1816020000C           Argenisoi         Sizi-ozza-oi         RES. FKD, OFNEN - 7K OHM, 530, 0.25W         91637         MFP1816020000C           Argenisoi         Sizi-ozza-oi         RES. FKD, OFNEN - 7K OHM, 500, 014, 12, 0.12W         91637         MFP1816020000C           Argenisoi         Sizi-ozza-oi         RES. FKD, FTLM: 7K OHM, 12, 0.12W         91637         MFP1816020000C           Argenisoi         Sizi-ozza-oi         RES. FKD, FTLM: 7K OHM, 12, 0.12W         91637         MFP1816010000C                                                                                                                                              | A29R1510      | 315-0432-00 |                  | RES., FXD, CMPSN: 4.3K OHM, 5%, 0.25W   | 01121 | CB4325          |                |
| A2981513         321-0268-00         RES., FXD, FILM: 6, OLC OMM, 1X, 0, 125W         91637         MFT 815660400F           A2981520         307-0445-00         RES. NTWK, FXD, FI:4, 7K, OHN, 202, (9) RES         91637         MSP10A01-472H           A2981530         307-0445-00         RES. NTWK, FXD, FI:4, 7K, OHN, 202, (9) RES         91637         MSP110A01-472H           A2981600         315-0427-00         RES., FXD, FILM: 27K, OHN, 202, (19) RES         91637         MSP116027001C           A2981601         315-0427-00         RES., FXD, OFTSN, 7, 5K OMN, 1X, 0, 125W         91637         MSP116027001C           A2981601         311-1286-00         RES., FXD, FILM: 2K OMN, 0, 5K, 0, 125W         91637         MSP18160200000C           A2981601         311-1278-00         RES., FXD, FILM: 1K, SO OMN, 107, 0, 5W         32997         33394-158-251           A2981605         311-1278-00         RES., FXD, FILM: 16, RO OMN, 132, 0, 125W         91637         MF1816020000C           A2981605         321-0219-00         RES., FXD, FILM: 16, RO OMN, 132, 0, 125W         91637         MF181602000F           A2981605         321-0219-00         RES., FXD, FILM: 20, OMN, 13, 0, 125W         91637         MF18160100F           A2981605         321-0222-03         RES., FXD, FILM: 20, OMN, 13, 0, 125W         91637         MF18160100F                                                                                                                                                       | A29R1511      | 321-0248-00 |                  | RES., FXD, FILM: 3.74K OHM, 1%, 0.125W  | 91637 | MFF1816G37400F  |                |
| AZ9R1520         307-0445-00         RES         NTWR, PXD, F1:4. 7K OHM, 207, (9)         RES         91637         NSP10A01-472M           AZ9R1500         321-1656-03         RES         NTWR, PXD, F1:4. 7K OHM, 207, (9)         RES         91637         MSP10A01-472M           AZ9R1601         315-0472-00         RES., FXD, CHMN, 47K OHM, 237, 0.125W         91637         MSP10A01-472M           AZ9R1602         315-0572-00         RES., FXD, CHMN, 4.7K OHM, 237, 0.25W         01121         C64725           AZ9R1603         321-0554-00         RES., FXD, CHMN, 7.5K OHM, 52, 0.25W         91637         MFF18166220000           AZ9R1603         321-0522-00         RES., FXD, CHMN, 4.3K OHM, 12, 0.125W         91637         MFF18166220000           AZ9R1625         311-1286-00         RES., FXD, FLM: 1.6K OHM, 12, 0.15W         32997         32994-158-531           AZ9R1628         321-0641-00         RES., FXD, FLM: 1.6K OHM, 12, 0.12SW         91637         MFF1816618002F           AZ9R1631         321-0126-00         RES., FXD, FLM: 1.6K OHM, 12, 0.12SW         91637         MFF1816618002F           AZ9R1701         321-0126-00         RES., FXD, FLM: 200 OHM, 12, 0.12SW         91637         MFF18166200006F           AZ9R1703         321-0126-00         RES., FXD, FLM: 1.6K OHM, 12, 0.12SW         91637                                                                                                                                                                              | A29R1512      | 321-0222-03 |                  | RES., FXD, FILM: 2K OHM, 0.25%, 0.125W  | 91637 | MFF1816D20000C  |                |
| Azgri 30         307-043-00         RES         NTW, XD, FI-4, XD, MH, Q2, (4)         RES         91637         MSP10A01-472M           A2981600         315-0472-00         RES         NTW, XD, YD, FI-4, XD, MH, D, 252, 0, 125W         91637         MSP10A01-472M           A2981601         315-0472-00         RES         NTW, XD, YD, CMNS, 7, 0, 25W         91121         C64725           A2981602         315-0752-00         RES         NTW, XD, YD, CMNS, 7, 0, 125W         91137         MFP1816042000           A2981601         321-0252-00         RES         NTW, IX, ND, ML, 32K (MH, J2, 0, 125W         91637         MFP1816042000           A2981620         311-1286-00         RES         NA, NOWH, IX, 20, (MH, J0, 5, 5M         32997         3329-158-5031           A2981631         311-1286-00         RES         NA, NOWH, IX, 20, CMH, 107, 0, 5M         31617         MFP18166120000F           A2981630         311-0126-00         RES         NES         NES <td>A29R1513</td> <td>321-0268-00</td> <td></td> <td>RES.,FXD,FILM:6.04K OHM,1%,0.125W</td> <td>91637</td> <td>MFF1816G60400F</td> <td></td>                                                                                                     | A29R1513      | 321-0268-00 |                  | RES.,FXD,FILM:6.04K OHM,1%,0.125W       | 91637 | MFF1816G60400F  |                |
| A2981600         321-655-03         RES., FXD, FLM-27K, OHM, 0.752, 0.125W         91637         MFF1816027001C           A2981601         315-0732-00         RES., FXD, OMPS4-7, KO, MM, S2, 0.25W         01121         C&7525           A2981601         321-0232-03         RES., FXD, OMPS4-7, XO, MM, S2, 0.25W         01121         C&7525           A2981601         321-0232-03         RES., FXD, FILM-32K, OHM, 0.253, 0.125W         91637         MFF1816C43200F           A2981620         311-1286-00         RES., VAR, NOWIR:50K, OHM, 107, 0.5W         32997         33294-158-531           A2981621         311-0128-00         RES., VAR, NOWIR:50K, OHM, 107, 0.5W         32997         33294-158-531           A2981623         321-0541-00         RES., FXD, FILM: 87X OHM, 12, 0.125W         91637         MFF1816C18000F           A2981635         321-0126-00         RES., FXD, FILM: 18K OHM, 12, 0.125W         91637         MFF1816C18000F           A2981701         321-0126-00         RES., FXD, FILM: 200 OHM, 13, 0.125W         91637         MFF1816C30000F           A2981703         321-0126-00         RES., FXD, FILM: 200 OHM, 13, 0.125W         91637         MFF1816C30000F           A2981703         321-0126-00         RES., FXD, FILM: 200 OHM, 13, 0.125W         91637         MFF1816C30000F           A2981703                                                                                                                                                                                | A29R1520      | 307-0445-00 |                  | RES NTWK,FXD,FI:4.7K OHM,20%,(9) RES    | 91637 | MSP10A01-472M   |                |
| 113-0472-00         RES., FXD, CMPSN: 4.7, K OFM, 53, 0.25W         01121         CE4725           42981.602         315-0472-00         RES., FXD, CMPSN: 7.5, K OHM, 53, 0.25W         01121         CE4725           42981.603         321-0224-00         RES., FXD, FULM: 4, 32K OHM, 13, 0.125W         91637         MFF1816520000C           A2981.610         311-1286-00         RES., FXD, CMPSN: 55K OHM, 103, 0.5W         32997         3329W-158-503           A2981.620         311-1278-00         RES., VAR, NOMVIR: 50K OHM, 103, 0.5W         32997         3329W-158-503           A2981.625         321-022-00         RES., VAR, NOMVIR: 50K OHM, 103, 0.5W         32997         3329W-158-503           A2981.626         321-026-00         RES., FXD, FULM: 1, 8K OHH, 12, 0.125W         91637         MFF1816618700P           A2981.633         321-0126-00         RES., FXD, FULM: 1, 8K OHH, 12, 0.125W         91637         MFF181660200R0P           42981.631         321-0126-00         RES., FXD, FULM: 1200         91637         MFF181660200R0P           42981.631         321-0126-00         RES., FXD, FULM: 1200         91637         MFF181660200R0P           42981.633         321-0126-00         RES., FXD, FULM: 200         91637         MFF1816020000C           42981.703         321-0127-00         RES., FXD, FULM: 12                                                                                                                                                                           | A29R1530      | 307-0445-00 |                  | RES NTWK,FXD,FI:4.7K OHM,20%,(9) RES    | 91637 | MSP10A01-472M   |                |
| 12981602         113-0752-00         RES., FXD, CMTSN: 7, 5K, ORM, 5Z, 0, 25W         01121         C67525           A2981601         321-0222-03         RES., FXD, FTLM: 4, 32K, OMM, 1Z, 0, 125W         91637         MFF18166320000C           A2981610         321-0222-03         RES., FXD, FTLM: 2K, OHM, 0, 25X, 0, 125W         91637         MFF18166320000C           A2981620         311-1286-00         RES., VAR, NOMTR: 50K OHM, 10X, 0, 5W         32997         3329M-158-503           A2981621         311-1286-00         RES., VAR, NOMTR: 50K OHM, 10X, 0, 5W         32997         3329M-158-503           A2981625         321-0661-00         RES., FXD, FTLM: 1, 8X, OHM, 1X, 0, 125W         91637         MFF1816618000P           A2981635         321-0126-00         RES., FXD, FTLM: 1, 8X, OHM, 1X, 0, 125W         91637         MFF1816618000P           A2981701         321-022-03         RES., FXD, FTLM: 1200         0HL, 1X, 0, 125W         91637         MFF181662000R0P           A2981701         321-022-03         RES., FXD, FTLM: 200         0HL, 12, 0, 125W         91637         MFF181662000R0P           A2981702         311-128-00         RES., FXD, FTLM: 200         0HL, 12, 0, 125W         91637         MFF18162000R0C           A2981703         321-00126-00         RES., FXD, FTLM: 2KO 0HN, 02, 0, 55W         73138                                                                                                                                                                  | A29R1600      | 321-1656-03 |                  | RES.,FXD,FILM:27K OHM,0.25%,0.125W      | 91637 | MFF1816D27001C  |                |
| A2981603         321-0254-00         RES., FXD, FILM:4.32K OHM, 17, 0.125W         91637         MFF1816632000C           A2981610         321-0222-03         RES., FXD, FILM:2K OHM, 0.257, 0.125W         91637         MFF1816032000C           A2981621         311-1278-00         RES., VAR, NOWNER:50C OHM, 107, 0.5W         32997         3329W-158-503           A2981626         321-0219-00         RES., VAR, NOWNER:50C OHM, 107, 0.5W         32997         3329W-158-503           A2981631         321-0320-00         RES., FXD, FILM:1, 8K OHM, 17, 0.125W         91637         MFF1816618700P           A2981633         321-0320-00         RES., FXD, FILM:1, 8K OHM, 17, 0.125W         91637         MFF181662000P           A2981633         321-0126-00         RES., FXD, FILM:200 OHM, 17, 0.125W         91637         MFF181662000P           A2981700         311-1240-00         RES., FXD, FILM:200 OHM, 17, 0.125W         91637         MFF1816620000C           A2981701         321-0222-03         RES., FXD, FILM:200 OHM, 17, 0.125W         91637         MFF1816620000C           A2981702         321-0222-03         RES., FXD, FILM:200 OHM, 17, 0.125W         91637         MFF1816020000C           A2981703         321-0220-00         RES., FXD, FILM:12 KO HM, 0.257, 0.125W         91637         MFF1816015000P           A2981723 <td>A29R1601</td> <td>315-0472-00</td> <td></td> <td>RES.,FXD,CMPSN:4.7K OHM,5%,0.25W</td> <td></td> <td></td> <td></td>                                            | A29R1601      | 315-0472-00 |                  | RES.,FXD,CMPSN:4.7K OHM,5%,0.25W        |       |                 |                |
| A29R1610         321-0222-03         RES., FXD, FILM: 2K OHM, 0.252, 0.125W         91637         NEP1816020000C           A29R161         311-1286-00         RES., VAR, NOWNIR: 50K OHM, 102, 0.5W         32997         33294-158-503           A29R1623         311-1286-00         RES., VAR, NOWNIR: 50K OHM, 102, 0.5W         32997         33294-158-503           A29R1626         321-0219-00         RES., VAR, NOWNIR: 50K OHM, 12, 0.125W         91637         MFF18166118000F           A29R1628         321-0392-00         RES., FXD, FILM: 1 RX OHM, 12, 0.125W         91637         MFF18166118002F           A29R1631         321-0126-00         RES., FXD, FILM: 200 OHM, 12, 0.125W         91637         MFF18166210802F           A29R1631         321-0126-00         RES., FXD, FILM: 200 OHM, 12, 0.125W         91637         MFF18166210802F           A29R1701         331-0226-03         RES., FXD, FILM: 200 OHM, 12, 0.125W         91637         MFF1816020000C           A29R1702         321-0220-03         RES., FXD, FILM: 200 OHM, 12, 0.125W         91637         MFF1816020000C           A29R171         321-0124-00         RES., FXD, FILM: 200 OHM, 12, 0.125W         91637         MFF181602000C           A29R1723         321-0219-00         RES., FXD, FILM: 18, 7K         A110, 12, 5W         91637         MFF1816018000F                                                                                                                                                                         | A29R1602      | 315-0752-00 |                  |                                         |       |                 |                |
| Additional         Additional         Additional         Additional         Additional           Additional         Additional         Additional         Additional         Additional         Additional         Additional           Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additional         Additiona         Additiona         Additio                                                                                                                                                                                                  | A29R1603      | 321-0254-00 |                  |                                         |       |                 |                |
| A2981621       311-1278-00       RES., VAA, NOWIR 1250, OHM, 102, 0.5W       32997       3329W-L58-501         A2981625       311-1278-00       RES., VAA, NOWIR 1250, OHM, 102, 0.5W       3297       3329W-L58-503         A2981636       321-064-00       RES., YAA, NOWIR 150X, OHM, 12, 0.125W       91637       MFF1816G18000F         A2981631       321-0126-00       RES., FXD, FILM: 18 KOHM, 12, 0.125W       91637       MFF1816G18000F         A2981633       321-0126-00       RES., FXD, FILM: 200       OHM, 12, 0.125W       91637       MFF1816G200R0F         A2981633       321-0126-00       RES., FXD, FILM: 200       OHM, 12, 0.125W       91637       MFF1816G200R0F         A2981701       321-0222-03       RES., FXD, FILM: 200       OHM, 12, 0.125W       91637       MFF1816G20000C         A2981702       311-1278-00       RES., FXD, FILM: 2X OHM, 0.232, 0.125W       91637       MFF1816G18000F         A2981723       321-014-00       RES., FXD, FILM: 150 OHM, 12, 0.125W       91637       MFF1816G1800F         A2981730       321-0641-00       RES., FXD, FILM: 180 CHM, 12, 0.125W       91637       MFF1816G1800F         A2981733       315-0132-00       RES., FXD, CMPSN: 15K OHM, 12, 0.125W       91637       MFF1816G1800F         A2981733       315-0132-00       RES., FXD, CMPSN:                                                                                                                                                                                                                       | A29R1610      | 321-0222-03 |                  | RES.,FXD,FILM:2K OHM,0.25%,0.125W       | 91637 | MFF1816D20000C  |                |
| A2981621       311-1278-00       RES., VAR, NOWNER 250, OHM, 102, 0.5W       32997       3329W-L58-531         A2981625       311-1278-00       RES., VAR, NOWNER 350, OHM, 102, 0.5W       3297       3329W-L58-533         A2981636       321-064-100       RES., FXD, FILM: 1.8 X, OHM, 15, 0.125W       91637       MFF1816G18000F         A2981631       321-0126-00       RES., FXD, FILM: 18, KOHM, 13, 0.125W       91637       MFF1816G18000F         A2981703       311-1240-00       RES., FXD, FILM: 200       0HH, 13, 0.125W       91637       MFF1816G200R0F         A2981701       321-0222-03       RES., FXD, FILM: 200       0HH, 13, 0.125W       91637       MFF1816G200R0F         A2981702       321-0222-03       RES., FXD, FILM: 2X OHR, 0.257, 0.125W       91637       MFF1816D20000C         A2981720       311-1278-00       RES., FXD, FILM: 2X OHR, 0.257, 0.125W       91637       MFF1816D20000C         A2981721       321-014-00       RES., FXD, FILM: 150 OHR, 12, 0.125W       91637       MFF1816G1800F         A2981730       321-0464-00       RES., FXD, FILM: 150 OHR, 12, 0.125W       91637       MFF1816G1800F         A2981731       315-0132-00       RES., FXD, CHPSN: 15K OHR, 12, 0.125W       91637       MFF1816G1800F         A2981731       315-0132-00       RES., FXD, CHPSN: 15K OHR,                                                                                                                                                                                                               | A29R1620      | 311-1286-00 |                  | RES.,VAR,NONWIR:50K OHM,10%,0.5W        | 32997 | 3329W-L58-503   |                |
| A2881626       321-0219-00       RES., FXD, FTLM:1.87X, OHM, 12, 0.125W       91637       MFF1816618000F         A2981628       321-0392-00       RES., FXD, FTLM:1.8X, OHM, 12, 0.125W       91637       MFF1816618002F         A2981630       321-0126-00       RES., FXD, FTLM:18K, OHM, 12, 0.125W       91637       MFF1816618002F         A2981631       321-0126-00       RES., FXD, FTLM:200 OHH, 12, 0.125W       91637       MFF1816620000F         A2981701       321-0222-03       RES., FXD, FTLM:2X OHH, 12, 0.125W       91637       MFF1816020000C         A2981702       321-0222-03       RES., FXD, FTLM:2X OHH, 0.257, 0.125W       91637       MFF1816020000C         A2981702       311-1278-00       RES., FXD, FTLM:2X OHH, 0.257, 0.125W       91637       MFF1816020000C         A2981703       321-014-00       RES., FXD, FTLM:1X KO HH, 12, 0.125W       91637       MFF181601800F         A2981733       321-0641-00       RES., FXD, FTLM:18K OHH, 12, 0.125W       91637       MFF181601800F         A2981733       315-0162-00       RES., FXD, FTLM:18K OHH, 12, 0.125W       91637       MFF181601800F         A2981733       315-0162-00       RES., FXD, CMPSN:16K OHM, 52, 0.25W       01121       CB1025         A2981830       315-0162-00       RES., FXD, CMPSN:16K OHM, 52, 0.25W       01121       CB                                                                                                                                                                                                              | A29R1621      | 311-1278-00 |                  | RES., VAR, NONWIR: 250 OHM, 10%, 0.5W   | 32997 | 3329W-L58-251   |                |
| 12981628         321-064-00         RES., FXD, FILM: 1.8X ORM, 1X, 0.125W         91637         MFF1816618000F           A2981630         321-0392-00         RES., FXD, FILM: 1.8X ORM, 1X, 0.125W         91637         MFF1816611802F           A2981631         321-0126-00         RES., FXD, FILM: 200 OHN, 1X, 0.125W         91637         MFF1816620000F           A2981631         321-0126-00         RES., FXD, FILM: 200 OHN, 1X, 0.125W         91637         MFF1816620000F           A2981700         311-1240-00         RES., FXD, FILM: 2X OHN, 0.25X, 0.125W         91637         MFF1816620000C           A2981702         321-0222-03         RES., FXD, FILM: 2X OHN, 0.25X, 0.125W         91637         MFF1816015000F           A2981702         321-0249-00         RES., FXD, FILM: 2X OHN, 10X, 0.5W         32997         33294-158-251           A2981723         321-0249-00         RES., FXD, FILM: 1X OHN, 1X, 0.125W         91637         MFF1816618700F           A2981735         321-0342-00         RES., FXD, FILM: 18K OHN, 1X, 0.125W         91637         MFF18161802F           A2981820         315-0162-00         RES., FXD, CMPSN: 14K. 6MH, 5X, 0.25W         01121         CB1025           A2981830         315-0152-00         RES., FXD, CMPSN: 14, KO OHN, 5X, 0.25W         01121         CB1025           A2981831         <                                                                                                                                                                       | A29R1625      | 311-1286-00 |                  | RES., VAR, NONWIR: 50K OHM, 10%, 0.5W   | 32997 | 3329W-L58-503   |                |
| A2981630       321-0392-00       RES., FXD, FILM: 118K OHM, 1%, 0, 125W       91637       MFF1816611802F         A2981631       321-0126-00       RES., FXD, FILM: 200 OHM, 1%, 0, 125W       91637       MFF1816620000F         A2981701       321-0222-03       RES., FXD, FILM: 200 OHM, 1%, 0, 125W       91637       MFF1816020000C         A2981701       321-0222-03       RES., FXD, FILM: 2K OHM, 0.25%, 0, 125W       91637       MFF1816020000C         A2981702       311-1278-00       RES., FXD, FILM: 2K OHM, 0.25%, 0, 125W       91637       MFF1816020000C         A2981702       311-1278-00       RES., FXD, FILM: 3K OHM, 1%, 0, 125W       91637       MFF1816018700P         A2981730       321-039-00       RES., FXD, FILM: 15K OHM, 1%, 0, 125W       91637       MFF1816018700F         A2981730       321-0392-00       RES., FXD, FILM: 15K OHM, 5%, 0, 125W       91637       MFF1816018700F         A2981830       315-012-00       RES., FXD, OHPSN: 15K OHM, 5%, 0, 25W       01121       CB1025         A2981831       315-0472-00       RES., FXD, OHPSN: 15K OHM, 5%, 0, 25W       01121       CB1025         A2981831       315-0472-00       RES., FXD, OHPSN: 15K OHM, 5%, 0, 25W       01121       CB1355         A2981832       315-0152-00       RES., FXD, OHPSN: 15K OHM, 5%, 0, 25W       01121 <t< td=""><td>A29R1626</td><td>321-0219-00</td><td></td><td></td><td></td><td></td><td></td></t<>                                                                                                                 | A29R1626      | 321-0219-00 |                  |                                         |       |                 |                |
| A29R1631         321-0126-00         RES., FXD, FILM: 200 OHM, 17, 0.125W         91637         MFF1816C200R0F           A29R1635         321-0126-00         RES., FXD, FILM: 200 OHM, 17, 0.125W         91637         MFF1816C200R0F           A29R1700         311-1240-00         RES., FXD, FILM: 200 OHM, 17, 0.125W         91637         MFF1816C20000C           A29R1701         321-0222-03         RES., FXD, FILM: 2K OHM, 0.253, 0.125W         91637         MFF1816D20000C           A29R1720         311-1278-00         RES., FXD, FILM: 2K OHM, 0.253, 0.125W         91637         MFF1816D20000C           A29R1723         321-0219-00         RES., FXD, FILM: 2K OHM, 0.25W         91637         MFF1816C18700F           A29R1730         321-0641-00         RES., FXD, FILM: 150 OHM, 12, 0.125W         91637         MFF1816C18700F           A29R1731         315-0102-00         RES., FXD, CMPSN: 1K OHM, 52, 0.125W         91637         MFF1816C1800F           A29R1820         315-0153-00         RES., FXD, CMPSN: 1K OHM, 53, 0.25W         01121         CB1825           A29R1831         315-0472-00         RES., FXD, CMPSN: 15K OHM, 53, 0.25W         01121         CB1825           A29R1832         321-0263-00         RES., FXD, CMPSN: 15K OHM, 53, 0.25W         01121         CB1253           A29R1832         315-0152-00<                                                                                                                                                                           | A29R1628      | 321-0641-00 |                  | RES.,FXD,FILM:1.8K OHM,1%,0.125W        |       |                 |                |
| A29R1635       321-0126-00       RES., FXD, FILM.200 OHN, 12, 0, 125W       91637       MFF18166200R0F         A29R1700       311-1240-00       RES., FXD, FILM.2XC OHN, 102, 0, 50W       73138       72-30-0         A29R1701       321-0222-03       RES., FXD, FILM.2XC OHN, 102, 0, 53X, 0, 125W       91637       MFF1816020000C         A29R1702       321-0222-03       RES., FXD, FILM.2XC OHN, 0, 2, 53X, 0, 125W       91637       MFF1816020000C         A29R1703       321-0219-00       RES., FXD, FILM.2XC OHN, 102, 0, 5W       32997       3294-D82-S1         A29R1723       321-0219-00       RES., FXD, FILM.135 OHN, 17X, 0, 125W       91637       MFF181661800F         A29R1735       321-0329-00       RES., FXD, FILM.11.8K OHN, 12X, 0, 125W       91637       MFF181661800F         A29R1735       321-0329-00       RES., FXD, OMPSN:1K OHN, 12X, 0, 125W       91637       MFF181661800F         A29R1820       315-0152-00       RES., FXD, OMPSN:1K OHN, 12X, 0, 125W       91637       MFF181661800F         A29R1831       315-0472-00       RES., FXD, OMPSN:1 KOHN, 12X, 0, 125W       91637       MFF181661800F         A29R1831       315-0472-00       RES., FXD, OMPSN:1 KOHN, 5X, 0, 25W       01121       CB1535         A29R1831       315-0472-00       RES., FXD, OMPSN:1 KOHN, 5X, 0, 25W       01121                                                                                                                                                                                                            | A29R1630      | 321-0392-00 |                  | RES.,FXD,FILM:118K OHM,1%,0.125W        | 91637 | MFF1816G11802F  |                |
| A29R1700       311-1240-00       RES., VAR, NOWLR: 25K OHM, 10%, 0.50W       73138       72-30-0         A29R1701       321-0222-03       RES., FXD, FILM: 2K OHM, 0.25%, 0.125W       91637       MFF1816020000C         A29R1720       311-1278-00       RES., FXD, FILM: 2K OHM, 0.25%, 0.125W       91637       MFF1816020000C         A29R1720       311-1278-00       RES., FXD, FILM: 2K OHM, 0.25%, 0.125W       91637       MFF1816020000C         A29R1721       321-0114-00       RES., FXD, FILM: 12K OHM, 12, 0.125W       91637       MFF18160150R0F         A29R1733       321-0641-00       RES., FXD, FILM: 1.87K OHM, 12, 0.125W       91637       MFF1816C1800F         A29R1735       321-0641-00       RES., FXD, FILM: 1.87K OHM, 12, 0.125W       91637       MFF1816C1800F         A29R1820       315-0162-00       RES., FXD, FILM: 1.87K OHM, 52, 0.25W       01121       C81255         A29R1821       315-0162-00       RES., FXD, CMPSN: 15 K OHM, 52, 0.25W       01121       C81535         A29R1831       315-0152-00       RES., FXD, CMPSN: 15 K OHM, 52, 0.25W       01121       C81535         A29R1920       315-0152-00       RES., FXD, CMPSN: 15 K OHM, 52, 0.25W       01121       C81525         A29R1921       315-033-00       RES., FXD, CMPSN: 15 K OHM, 52, 0.25W       01121       C83035                                                                                                                                                                                                                      | A29R1631      | 321-0126-00 |                  | RES.,FXD,FILM:200 OHM,1%,0.125W         | 91637 | MFF1816G200R0F  |                |
| A29R1701       321-0222-03       RES., FXD, FILM: 2K OHM, 0.25%, 0.125W       91637       MFF1816020000C         A29R1702       311-1278-00       RES., FXD, FILM: 2K OHM, 0.25%, 0.125W       91637       MFF1816020000C         A29R1721       321-0114-00       RES., FXD, FILM: 2K OHM, 0.25%, 0.125W       91637       MFF1816020000C         A29R1723       321-0219-00       RES., FXD, FILM: 150 OHM, 1%, 0.125W       91637       MFF18160150R0P         A29R1735       321-0641-00       RES., FXD, FILM: 1.87 KOHM, 1%, 0.125W       91637       MFF1816018000P         A29R1735       321-0392-00       RES., FXD, FILM: 1.87 KOHM, 1%, 0.125W       91637       MFF181601800P         A29R1810       315-0102-00       RES., FXD, CMPSN: 1.6K OHM, 5%, 0.25W       01121       CB1025         A29R1830       315-0152-00       RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W       01121       CB1025         A29R1831       315-0472-00       RES., FXD, CMPSN: 5.0 CMPSN: 5.0 CMM       91637       MFF1816653600P         A29R1920       315-0152-00       RES., FXD, CMPSN: 5.0 CMPSN: 5.0 C25W       01121       CB1255         A29R1921       315-0303-00       RES., FXD, CMPSN: 5.0 KOHM, 5%, 0.25W       01121       CB7515         A29R1923       315-0303-00       RES., FXD, CMPSN: 30K OHM, 5%, 0.25W       01121       CB3035<                                                                                                                                                                                                              | A29R1635      | 321-0126-00 |                  |                                         |       |                 |                |
| A29R1702       321-0222-03       RES., FXD, FTLM: 2K OHM, 0.25%, 0.125W       91637       MFF1816020000C         A29R1720       311-1278-00       RES., FXD, FTLM: 2K OHM, 0.25%, 0.125W       32997       3329W-L58-251         A29R1721       321-0219-00       RES., FXD, FTLM: 150 OHM, 1%, 0.125W       91637       MFF1816G15000F         A29R1730       321-0641-00       RES., FXD, FTLM: 1.87K OHM, 1%, 0.125W       91637       MFF1816G18000F         A29R1730       321-0641-00       RES., FXD, FTLM: 1.87K OHM, 1%, 0.125W       91637       MFF1816G18000F         A29R1730       315-0102-00       RES., FXD, FTLM: 1.86K OHM, 1%, 0.125W       91637       MFF1816G18000F         A29R1820       315-0122-00       RES., FXD, CMPSN: 1K OHM, 5%, 0.25W       01121       CB1025         A29R1830       315-0152-00       RES., FXD, CMPSN: 1.8K OHM, 5%, 0.25W       01121       CB1725         A29R1832       321-0263-00       RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W       01121       CB1525         A29R1832       315-0152-00       RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W       01121       CB1525         A29R1921       315-0152-00       RES., FXD, CMPSN: 30K OHM, 5%, 0.25W       01121       CB1525         A29R1923       315-0132-00       RES., FXD, CMPSN: 30K OHM, 5%, 0.25W       01121       CB3035     <                                                                                                                                                                                                                   | A29R1700      | 311-1240-00 |                  | RES.,VAR,NONWIR:25K OHM,10%,0.50W       |       |                 | Sec. and       |
| A29R1720       311-1278-00       RES., VAR, NONWIR: 250 OHM, 10%, 0.5W       32997       3329W-L58-251         A29R1721       321-0114-00       RES., FXD, FILM: 150 OHM, 1%, 0.125W       91637       MFF1816G15000F         A29R1723       321-0219-00       RES., FXD, FILM: 1.8X OHM, 1%, 0.125W       91637       MFF1816G18000F         A29R1735       321-032-00       RES., FXD, FILM: 1.8X OHM, 1%, 0.125W       91637       MFF1816G1800F         A29R1820       315-0102-00       RES., FXD, CMPSN: 1.8K OHM, 1%, 0.125W       91637       MFF1816G1800F         A29R1830       315-0153-00       RES., FXD, CMPSN: 1.8K OHM, 5%, 0.25W       01121       CB1025         A29R1831       315-0472-00       RES., FXD, CMPSN: 1.8K OHM, 5%, 0.25W       01121       CB4725         A29R1832       321-0263-00       RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W       01121       CB4725         A29R1921       315-0571-00       RES., FXD, CMPSN: 750 OHM, 5%, 0.25W       01121       CB555         A29R1921       315-0303-00       RES., FXD, CMPSN: 30K OHM, 5%, 0.25W       01121       CB525         A29R1923       315-0303-00       RES., FXD, CMPSN: 30K OHM, 5%, 0.25W       01121       CB3035         A29R1923       315-0303-00       RES., FXD, CMPSN: 30K OHM, 5%, 0.25W       01121       CB3035                                                                                                                                                                                                                                          | A29R1701      | 321-0222-03 |                  |                                         |       |                 |                |
| A29R1721       321-0114-00       RES., FXD, FILM:150 OHN, 1%, 0.125W       91637       MFF1816G150R0F         A29R1723       321-0219-00       RES., FXD, FILM:1.87K OHN, 1%, 0.125W       91637       MFF1816G18000F         A29R1735       321-0392-00       RES., FXD, FILM:1.87K OHN, 1%, 0.125W       91637       MFF1816G18000F         A29R1820       315-0102-00       RES., FXD, FILM:1.87K OHN, 5%, 0.25W       01121       CB1025         A29R1821       315-0153-00       RES., FXD, CMPSN:1.8K OHN, 5%, 0.25W       01121       CB1535         A29R1831       315-0472-00       RES., FXD, CMPSN:1.8K OHN, 5%, 0.25W       01121       CB1535         A29R1821       315-0472-00       RES., FXD, CMPSN:1.5X OHN, 5%, 0.25W       01121       CB1535         A29R1920       315-0751-00       RES., FXD, CMPSN:3.6X OHN, 5%, 0.25W       01121       CB1525         A29R1921       315-0303-00       RES., FXD, CMPSN:30K OHN, 5%, 0.25W       01121       CB1525         A29R1923       315-0303-00       RES., FXD, CMPSN:30K OHN, 5%, 0.25W       01121       CB3035         A29R1923       315-0303-00       RES., FXD, CMPSN:30K OHN, 5%, 0.25W       01121       CB3035         A29R1923       315-0472-00       RES., FXD, CMPSN:4.4.7K OHN, 5%, 0.25W       01121       CB3035         A29R2031 <td>A29R1702</td> <td>321-0222-03</td> <td></td> <td>RES.,FXD,FILM:2K OHM,0.25%,0.125W</td> <td></td> <td></td> <td></td>                                                                                                                 | A29R1702      | 321-0222-03 |                  | RES.,FXD,FILM:2K OHM,0.25%,0.125W       |       |                 |                |
| A29R1723321-0219-00RES., FXD, F1LM: 1.87K 0HM, 1%, 0.125W91637MFF1816G18700FA29R1730321-0641-00RES., FXD, F1LM: 1.8K 0HM, 1%, 0.125W91637MFF1816G18000FA29R1735321-0392-00RES., FXD, F1LM: 1.8K 0HM, 1%, 0.125W91637MFF1816G1802FA29R1820315-0102-00RES., FXD, F1LM: 1.8K 0HM, 1%, 0.125W91637MFF1816G1802FA29R1821315-0102-00RES., FXD, CMPSN: 1.8K 0HM, 5%, 0.25W01121CB1025A29R1830315-0153-00RES., FXD, CMPSN: 1.8K 0HM, 5%, 0.25W01121CB1635A29R1831315-0472-00RES., FXD, CMPSN: 4.7K 0HM, 5%, 0.25W01121CB1637A29R1832321-0263-00RES., FXD, CMPSN: 7.00HM, 5%, 0.25W01121CB7515A29R1920315-052-00RES., FXD, CMPSN: 7.50 0HM, 5%, 0.25W01121CB3035A29R1922315-0303-00RES., FXD, CMPSN: 30K 0HM, 5%, 0.25W01121CB3035A29R1930321-0263-00RES., FXD, CMPSN: 30K 0HM, 5%, 0.25W01121CB3035A29R1930315-0472-00RES., FXD, CMPSN: 30K 0HM, 5%, 0.25W01121CB3035A29R2020315-0472-00RES., FXD, CMPSN: 4.7K 0HM, 5%, 0.25W01121CB4725A29R2031315-0472-00RES., FXD, CMPSN: 4.7K 0HM, 5%, 0.25W01121CB4725A29R2032315-0472-00RES., FXD, CMPSN: 4.7K 0HM, 5%, 0.25W01121CB4725A29R2031315-0472-00RES., FXD, CMPSN: 4.7K 0HM, 5%, 0.25W01121CB4725A29R2201315-0472-00RES., FXD, CMPSN: 4.7K 0HM, 5%,                                                                                                                                                                                                                                                                                                                                                                    | A29R1720      | 311-1278-00 |                  | RES.,VAR,NONWIR:250 OHM,10%,0.5W        | 32997 | 3329W-L58-251   |                |
| A29R1730321-0641-00RES.,FXD,FILM:1.8K OHM,1Z,0.125W91637MFF1816G18000FA29R1735321-0392-00RES.,FXD,FILM:1.8K OHM,1Z,0.125W91637MFF1816G18000FA29R1820315-0102-00RES.,FXD,CMPSN:1K OHM,5Z,0.25W01121CB1025A29R1831315-0153-00RES.,FXD,CMPSN:1K OHM,5Z,0.25W01121CB1535A29R1832321-0263-00RES.,FXD,CMPSN:1K OHM,5Z,0.25W01121CB4725A29R1832321-0263-00RES.,FXD,CMPSN:4.7K OHM,5Z,0.25W01121CB4725A29R1920315-0751-00RES.,FXD,CMPSN:5.3K OHM,5Z,0.25W01121CB7515A29R1921315-0152-00RES.,FXD,CMPSN:1.5K OHM,5Z,0.25W01121CB7515A29R1922315-0303-00RES.,FXD,CMPSN:30K OHM,5Z,0.25W01121CB3035A29R1923315-0303-00RES.,FXD,CMPSN:30K OHM,5Z,0.25W01121CB3035A29R1923315-0303-00RES.,FXD,CMPSN:30K OHM,5Z,0.25W01121CB3035A29R1923315-0472-00RES.,FXD,CMPSN:30K OHM,5Z,0.25W01121CB3035A29R2020315-0472-00RES.,FXD,CMPSN:30K OHM,5Z,0.25W01121CB4725A29R2031315-0472-00RES.,FXD,CMPSN:2.2K OHM,5Z,0.25W01121CB4725A29R2031315-0472-00RES.,FXD,CMPSN:2.2K OHM,5Z,0.25W01121CB4725A29R2032315-0472-00RES.,FXD,CMPSN:2.2K OHM,5Z,0.25W01121CB4725A29R2033315-0472-00RES.,FXD,CMPSN:2.2K OHM,5Z,0.25W01121CB4725A29R2032315-0472-00RES.,FXD,CMPSN:2                                                                                                                                                                                                                                                                                                                                                                                                                         | A29R1721      | 321-0114-00 |                  |                                         |       |                 |                |
| A29R1735       321-0392-00       RES., FXD, FLN: 118K OHM, 1%, 0.125W       91637       MFF1816G11802F         A29R1820       315-0102-00       RES., FXD, CMPSN: 1K OHM, 5%, 0.25W       01121       CB1025         A29R1821       315-0153-00       RES., FXD, CMPSN: 15K OHM, 5%, 0.25W       01121       CB1535         A29R1830       315-0157-00       RES., FXD, CMPSN: 15K OHM, 5%, 0.25W       01121       CB1535         A29R1831       315-0472-00       RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W       01121       CB7515         A29R1832       321-0263-00       RES., FXD, CMPSN: 750       0H121       CB7515         A29R1920       315-0152-00       RES., FXD, CMPSN: 750       0H121       CB1525         A29R1921       315-0303-00       RES., FXD, CMPSN: 30K OHM, 5%, 0.25W       01121       CB3035         A29R1923       315-0303-00       RES., FXD, CMPSN: 30K OHM, 5%, 0.25W       01121       CB3035         A29R1923       315-0472-00       RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W       01121       CB3035         A29R1923       315-0472-00       RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W       01121       CB3035         A29R2020       315-0472-00       RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W       01121       CB4725         A29R2032       315-0472-00       RES                                                                                                                                                                                                                                                          | A29R1723      | 321-0219-00 |                  |                                         |       |                 |                |
| A29R1820       315-0102-00       RES., FXD, CMPSN:1K OHM, 5%, 0.25W       01121       CB1025         A29R1821       315-0182-00       RES., FXD, CMPSN:1.8K OHM, 5%, 0.25W       01121       CB1025         A29R1830       315-0153-00       RES., FXD, CMPSN:1.8K OHM, 5%, 0.25W       01121       CB1335         A29R1831       315-0472-00       RES., FXD, CMPSN:4.7K OHM, 5%, 0.25W       01121       CB4725         A29R1832       321-0263-00       RES., FXD, CMPSN:750       OHM, 5%, 0.25W       01121       CB4725         A29R1920       315-0152-00       RES., FXD, CMPSN:750       OHM, 5%, 0.25W       01121       CB1525         A29R1922       315-0303-00       RES., FXD, CMPSN:30K OHM, 5%, 0.25W       01121       CB3035         A29R1923       315-0303-00       RES., FXD, CMPSN:30K OHM, 5%, 0.25W       01121       CB3035         A29R1923       315-0472-00       RES., FXD, CMPSN:1.8K OHM, 5%, 0.25W       01121       CB3035         A29R2030       315-0472-00       RES., FXD, CMPSN:1.8K OHM, 5%, 0.25W       01121       CB4725         A29R2031       315-0472-00       RES., FXD, CMPSN:4.7K OHM, 5%, 0.25W       01121       CB4725         A29R2032       315-0472-00       RES., FXD, CMPSN:4.7K OHM, 5%, 0.25W       01121       CB4725         A29R2031 <td>A29R1730</td> <td>321-0641-00</td> <td></td> <td></td> <td></td> <td></td> <td></td>                                                                                                                                                                    | A29R1730      | 321-0641-00 |                  |                                         |       |                 |                |
| A29R1821315-0182-00RES., FXD, CMPSN:1.8K OHM, 5%, 0.25W01121CB1825A29R1830315-0153-00RES., FXD, CMPSN:15K OHM, 5%, 0.25W01121CB1535A29R1831315-0472-00RES., FXD, CMPSN:4.7K OHM, 5%, 0.25W01121CB4725A29R1832321-0263-00RES., FXD, FILM:5.36K OHM, 1%, 0.125W91637MFF1816653600FA29R1920315-0751-00RES., FXD, CMPSN:7500HM, 5%, 0.25W01121CB1525A29R1921315-0152-00RES., FXD, CMPSN:30K OHM, 5%, 0.25W01121CB1525A29R1923315-0303-00RES., FXD, CMPSN:30K OHM, 5%, 0.25W01121CB3035A29R1930321-0263-00RES., FXD, CMPSN:30K OHM, 5%, 0.25W01121CB3035A29R2020315-0472-00RES., FXD, CMPSN:1.8K OHM, 5%, 0.25W01121CB825A29R2030315-0472-00RES., FXD, CMPSN:1.8K OHM, 5%, 0.25W01121CB825A29R2031315-0472-00RES., FXD, CMPSN:1.4K OHM, 5%, 0.25W01121CB4725A29R2032315-0472-00RES., FXD, CMPSN:4.7K OHM, 5%, 0.25W01121CB2225A29R2033315-0472-00RES., FXD, CMPSN:4.7K OHM, 5%, 0.25W01121CB4725A29R2200311-1248-00RES., FXD, CMPSN:4.7K OHM, 5%, 0.25W01121CB3915A29R2201315-0102-00RES., FXD, CMPSN:1K OHM, 5%, 0.25W01121CB3915A29R2203315-0102-00RES., FXD, CMPSN:1K OHM, 5%, 0.25W01121CB1025A29R2233315-0102-00RES., FXD, CMPSN:1K OHM, 5%, 0.25W01121CB1025 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>                                                                                                                                                                                                                                                                                                                            |               |             |                  |                                         |       |                 |                |
| A29R1830       315-0153-00       RES., FXD, CMPSN:15K OHM, 5%, 0.25W       01121       CB1535         A29R1831       315-0472-00       RES., FXD, CMPSN:53K OHM, 5%, 0.25W       01121       CB4725         A29R1920       315-0152-00       RES., FXD, CMPSN:750 OHN, 5%, 0.25W       01121       CB7515         A29R1921       315-0152-00       RES., FXD, CMPSN:750 OHN, 5%, 0.25W       01121       CB7515         A29R1922       315-0303-00       RES., FXD, CMPSN:30K OHM, 5%, 0.25W       01121       CB3035         A29R1923       315-0303-00       RES., FXD, CMPSN:30K OHM, 5%, 0.25W       01121       CB3035         A29R1920       315-0303-00       RES., FXD, CMPSN:30K OHM, 5%, 0.25W       01121       CB3035         A29R1920       315-0303-00       RES., FXD, CMPSN:30K OHM, 5%, 0.25W       01121       CB3035         A29R2020       315-0182-00       RES., FXD, CMPSN:1.4K OHM, 5%, 0.25W       01121       CB1825         A29R2031       315-0472-00       RES., FXD, CMPSN:2.2K OHM, 5%, 0.25W       01121       CB4725         A29R2032       315-0472-00       RES., FXD, CMPSN:2.2K OHM, 5%, 0.25W       01121       CB4725         A29R2031       315-0472-00       RES., FXD, CMPSN:300 OHM, 5%, 0.25W       01121       CB4725         A29R2200       311-1248-00                                                                                                                                                                                                                                                          |               |             |                  |                                         |       |                 |                |
| A29R1831315-0472-00RES., FXD, CMPSN: 4.7KOHM, 5%, 0.25W01121CB4725A29R1832321-0263-00RES., FXD, FILM: 5.36KOHM, 1%, 0.125W91637MFF1816C53600FA29R1920315-0751-00RES., FXD, CMPSN: 750OHM, 5%, 0.25W01121CB7515A29R1921315-0152-00RES., FXD, CMPSN: 1.5KOHM, 5%, 0.25W01121CB3035A29R1922315-0303-00RES., FXD, CMPSN: 30KOHM, 5%, 0.25W01121CB3035A29R1923315-0303-00RES., FXD, CMPSN: 30KOHM, 5%, 0.25W01121CB3035A29R1930321-0263-00RES., FXD, CMPSN: 30KOHM, 5%, 0.25W01121CB3035A29R2020315-0182-00RES., FXD, CMPSN: 1.8KOHM, 5%, 0.25W01121CB1825A29R2030315-0472-00RES., FXD, CMPSN: 4.7KOHM, 5%, 0.25W01121CB4725A29R2031315-0222-00RES., FXD, CMPSN: 4.7KOHM, 5%, 0.25W01121CB225A29R2032315-0472-00RES., FXD, CMPSN: 4.7KOHM, 5%, 0.25W01121CB4725A29R2033315-0472-00RES., FXD, CMPSN: 4.7KOHM, 5%, 0.25W01121CB4725A29R2203315-0472-00RES., FXD, CMPSN: 4.7KOHM, 5%, 0.25W01121CB4725A29R2203315-0472-00RES., FXD, CMPSN: 4.7KOHM, 5%, 0.25W01121CB4725A29R2203315-0472-00RES., FXD, CMPSN: 1.4KOHM, 5%, 0.25W01121CB4725A29R2203315-0472-00RES., FXD, CMPSN: 1.4KOHM, 5%, 0.25W                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | A29R1821      | 315-0182-00 |                  | RES.,FXD,CMPSN:1.8K OHM,5%,0.25W        | 01121 | CB1825          |                |
| A29R1832321-0263-00RES., FXD, FTI.M: 5.36K OHH, 1%, 0.125W91637MFF1816G53600FA29R1920315-0751-00RES., FXD, CMPSN: 750OHM, 5%, 0.25W01121CB7515A29R1921315-0303-00RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W01121CB3035A29R1923315-0303-00RES., FXD, CMPSN: 30K OHM, 5%, 0.25W01121CB3035A29R1930321-0263-00RES., FXD, CMPSN: 30K OHM, 5%, 0.25W01121CB3035A29R2020315-0182-00RES., FXD, CMPSN: 30K OHM, 5%, 0.25W01121CB3035A29R2030315-0472-00RES., FXD, CMPSN: 1.8K OHM, 5%, 0.25W01121CB4255A29R2031315-0472-00RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W01121CB4725A29R2032315-0472-00RES., FXD, CMPSN: 2.2K OHM, 5%, 0.25W01121CB4725A29R2033315-0472-00RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W01121CB4725A29R2033315-0472-00RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W01121CB4725A29R203315-0472-00RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W01121CB4725A29R203315-0472-00RES., FXD, CMPSN: 3900HM, 10%, 0.50W7313872-23-0A29R2203315-0102-00RES., FXD, CMPSN: 1K OHM, 5%, 0.25W01121CB3915A29R2203315-0102-00RES., FXD, CMPSN: 1K OHM, 5%, 0.25W01121CB1025A29R2231315-0102-00RES., FXD, CMPSN: 1K OHM, 5%, 0.25W01121CB1025A29R2232315-0102-00RES., FXD, CMPSN: 1K OHM, 5%, 0.25W <t< td=""><td>A29R1830</td><td>315-0153-00</td><td></td><td></td><td></td><td></td><td></td></t<>                                                                                                                                                                                                                                                                                          | A29R1830      | 315-0153-00 |                  |                                         |       |                 |                |
| A29R1920315-0751-00RES., FXD, CMPSN: 750 OHM, 5%, 0.25W01121CB7515A29R1921315-0152-00RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W01121CB1525A29R1922315-0303-00RES., FXD, CMPSN: 30K OHM, 5%, 0.25W01121CB3035A29R1923315-0303-00RES., FXD, CMPSN: 30K OHM, 5%, 0.25W01121CB3035A29R1930321-0263-00RES., FXD, CMPSN: 30K OHM, 5%, 0.25W01121CB3035A29R2020315-0182-00RES., FXD, CMPSN: 1.8K OHM, 5%, 0.25W01121CB1825A29R2030315-0472-00RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W01121CB4725A29R2031315-0472-00RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W01121CB4725A29R2032315-0472-00RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W01121CB4725A29R200311-1248-00RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W01121CB3915A29R2201315-0391-00RES., FXD, CMPSN: 390 OHM, 5%, 0.25W01121CB3915A29R2202307-0445-00RES., FXD, CMPSN: 14.7K OHM, 5%, 0.25W01121CB3915A29R2203315-0102-00RES., FXD, CMPSN: 116 OHM, 5%, 0.25W01121CB1025A29R2230315-0102-00RES., FXD, CMPSN: 11K OHM, 5%, 0.25W01121CB1025A29R2231315-0102-00RES., FXD, CMPSN: 11K OHM, 5%, 0.25W01121CB1025A29R2232315-0102-00RES., FXD, CMPSN: 11K OHM, 5%, 0.25W01121CB1025A29R2233315-0102-00RES., FXD, CMPSN: 11K OHM, 5%, 0.25W01121CB5125<                                                                                                                                                                                                                                                                                                                                                                                     |               |             |                  |                                         |       |                 |                |
| A29R1921315-0152-00RES.,FXD,CMPSN:1.5K OHM,5%,0.25W01121CB1525A29R1922315-0303-00RES.,FXD,CMPSN:30K OHM,5%,0.25W01121CB3035A29R1923315-0303-00RES.,FXD,CMPSN:30K OHM,5%,0.25W01121CB3035A29R1930321-0263-00RES.,FXD,FILM:5.36K OHM,1%,0.125W91637MFF1816G53600FA29R2020315-0182-00RES.,FXD,CMPSN:1.8K OHM,5%,0.25W01121CB1825A29R2030315-0472-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2031315-0472-00RES.,FXD,CMPSN:2.2K OHM,5%,0.25W01121CB4725A29R2032315-0472-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2031315-0472-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2032315-0472-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2033315-0472-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2200311-1248-00RES.,VAR,NONWIR:500 OHM,10%,0.50W7313872-23-0A29R2201315-0391-00RES.,FXD,CMPSN:390 OHM,5%,0.25W01121CB3915A29R2230315-0102-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1025A29R2231315-0102-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1025A29R2232315-0102-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1025A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB1025A29R2233315-0512-00RES.,FXD,CMPSN:5.1K                                                                                                                                                                                                                                                                                                                                                                                                                         |               |             |                  |                                         |       |                 |                |
| A29R1922315-0303-00RES.,FXD,CMPSN: 30K OHM,5%,0.25W01121CB3035A29R1923315-0303-00RES.,FXD,CMPSN: 30K OHM,5%,0.25W01121CB3035A29R1930321-0263-00RES.,FXD,FILM: 5.36K OHM, 1%,0.125W91637MFF1816G53600FA29R2020315-0182-00RES.,FXD,CMPSN: 1.6K OHM, 5%,0.25W01121CB1825A29R2030315-0472-00RES.,FXD,CMPSN: 1.6K OHM, 5%,0.25W01121CB4725A29R2031315-0222-00RES.,FXD,CMPSN: 2.2K OHM, 5%,0.25W01121CB4725A29R2032315-0472-00RES.,FXD,CMPSN: 4.7K OHM, 5%,0.25W01121CB4725A29R2031315-0391-00RES.,FXD,CMPSN: 4.7K OHM, 5%,0.25W01121CB3915A29R2201315-0391-00RES.,FXD,CMPSN: 390 OHM, 10%,0.50W7313872-23-0A29R2203307-0445-00RES.,FXD,CMPSN: 1K OHM, 5%,0.25W01121CB3915A29R2230315-0102-00RES.,FXD,CMPSN: 1K OHM, 5%,0.25W01121CB1025A29R2231315-0102-00RES.,FXD,CMPSN: 1K OHM, 5%,0.25W01121CB1025A29R2232315-0102-00RES.,FXD,CMPSN: 1K OHM, 5%,0.25W01121CB1025A29R2233315-0512-00RES.,FXD,CMPSN: 1K OHM, 5%,0.25W01121CB1025A29R2233315-0512-00RES.,FXD,CMPSN: 5.1K OHM, 5%,0.25W01121CB1025A29R2233315-0512-00RES.,FXD,CMPSN: 5.1K OHM, 5%,0.25W01121CB1025A29R2233315-0512-00RES.,FXD,CMPSN: 5.1K OHM, 5%,0.25W01121CB1025                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |             |                  |                                         |       |                 |                |
| A29R1923315-0303-00RES.,FXD,CMPSN:30K OHM,5%,0.25W01121CB3035A29R1930321-0263-00RES.,FXD,FILM:5.36K OHM,1%,0.125W91637MFF1816G53600FA29R2020315-0182-00RES.,FXD,CMPSN:1.8K OHM,5%,0.25W01121CB1825A29R2030315-0472-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2031315-0222-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2032315-0472-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2032315-0472-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2032315-0472-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R200311-1248-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB3915A29R2201315-0391-00RES.,FXD,CMPSN:390OHM,5%,0.25W01121CB3915A29R2220307-0445-00RESRES NTWK,FXD,F1:4.7K OHM,5%,0.25W01121CB1025A29R2230315-0102-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1025A29R2231315-0103-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1035A29R2232315-0102-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1025A29R2232315-0102-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1025A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB1025A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB5125                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |             |                  |                                         |       |                 |                |
| A29R1930321-0263-00RES.,FXD,FILM:5.36K OHM,1%,0.125W91637MFF1816G53600FA29R2020315-0182-00RES.,FXD,CMPSN:1.8K OHM,5%,0.25W01121CB1825A29R2030315-0472-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2031315-0222-00RES.,FXD,CMPSN:2.2K OHM,5%,0.25W01121CB2225A29R2032315-0472-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2200311-1248-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2201315-0391-00RES.,FXD,CMPSN:390 OHM,5%,0.25W01121CB3915A29R2203307-0445-00RES.,FXD,CMPSN:390 OHM,5%,0.25W01121CB3915A29R2204307-0445-00RES.,FXD,CMPSN:180 OHM,5%,0.25W01121CB1025A29R2230315-0102-00RES.,FXD,CMPSN:11K OHM,5%,0.25W01121CB1025A29R2231315-0102-00RES.,FXD,CMPSN:11K OHM,5%,0.25W01121CB1025A29R2232315-0102-00RES.,FXD,CMPSN:11K OHM,5%,0.25W01121CB1025A29R2233315-0102-00RES.,FXD,CMPSN:11K OHM,5%,0.25W01121CB1025A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB1025A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB5125A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB5125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | A29R1922      | 315-0303-00 |                  | RES.,FXD,CMPSN:30K OHM,5%,0.25W         | 01121 | CB3032          |                |
| A29R2020315-0182-00RES.,FXD,CMPSN:1.8K OHM,5%,0.25W01121CB1825A29R2030315-0472-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2031315-0222-00RES.,FXD,CMPSN:2.2K OHM,5%,0.25W01121CB2225A29R2032315-0472-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2200311-1248-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2201315-0391-00RES.,FXD,CMPSN:390 OHM,10%,0.50W7313872-23-0A29R2202307-0445-00RES.,FXD,CMPSN:390 OHM,5%,0.25W01121CB3915A29R2203315-0102-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1025A29R2231315-0102-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1025A29R2232315-0102-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1025A29R2233315-0102-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1025A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB1025A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB5125A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB5125A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB5125A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB5125A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB5125                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |             |                  |                                         |       |                 |                |
| A29R2030315-0472-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2031315-0222-00RES.,FXD,CMPSN:2.2K OHM,5%,0.25W01121CB2225A29R2032315-0472-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2200311-1248-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2201315-0391-00RES.,FXD,CMPSN:390 OHM,5%,0.25W01121CB3915A29R2203307-0445-00RES.,FXD,CMPSN:390 OHM,5%,0.25W01121CB3915A29R2230315-0102-00RES.,FXD,CMPSN:18 OHM,5%,0.25W01121CB1025A29R2231315-0102-00RES.,FXD,CMPSN:10K OHM,5%,0.25W01121CB1025A29R2232315-0102-00RES.,FXD,CMPSN:11K OHM,5%,0.25W01121CB1025A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB5125A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB5125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               |             |                  |                                         |       |                 |                |
| A29R2031315-0222-00RES.,FXD,CMPSN:2.2K OHM,5%,0.25W01121CB2225A29R2032315-0472-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2200311-1248-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2201315-0391-00RES.,FXD,CMPSN:390 OHM,10%,0.50W7313872-23-0A29R2202307-0445-00RES.,FXD,CMPSN:390 OHM,5%,0.25W01121CB3915A29R2230315-0102-00RES.,FXD,CMPSN:14.7K OHM,20%,(9) RES91637MSP10A01-472MA29R2231315-0102-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1025A29R2232315-0102-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1035A29R2233315-0512-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1025A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB5125A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB5125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2020      | 315-0182-00 |                  |                                         |       |                 |                |
| A29R2032315-0472-00RES.,FXD,CMPSN:4.7K OHM,5%,0.25W01121CB4725A29R2200311-1248-00RES.,VAR,NONWIR:500 OHM,10%,0.50W7313872-23-0A29R2201315-0391-00RES.,FXD,CMPSN:390 OHM,5%,0.25W01121CB3915A29R2220307-0445-00RES.NTWK,FXD,F1:4.7K OHM,20%,(9) RES91637MSP10A01-472MA29R2230315-0102-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1025A29R2231315-0103-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1035A29R2232315-0102-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1025A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB1025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |             |                  |                                         |       |                 |                |
| A29R2200311-1248-00RES.,VAR,NONWIR:500 OHM,10%,0.50W7313872-23-0A29R2201315-0391-00RES.,FXD,CMPSN:390 OHM,5%,0.25W01121CB3915A29R2220307-0445-00RES NTWK,FXD,F1:4.7K OHM,20%,(9) RES91637MSP10A01-472MA29R2230315-0102-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1025A29R2231315-0103-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1035A29R2232315-0102-00RES.,FXD,CMPSN:1K OHM,5%,0.25W01121CB1025A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB1025A29R2233315-0512-00RES.,FXD,CMPSN:5.1K OHM,5%,0.25W01121CB1025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |             |                  |                                         |       |                 |                |
| A29R2201       315-0391-00       RES., FXD, CMPSN: 390 OHM, 5%, 0.25W       01121       CB3915         A29R2220       307-0445-00       RES. NTWK, FXD, F1:4.7K       OHM, 20%, (9)       RES       91637       MSP10A01-472M         A29R2230       315-0102-00       RES., FXD, CMPSN: 1K       OHM, 5%, 0.25W       01121       CB1025         A29R2231       315-0103-00       RES., FXD, CMPSN: 10K       OHM, 5%, 0.25W       01121       CB1035         A29R2232       315-0102-00       RES., FXD, CMPSN: 11K       OHM, 5%, 0.25W       01121       CB1025         A29R2233       315-0512-00       RES., FXD, CMPSN: 5.1K       OHM, 5%, 0.25W       01121       CB5125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | A29R2032      | 315-0472-00 |                  | RES.,FXD,CMPSN:4.7K OHM,5%,0.25W        | 01121 | CB4725          |                |
| A29R2220       307-0445-00       RES NTWK,FXD,FI:4.7K OHM,20%,(9) RES       91637       MSP10A01-472M         A29R2230       315-0102-00       RES.,FXD,CMPSN:1K OHM,5%,0.25W       01121       CB1025         A29R2231       315-0103-00       RES.,FXD,CMPSN:10K OHM,5%,0.25W       01121       CB1035         A29R2232       315-0102-00       RES.,FXD,CMPSN:1K OHM,5%,0.25W       01121       CB1025         A29R2233       315-0512-00       RES.,FXD,CMPSN:5.1K OHM,5%,0.25W       01121       CB5125         A29R2233       315-0512-00       RES.,FXD,CMPSN:5.1K OHM,5%,0.25W       01121       CB5125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               | 311-1248-00 |                  |                                         |       |                 |                |
| A29R2230       315-0102-00       RES.,FXD,CMPSN:1K OHM,5%,0.25W       01121       CB1025         A29R2231       315-0103-00       RES.,FXD,CMPSN:10K OHM,5%,0.25W       01121       CB1035         A29R2232       315-0102-00       RES.,FXD,CMPSN:1K OHM,5%,0.25W       01121       CB1025         A29R2233       315-0512-00       RES.,FXD,CMPSN:5.1K OHM,5%,0.25W       01121       CB5125         A29R2233       315-0512-00       RES.,FXD,CMPSN:5.1K OHM,5%,0.25W       01121       CB5125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |               |             |                  |                                         |       |                 |                |
| A29R2231       315-0103-00       RES., FXD, CMPSN:10K OHM, 5%, 0.25W       01121       CB1035         A29R2232       315-0102-00       RES., FXD, CMPSN:1K OHM, 5%, 0.25W       01121       CB1025         A29R2233       315-0512-00       RES., FXD, CMPSN:5.1K OHM, 5%, 0.25W       01121       CB5125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |             |                  |                                         |       |                 |                |
| A29R2232       315-0102-00       RES., FXD, CMPSN: 1K OHM, 5%, 0.25W       01121       CB1025         A29R2233       315-0512-00       RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W       01121       CB5125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |             |                  |                                         |       |                 |                |
| A29R2233 315-0512-00 RES.,FXD,CMPSN:5.1K OHM,5%,0.25W 01121 CB5125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |             |                  |                                         |       |                 |                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2232      | 315-0102-00 |                  | RES.,FXD,CMPSN:1K OHM,5%,0.25W          | 01121 | CB1025          |                |
| A29R2234 315-0102-00 RES.,FXD,CMPSN:1K 0HM,5%,0.25W 01121 CB1025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | A29R2233      | 315-0512-00 |                  |                                         |       |                 |                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2234      | 315-0102-00 |                  | RES.,FXD,CMPSN:1K OHM,5%,0.25W          | 01121 | CB1025          | - A STORE OF B |

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|----------------------------|------------------|--------------------------------------------------------------------|-------|--------------------------------------------------------------------------------------------|
| - m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Component No.                                    | Part No.                   | Eff Dscont       | Name & Description                                                 |       | Mfr Part Number                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | aparateria ana ana ana ana ana ana ana ana ana a |                            |                  |                                                                    |       | а на подрежа на спорти напрели има на селина, при част сремо радо у Алексаниј и Колексији. |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2236<br>A29R2300                             | 315-0102-00                |                  | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W                                |       | CB1025                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2302                                         | 315-0393-00<br>315-0393-00 |                  | RES.,FXD,CMPSN:39K OHM,5%,0.25W<br>RES.,FXD,CMPSN:39K OHM,5%,0.25W |       | CB3935                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2310                                         | 315-0393-00                |                  | RES.,FXD,CMPSN:39K OHM,5%,0.25W                                    |       | CB3935<br>CB3935                                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2311                                         | 315-0751-00                |                  | RES., FXD, CMPSN: 750 OHM, 5%, 0.25W                               | 01121 |                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2312                                         | 315-0751-00                |                  | RES., FXD, CMPSN: 750 OHM, 5%, 0.25W                               |       | CB7515<br>CB7515                                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                  | 515 0751 00                |                  | KB0.,1KD,0115K.750 0111,5%,0.25%                                   | 01121 | 007919                                                                                     |
| *****                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A29R2330                                         | 315-0751-00                |                  | RES.,FXD,CMPSN:750 OHM,5%,0.25W                                    | 01121 | CB7515                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2331                                         | 315-0751-00                |                  | RES., FXD, CMPSN: 750 OHM, 5%, 0.25W                               |       | CB7515                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2332                                         | 315-0751-00                |                  | RES.,FXD,CMPSN:750 OHM,5%,0.25W                                    | 01121 | CB7515                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2333                                         | 315-0751-00                |                  | RES., FXD, CMPSN: 750 OHM, 5%, 0.25W                               | 01121 | CB7515                                                                                     |
| ~~~                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | A29R2334                                         | 315-0751-00                |                  | RES.,FXD,CMPSN:750 OHM,5%,0.25W                                    | 01121 | CB7515                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2335                                         | 315-0751-00                |                  | RES.,FXD,CMPSN:750 OHM,5%,0.25W                                    | 01121 | CB7515                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 10000000                                         | 215 0751 00                |                  |                                                                    |       | 0.7.7.1.5                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2336                                         | 315-0751-00                |                  | RES., FXD, CMPSN: 750 OHM, 5%, 0.25W                               | 01121 | CB7515                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2337                                         | 315-0751-00                |                  | RES., FXD, CMPSN: 750 OHM, 5%, 0.25W                               | 01121 |                                                                                            |
| 1984 -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | A29R2400<br>A29R2420                             | 315-0302-00                |                  | RES., FXD, CMPSN: 3K OHM, 5%, 0.25W                                | 01121 |                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2500                                         | 315-0472-00<br>321-0403-00 |                  | RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W                              | 01121 |                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2500                                         | 321-0372-00                |                  | RES., FXD, FILM: 154K OHM, 1%, 0. 125W                             |       | MFF1816G15402F                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | R2 7R2 J01                                       | 521-0572-00                |                  | RES.,FXD,FILM:73.2K OHM,1%,0.125W                                  | 91037 | MFF1816G73201F                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2502                                         | 321-0262-00                |                  | RES.,FXD,FILM:5.23K OHM,1%,0.125W                                  | 91637 | MFF1816G52300F                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2503                                         | 315-0202-00                |                  | RES., FXD, CMPSN: 2K OHM, 5%, 0.25W                                |       | CB2025                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2600                                         | 311-1248-00                |                  | RES., VAR, NONWIR: 500 OHM, 10%, 0.50W                             |       | 72-23-0                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2601                                         | 315-0153-00                |                  | RES., FXD, CMPSN: 15K OHM, 5%, 0.25W                               |       | CB1535                                                                                     |
| /46                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | A29R2602                                         | 315-0133-00                |                  | RES., FXD, CMPSN: 13K OHM, 5%, 0.25W                               |       | CB1335                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2610                                         | 315-0302-00                |                  | RES.,FXD,CMPSN:3K OHM,5%,0.25W                                     |       | CB3025                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                  |                            |                  |                                                                    |       |                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2611                                         | 315-0393-00                |                  | RES.,FXD,CMPSN:39K OHM,5%,0.25W                                    |       | CB3935                                                                                     |
| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | A29R2700                                         | 321-0259-00                |                  | RES.,FXD,FILM:4.87K OHM,1%,0.125W                                  | 91637 |                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2701                                         | 315-0752-00                |                  | RES., FXD, CMPSN: 7.5K OHM, 5%, 0.25W                              |       | CR7525                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2710                                         | 315-0124-00                |                  | RES., FXD, CMPSN: 120K OHM, 5%, 0.25W                              |       | CB1245                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2711                                         | 315-0153-00                |                  | RES., FXD, CMPSN: 15K OHM, 5%, 0.25W                               |       | CB1535                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2720                                         | 315-0104-00                |                  | RES.,FXD,CMPSN:100K OHM,5%,0.25W                                   | 01121 | CB1045                                                                                     |
| an c                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | A29R2721                                         | 321-0210-00                |                  | RES.,FXD,FILM:1.5K OHM,1%,0.125W                                   | 91637 | MFF1816G15000F                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2802                                         | 315-0304-00                |                  | RES., FXD, CMPSN: 300K OHM, 5%, 0.25W                              |       | СВ3045                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29R2810                                         | 315-0751-00                |                  | RES., FXD, CMPSN: 750 OHM, 5%, 0.25W                               |       | CB7515                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29RT1720                                        | 307-0126-00                |                  | RES., THERMAL: 100 OHM, 10%                                        | 14193 |                                                                                            |
| an .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | A29U100                                          | 156-0480-02                |                  | MICROCIRCUIT, DI:QUAD 2 INP & GATE                                 | 01295 | SN74LS08NP3                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29U110                                          | 156-0382-02                |                  | MICROCIRCUIT, DI:QUAD 2-INP NAND GATE                              | 01295 | SN74LS00                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                  |                            |                  |                                                                    |       |                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29U120                                          | 156-0479-02                |                  | MICROCIRCUIT, DI:QUAD 2-INP ORGATE                                 | 01295 |                                                                                            |
| w.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | A29U130                                          | 156-0388-03                |                  | MICROCIRCUIT, DI: DUAL D FLIP-FLOP                                 | 07263 | 74LS74A                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29U200                                          | 156-0479-02                |                  | MICROCIRCUIT, DI:QUAD 2-INP ORGATE                                 | 01295 | SN74LS32NP3                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29U210<br>A29U220                               | 156-0381-02                |                  | MICROCIRCUIT, DI:QUAD 2-INP EXCL OR GATE                           |       | SN74LS86                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29U230                                          | 156-0388-03<br>156-0388-03 |                  | MICROCIRCUIT, DI:DUAL D FLIP-FLOP                                  | 07263 | 74LS74A                                                                                    |
| 5.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | R2 70 2 50                                       | 100-0388-03                |                  | MICROCIRCUIT, DI: DUAL D FLIP-FLOP                                 | 07263 | 74LS74A                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29U300                                          | 156-0382-02                |                  | MICROCIRCUIT, DI:QUAD 2-INP NAND GATE                              | 01295 | SN74LS00                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29U310                                          | 156-0479-02                |                  | MICROCIRCUIT, DI:QUAD 2-INP ORGATE                                 | 01295 | SN74LS32NP3                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29U320                                          | 156-0720-02                |                  | MICROCIRCUIT, DI:HEX DRVR, 4 TO2 LINE                              | 01295 |                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29U330                                          | 156-0465-02                |                  | MICROCIRCUIT, DI:8 INP NAND GATE                                   | 01295 | SN74LS30NP3                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29U400                                          | 156-0480-02                |                  | MICROCIRCUIT, DI:QUAD 2 INP & GATE                                 | 01295 |                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29U410                                          | 156-0471-02                |                  | MICROCIRCUIT, DI: DUAL 4/1 DATA SEL                                | 80009 | 156-0471-02                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                  |                            |                  |                                                                    |       |                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29U420                                          | 156-0798-02                |                  | MICROCIRCUIT, DI: DUAL 14 TO 1 LINE SEL/MUX                        | 01295 | SN74LS153                                                                                  |
| «.,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | A29U430                                          | 156-0388-03                |                  | MICROCIRCUIT, DI: DUAL D FLIP-FLOP                                 | 07263 | 74LS74A                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A290500                                          | 156-0798-02                |                  | MICROCIRCUIT, DI: DUAL 14 TO 1 LINE SEL/MUX                        | 01295 | SN74LS153                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29U510                                          | 156-0735-02                |                  | MICROCIRCUIT, DI:4 BIT BISTABLE LCH, BURN-IN                       | 80009 | 156~0735-02                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29U520<br>A29U530                               | 156-0798-02<br>156-0479-02 |                  | MICROCIRCUIT, DI:DUAL 14 TO 1 LINE SEL/MUX                         | 01295 | SN74LS153                                                                                  |
| e ve                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | **** / 0 / / 0                                   | 10 04/9-02                 |                  | MICROCIRCUIT, DI: QUAD 2-INP ORGATE                                | 01295 | SN74LS32NP3                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A29U600                                          | 156-0479-02                |                  | MICROCIRCUIT, DI:QUAD 2-INP ORGATE                                 | 01295 | SN74LS32NP3                                                                                |
| and the second s | A29U610                                          | 156-0994-02                |                  | MICROCIRCUIT, DI:8 INPUT DATA SEL/MUX                              | 01295 |                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                  |                            |                  | ,                                                                  |       | · · · · · · · · · · · · ·                                                                  |

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|                      | Tektronix                                | Serial/Model No. |                                                                                            | Mfr                                   |                                                                                           |       |
|----------------------|------------------------------------------|------------------|--------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------|-------|
| Component No.        | Part No.                                 | Eff Dscont       | Name & Description                                                                         |                                       | Mfr Part Number                                                                           | a>-   |
|                      | 0779072737777777777777777777777777777777 |                  |                                                                                            | ADDA OF ADDA ADDA ADDA ADDA ADDA ADDA | алаан илтаруун нуна таас карарын ну килунтун Кинарарикана нарактана анууна тааруу каракта |       |
| A29U620<br>A29U630   | 160-0367-00                              |                  | MICROCIRCUIT, DI: 1024 X 8 ROM                                                             | 80009                                 | 160-0367-00                                                                               |       |
| A290700              | 156-0865-02<br>156-0412-02               |                  | MICROCIRCUIT, DI:OCTAL D-TYPE FF W/CLEAR                                                   | 01295                                 | SN74LS273NP3                                                                              |       |
| A29U710              | 156-0412-02                              |                  | MICROCIRCUIT, DI:SYN 4 BIT UP-DOWN CNTR                                                    | 80009                                 | 156-0412-02                                                                               | ~     |
| A29U720              | 156~1045~01                              |                  | MICROCIRCUIT, DI:SYN 4 BIT UP-DOWN CNTR<br>MICROCIRCUIT, DI:QUAD 2 INPUT MUX W/STORAGE     | 80009                                 | 156-0412-02                                                                               |       |
| A29U730              | 156-1045-01                              |                  | MICROCIRCUIT, DI:QUAD 2 INPUT MUX W/SIORAGE<br>MICROCIRCUIT, DI:QUAD 2 INPUT MUX W/SIORAGE | 80009<br>80009                        | 156-1045-01<br>156-1045-01                                                                |       |
|                      |                                          |                  |                                                                                            | 00007                                 | 190 1049 01                                                                               |       |
| A29U800              | 156-0412-02                              |                  | MICROCIRCUIT, DI:SYN 4 BIT UP-DOWN CNTR                                                    | 80009                                 | 156-0412-02                                                                               |       |
| A29U810              | 156-0679-01                              |                  | MICROCIRCUIT, DI:4 BIT BINARY ADDER, BURN-IN                                               | 04713                                 | SN74LS283NDS                                                                              |       |
| A29U820              | 156-0784-00                              |                  | MICROCIRCUIT, DI:SYNC 4 BIT BINARY COUNTER                                                 | 01295                                 | SN74LS163AN                                                                               |       |
| A29U830              | 156-0916-02                              |                  | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN                                                 | 27014                                 | DM81LS97                                                                                  |       |
| A29U900              | 156-0927-02                              |                  | MICROCIRCUIT, LI: DIGITAL TO ANALOG CONVERT                                                | 80009                                 | 156-0927-02                                                                               |       |
| A29U910              | 156-0784-00                              |                  | MICROCIRCUIT, DI: SYNC 4 BIT BINARY COUNTER                                                | 01295                                 | SN74LS163AN                                                                               |       |
| A29U920              | 156-0530-02                              |                  | MICROCIRCUIT, DI: QUAD 2 INP MUX                                                           | 01295                                 | SN74LS157P3                                                                               |       |
| A29U930              | 156-0916-02                              |                  | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN                                                 | 27014                                 | DM81LS97                                                                                  |       |
| A29U1010             | 156-0927-02                              |                  | MICROCIRCUIT, LI: DIGITAL TO ANALOG CONVERT                                                | 80009                                 | 156-0927-02                                                                               |       |
| A29U1020             | 156-0391-02                              |                  | MICROCIRCUIT, DI:HEX LATCH W/CLEAR                                                         | 01295                                 | SN74LS174                                                                                 |       |
| A29U1030             | 156-0916-02                              |                  | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN                                                 | 27014                                 | DM81LS97                                                                                  |       |
| A29U1120             | 156-0784-00                              |                  | MICROCIRCUIT, DI:SYNC 4 BIT BINARY COUNTER                                                 | 01295                                 | SN74LS163AN                                                                               |       |
| 4 8 9 4 1 1 9 9      |                                          |                  |                                                                                            |                                       |                                                                                           |       |
| A29U1130             | 156-1172-01                              |                  | MICROCIRCUIT, DI: DUAL 4 BIT CNTR, BURN IN                                                 | 01295                                 | SN74LS393                                                                                 |       |
| A29U1200<br>A29U1220 | 156-1236-00                              |                  | MICROCIRCUIT, INTFC: DUAL SPST ANALOG SWITCH                                               | 80009                                 | 156-1236-00                                                                               |       |
| A2901220             | 155-0014-01                              |                  | MICROCIRCUIT, DI:ML, ANALOG TO DECIMAL CONV                                                | 80009                                 | 155-0014-01                                                                               |       |
| A2901230             | 156-1177-01<br>156-1236-00               |                  | MICROCIRCUIT, DI: 10/4 LINE PRIORITY ENCODER                                               | 80009                                 | 156-1177-01                                                                               |       |
| A2901305             | 156-0067-12                              |                  | MICROCIRCUIT, INTFC: DUAL SPST ANALOG SWITCH                                               | 80009                                 | 156-1236-00<br>MC1741CU                                                                   |       |
| M2901909             | 150 0007 12                              |                  | MICROCIRCUIT, LI: OPERATIONAL AMPLIFIER                                                    | 04713                                 | MC1741C0 .                                                                                |       |
| A29U1310             | 156-1236-00                              |                  | MICROCIRCUIT, INTFC: DUAL SPST ANALOG SWITCH                                               | 80009                                 | 156-1236-00                                                                               |       |
| A29U1330             | 156-0405-00                              |                  | MICROCIRCUIT, DI: DUAL RETRIG MONOSTABLE MV                                                | 07263                                 | 9602 (PC OR DC)                                                                           |       |
| A29U1410             | 156-1236-00                              |                  | MICROCIRCUIT, INTFC: DUAL SPST ANALOG SWITCH                                               | 80009                                 | 156-1236-00                                                                               | < ~ ~ |
| A29U1420             | 156-1176-01                              |                  | MICROCIRCUIT, DI: 8/3 LINE PRIORITY ENCODER                                                | 80009                                 | 156-1176-01                                                                               |       |
| A29U1430             | 156-1176-01                              |                  | MICROCIRCUIT, DI:8/3 LINE PRIORITY ENCODER                                                 | 80009                                 | 156-1176-01                                                                               |       |
| A29U1500             | 156-0742-02                              |                  | MICROCIRCUIT, LI: OPERATIONAL AMPLIFIER, SEL                                               | 01295                                 | LM318P3                                                                                   |       |
| A29U1505             | 156-0742-02                              |                  | MICROCIRCUIT, LI: OPERATIONAL AMPLIFIER, SEL                                               | 01295                                 | LM318P3                                                                                   | ~*    |
| A29U1520             | 155-0014-01                              |                  | MICROCIRCUIT, DI:ML, ANALOG TO DECIMAL CONV                                                | 80009                                 | 155-0014-01                                                                               |       |
| A29U1530             | 156-0386-02                              |                  | MICROCIRCUIT, DI: TRIPLE 3 INP NAND GATE                                                   | 01295                                 | SN74LS10NP3                                                                               |       |
| A29U1620             | 156-1191-01                              |                  | MICROCIRCUIT, LI: DUAL BI-FET OP-AMP, 8 DIP                                                | 01295                                 | TL072CP                                                                                   |       |
| A29U1700             | 156038502                                |                  | MICROCIRCUIT, DI: HEX INVERTER                                                             | 01295                                 | SN74LSO4                                                                                  | *     |
| A29U1720             | 156-1211-00                              |                  | MICROCKT, INTFC: QUAD SPST SWITCH, 2NC, 2NO                                                | 80009                                 | 156-1211-00                                                                               |       |
| 420111720            | 156 1006 00                              |                  |                                                                                            |                                       |                                                                                           |       |
| A29U1730<br>A29U1800 | 156-1236-00                              |                  | MICROCIRCUIT, INTFC: DUAL SPST ANALOG SWITCH                                               | 80009                                 | 156-1236-00                                                                               |       |
| A29U1810             | 156-0708-02                              |                  | MICROCIRCUIT, DI: DUAL 4 INP NAND GATE                                                     | 01295                                 | SN74LS20                                                                                  | -     |
| A29U1820             | 156-0798-02<br>156-0383-02               |                  | MICROCIRCUIT, DI:DUAL 14 TO 1 LINE SEL/MUX                                                 | 01295                                 |                                                                                           |       |
| A29U1900             | 156-0412-02                              |                  | MICROCIRCUIT, DI:QUAD 2-INP NOR GATE<br>MICROCIRCUIT, DI:SYN 4 BIT UP-DOWN CNTR            | 01295                                 | SN74LSO2<br>156-0412-02                                                                   |       |
| A29U1910             | 156-0479-02                              |                  | MICROCIRCUIT, DI:QUAD 2-INP ORGATE                                                         | 01295                                 |                                                                                           |       |
|                      |                                          |                  |                                                                                            |                                       |                                                                                           | -     |
| A29U1920             | 156-0387-02                              |                  | MICROCIRCUIT, DI: DUAL J-K FF, BURN IN                                                     | 80009                                 | 156-0387-02                                                                               |       |
| A29U2000             | 156-0412-02                              |                  | MICROCIRCUIT, DI: SYN 4 BIT UP-DOWN CNTR                                                   | 80009                                 | 156-0412-02                                                                               |       |
| A29U2010             | 156-0480-02                              |                  | MICROCIRCUIT, DI:QUAD 2 INP & GATE                                                         | 01295                                 | SN74LS08NP3                                                                               |       |
| A29U2020             | 156-0382-02                              |                  | MICROCIRCUIT, DI: QUAD 2-INP NAND GATE                                                     | 01295                                 | SN74LS00                                                                                  | -01   |
| A29U2100             | 156-0331-00                              |                  | MICROCIRCUIT, DI: DUAL D-TYPE, FLIP-FLOP                                                   | 80009                                 | 156-0331-00                                                                               |       |
| A29U2110             | 156~0464-02                              |                  | MICROCIRCUIT, DI: DUAL 4 INP NAND GATE                                                     | 01295                                 | SN74LS20                                                                                  |       |
| A29U2120             | 156-0798-02                              |                  | MICROCIRCUIT, DI: DUAL 14 TO 1 LINE SEL/MUX                                                | 01295                                 | SN74LS153                                                                                 |       |
| A29U2130             | 156-0479-02                              |                  | MICROCIRCUIT, DI:QUAD 2-INP ORGATE                                                         | 01295                                 |                                                                                           | -     |
| A29U2310             | 156-0645-02                              |                  | MICROCIRCUIT, DI:SCHMITT-TRIG POS-NAND                                                     | 01295                                 | SN74LS14                                                                                  |       |
| A29U2320             | 155-0017-00                              |                  | MICROCIRCUIT, DI:ML, ZERO LOGIC COUNTER                                                    | 80009                                 | 155-0017-00                                                                               |       |
| A29U2410             | 156-0480-02                              |                  | MICROCIRCUIT, DI: QUAD 2 INP & GATE                                                        | 01295                                 | SN74LSO8NP3                                                                               |       |
| A29U2420             | 156-0646-02                              |                  | MICROCIRCUIT, DI:4 BIT BINARY COUNTER                                                      | 01295                                 |                                                                                           |       |
|                      |                                          |                  |                                                                                            |                                       |                                                                                           |       |

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| Component No. | Tektronix<br>Part No. | Serial/Model<br>Eff Ds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | l No.<br>cont | Name & Des        | cription      | Mfr<br>Code | Mfr Part Number |
|---------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------------|---------------|-------------|-----------------|
| A29U2530      | 155-0015-01           | Ning States and a state of the strategy of the states of the | MIC           | ROCIRCUIT, DI:ML, | ANALOG DATA S | WITCH 8000  | 9 155-0015-01   |
| A29W110       | 131-0566-00           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               | CONDUCTOR : DUMMY |               |             |                 |
| A29W1401      | 131-0566-00           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               | CONDUCTOR : DUMMY |               |             | ) L-2007-1      |
| A29W1411      | 131-0566-00           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               | CONDUCTOR : DUMMY |               |             | ) L-2007-1      |
| A29W2632      | 131-0566-00           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               | CONDUCTOR : DUMMY |               |             | ) L-2007-1      |
| A29W2633      | 131-0566-00           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | BUS           | CONDUCTOR : DUMMY | RES,2.375,22  | AWG 55210   | ) L-2007-1      |
| A29W2800      | 131-0566-00           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | BUS           | CONDUCTOR : DUMMY | RES,2.375,22  | AWG 55210   | ) L-2007-1      |

|               | Tektronix   | Serial/N | lodel No. |                                             | Mfr   |                  |                                        |
|---------------|-------------|----------|-----------|---------------------------------------------|-------|------------------|----------------------------------------|
| Component No. | Part No.    | Eff      | Dscont    | Name & Description                          | Code  | Mfr Part Number  |                                        |
| A30           |             |          |           | CKT BOARD ASSY:G.P.I.B                      |       |                  |                                        |
| A30C100       | 281-0775-00 |          |           | CAP., FXD, CER DI:0.1UF, 20%, 50V           | 72982 | 8005D9AABZ5U104M |                                        |
| A30C140       | 281-0775-00 |          |           | CAP., FXD, CER DI:0.1UF, 20%, 50V           | 72982 | 8005D9AABZ5U104M |                                        |
| A30C210       | 281-0775-00 |          |           | CAP., FXD, CER DI:0.1UF, 20%, 50V           | 72982 | 8005D9AABZ5U104M |                                        |
| A30C320       | 281-0775-00 |          |           | CAP., FXD, CER DI:0.1UF, 20%, 50V           | 72982 | 8005D9AABZ5U104M |                                        |
| A30C340       | 281-0775-00 |          |           | CAP., FXD, CER DI:0.1UF, 20%, 50V           | 72982 | 8005D9AABZ5U104M |                                        |
| A30C440       | 281-0775-00 |          |           | CAP., FXD, CER DI:0.1UF, 20%, 50V           | 72982 | 8005D9AABZ5U104M |                                        |
| A30C510       | 281-0775-00 |          |           | CAP., FXD, CER DI:0.1UF, 20%, 50V           | 72982 | 8005D9AABZ5U104M |                                        |
| A30C520       | 283-0788-00 |          |           | CAP., FXD, MICA D:267PF, 1%, 500V           | 09023 | CD15F0(267)F03   |                                        |
| A30C610       | 281-0775-00 |          |           | CAP., FXD, CER DI:0.1UF, 20%, 50V           | 72982 | 8005D9AABZ5U104M |                                        |
| A30C640       | 281-0775-00 |          |           | CAP., FXD, CER DI:0.1UF, 20%, 50V           | 72982 | 8005D9AABZ5U104M |                                        |
| A30Q700       | 151-0190-05 |          |           | TRANSISTOR: SILICON, NPN                    | 80009 | 151-0190-05      |                                        |
| A30Q701       | 151-0190-05 |          |           | TRANSISTOR: SILICON, NPN                    | 80009 | 151-0190-05      |                                        |
| A30R201       | 315-0223-00 |          |           | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W        | 01121 | CB2235           |                                        |
| A30R202       | 315-0223-00 |          |           | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W        | 01121 | CB2235           |                                        |
| A30R203       | 315-0223-00 |          |           | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W        |       | CB2235           |                                        |
| A30R204       | 315-0223-00 |          |           | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W        | 01121 | CB2235           |                                        |
| A30R205       | 315-0223-00 |          |           | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W        | 01121 | CB2235           |                                        |
| A30R210       | 315-0223-00 |          |           | RES.,FXD,CMPSN:22K OHM,5%,0.25W             | 01121 | CB2235           |                                        |
| A30R301       | 315-0223-00 |          |           | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W        | 01121 | CB2235           |                                        |
| A30R302       | 315-0223-00 |          |           | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W        | 01121 | CB2235           |                                        |
| A30R303       | 315-0223-00 |          |           | RES.,FXD,CMPSN:22K OHM,5%,0.25W             | 01121 | CB2235           |                                        |
| A30R340       | 315-0223-00 |          |           | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W        | 01121 | CB2235           |                                        |
| A30R520       | 315-0561-00 |          |           | RES.,FXD,CMPSN:560 OHM,5%,0.25W             | 01121 | CB5615           |                                        |
| A30R700       | 315-0512-00 |          |           | RES.,FXD,CMPSN:5.1K OHM,5%,0.25W            | 01121 | CB5125           |                                        |
| A30R701       | 315-0512-00 |          |           | RES.,FXD,CMPSN:5.1K OHM,5%,0.25W            | 01121 | CB5125           |                                        |
| A30U110       | 156-1133-02 |          |           | MICROCIRCUIT, DI: QUAD 3 STATE XCVR         | 80009 | 156-1133-02      | ···· · · · · · · · · · · · · · · · · · |
| A30U120       | 156-1133-02 |          |           | MICROCIRCUIT, DI:QUAD 3 STATE XCVR          | 80009 |                  |                                        |
| A3CU130       | 156-1133-02 |          |           | MICROCIRCUIT, DI: QUAD 3 STATE XCVR         | 80009 |                  |                                        |
| A30U220       | 156-1246-00 |          |           | MICROCIRCUIT, DI: GPIB PROTOCOL             | 80009 | 156-1246-00      |                                        |
| A30U310       | 156-1133-02 |          |           | MICROCIRCUIT, DI: QUAD 3 STATE XCVR         | 80009 | 156-1133-02      |                                        |
| A30U330       | 156-0916-02 |          |           | MICROCIRCUIT, DI: 8-2 INP 3-STATE BFR, BURN | 27014 | DM81LS97         |                                        |
| A30U410       | 156-0916-02 |          |           | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN  | 27014 | DM81LS97         |                                        |
| A30U430       | 156-0916-02 |          |           | MICROCIRCUIT, DI: 8-2 INP 3-STATE BFR, BURN | 27014 |                  |                                        |
| A30U510       | 156-0382-02 |          |           | MICROCIRCUIT, DI:QUAD 2-INP NAND GATE       | 01295 |                  |                                        |
| A30U520       | 156-0651-02 |          |           | MICROCIRCUIT, DI:8 BIT PRL-OUTSER SHF RGTR  | 01295 | SN74LS164        |                                        |
| A30U530       | 156-0479-02 |          |           | MICROCIRCUIT, DI: QUAD 2-INP ORGATE         | 01295 |                  |                                        |
| A30U610       | 156-0388-03 |          |           | MICROCIRCUIT, DI: DUAL D FLIP-FLOP          | 07263 |                  |                                        |
| A30U620       | 156-0387-02 |          |           | MICROCIRCUIT, DI: DUAL J-K FF, BURN IN      | 80009 |                  |                                        |
| A30U630       | 156-0385-02 |          |           | MICROCIRCUIT, DI: HEX INVERTER              | 01295 | SN74LS04         |                                        |

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| (normal)      | Component No. | Tektronix<br>Part No.                                                 | Serial/Mod<br>Eff | del No.<br>Dscont | Name & Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Mfr<br>Code | Mfr Part Number                                                                   |
|---------------|---------------|-----------------------------------------------------------------------|-------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------------------------------------------------------------------|
|               | A31           |                                                                       |                   |                   | CKT BOARD ASSY: ROM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             | а, уданданита на накалитично адороганија и рисси, кали на негодијањи (колонскија) |
|               | A31C105       | 281-0775-00                                                           |                   |                   | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 72982       | 8005D9AABZ5U104M                                                                  |
|               | A31C110       | 281-0775-00                                                           |                   |                   | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 72982       | 8005D9AABZ5U104M                                                                  |
| , and 31      | A31C115       | 281-0775-00                                                           |                   |                   | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 72982       |                                                                                   |
|               | A31C120       | 281-0775-00                                                           |                   |                   | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 72982       |                                                                                   |
|               | A31C205       | 281-0775-00                                                           |                   |                   | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 72982       |                                                                                   |
| مەلە مەرىپىر  | A31C210       | 281-0775-00                                                           |                   |                   | CAP.,FXD,CER DI:0.1UF,20%,50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 72982       | 8005D9AABZ5U104M                                                                  |
|               | A31C215       | 281-0775-00                                                           |                   |                   | CAP., FXD, CER DI:0.10F, 20%, 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 72982       |                                                                                   |
|               | A31C220       | 281-0775-00                                                           |                   |                   | CAP.,FXD,CER DI:0.10F,20%,50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 72982       |                                                                                   |
|               | A31C222       | 283-0103-00                                                           |                   |                   | CAP., FXD, CER DI: 180PF, 5%, 500V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 59660       |                                                                                   |
|               | A31C305       | 281-0775-00                                                           |                   |                   | CAP., FXD, CER DI: 180FF, 5%, 500V<br>CAP., FXD, CER DI: 0.1UF, 20%, 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             | 831-518-Z5D0181J<br>8005D9AABZ5U104M                                              |
| Aller and     | A31C310       | 281-0775-00                                                           |                   |                   | CAP., FXD, CER DI:0.10F, 20%, 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 72982       |                                                                                   |
|               | 1210/05       |                                                                       |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                   |
|               | A31C405       | 281-0775-00                                                           |                   |                   | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 72982       |                                                                                   |
|               | A31C410       | 281-0775-00                                                           |                   |                   | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 72982       |                                                                                   |
| men series de | A31C415       | 281-0775-00                                                           |                   |                   | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 72982       |                                                                                   |
|               | A31C420       | 281-0775-00                                                           |                   |                   | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 72982       |                                                                                   |
|               | A31C425       | 281-0775-00                                                           |                   |                   | CAP., FXD, CER DI:0.1UF, 20%, 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 72982       |                                                                                   |
|               | A31R210       | 315-0152-00                                                           |                   |                   | RES.,FXD,CMPSN:1.5K OHM,5%,0.25W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 01121       | CB1525                                                                            |
|               | A31R220       | 315-0222-00                                                           |                   |                   | RES.,FXD,CMPSN:2.2K OHM,5%,0.25W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 01121       | CB2225                                                                            |
|               | A31R222       | 315-0201-00                                                           |                   |                   | RES., FXD, CMPSN: 200 OHM, 5%, 0.25W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 01121       | CB2015                                                                            |
|               | A31U100       | 160-0408-00                                                           |                   |                   | MICROCIRCUIT, DI:8192 X 8 ROM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                                                                                   |
|               | A31U110       | 160-0409-00                                                           |                   |                   | MICROCIRCUIT, DI:8192 X 8 ROM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                                                                                   |
|               | A31U120       | 160-0445-00                                                           |                   |                   | MICROCIRCUIT, DI: FPLA W/3 STATE OUT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 80009       | 160-0445-00                                                                       |
|               | A31U130       | 156-0916-02                                                           |                   |                   | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 27014       | DM81LS97                                                                          |
|               | A31U200       | 160-0410-00                                                           |                   |                   | MICROCIRCUIT, DI:8192 X 8 ROM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 80009       | 160-0410-00                                                                       |
|               | A31U210       | 160-0411-00                                                           |                   |                   | MICROCIRCUIT, DI:8192 X 8 ROM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 80009       | 160-0411-00                                                                       |
| survey survey | A31U220       | 156-0171-00                                                           |                   |                   | MICROCIRCUIT, DI:QUAD 2-INPUT OR GATE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 80009       | 156-0171-00                                                                       |
|               | A31U225       | 156-0382-02                                                           |                   |                   | MICROCIRCUIT, DI:QUAD 2-INP NAND GATE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 01295       | SN74LS00                                                                          |
|               | A31U227       | 156-0387-02                                                           |                   |                   | MICROCIRCUIT, DI: DUAL J-K FF, BURN IN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 80009       | 156-0387-02                                                                       |
|               | A31U230       | 156-0916-02                                                           |                   |                   | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 27014       | DM81LS97                                                                          |
|               |               |                                                                       |                   |                   | in a serie of the series of th | 2,014       | bild i i i bild i i i i i i i i i i i i i i i i i i                               |
| per cer       | A31U320       | 156-0690-03                                                           |                   |                   | MICROCIRCUIT, DI: QUAD 2 INP NOR GATE, BURN IN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 01295       | SN74S02                                                                           |
|               | A31U325       | 156-0718-03                                                           |                   |                   | MICROCIRCUIT, DI:TRIPLE 3-INP NOR GATE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 01295       | SN74LS27                                                                          |
|               | A31U330       | 156-0916-02                                                           |                   |                   | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 27014       | DM81LS97                                                                          |
|               | A31U400       | 160-0466-00                                                           |                   |                   | MICROCIRCUIT, DI: 2048 X 8 E PROM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 80009       | 160-0466-00                                                                       |
| ar - Suppose  | A31U410       | 160-0467-00                                                           |                   |                   | MICROCIRCUIT, DI: 2048 X 8 E PROM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 80009       | 160-0467-00                                                                       |
|               | A31U420       | 156-0180-04                                                           |                   |                   | MICROCIRCUIT, DI: 2048 X B E FROM<br>MICROCIRCUIT, DI: QUAD 2 INP NAND GATE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 01295       |                                                                                   |
|               |               | -20 0100 04                                                           |                   |                   | ALONGOTINGTINGT Z THE NAME GATE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | J127J       | JR/4500RFJ                                                                        |
|               | A31U425       | 156-0385-02                                                           |                   |                   | MICROCIRCUIT, DI: HEX INVERTER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 01295       |                                                                                   |
| e verena      | A31U430       | 156-0916-02                                                           |                   |                   | MICROCIRCUIT, DI:8-2 INP 3-STATE BFR, BURN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 27014       | DM81LS97                                                                          |
|               | A31XU300      | Fig. 486, 696, 697, 204                                               |                   |                   | (FOR FUTURE EXPANSION)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |                                                                                   |
|               | A31XU310      | danta dalam namar najada manasa — a ayaya nginga dalaga ngilan dalaha |                   |                   | (FOR FUTURE EXPANSION)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |                                                                                   |
|               |               |                                                                       |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                   |

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## Replaceable Electrical Parts-7854 Service

| Component No.                                                                                                   | Tektronix<br>Part No.                           | Serial/N<br>Eff | /lodel No.<br>Dscont | Name & Description                          | Mfr<br>Code   | Mfr Part Number  | n a serada      |
|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-----------------|----------------------|---------------------------------------------|---------------|------------------|-----------------|
| CONTRACTOR OF A | rait NU.                                        |                 | DSCOIN               |                                             | oouc          |                  |                 |
| A32                                                                                                             | way the Pills 4/9 and once one take and the set |                 |                      | CKT BOARD ASSY:REAR PANEL                   |               |                  |                 |
| A32C14                                                                                                          | 281-0775-00                                     |                 |                      | CAP.,FXD,CER DI:0.1UF,20%,50V               | 72982         | 8005D9AABZ5U104M |                 |
| A32CR12                                                                                                         | 152-0198-00                                     |                 |                      | SEMICOND DEVICE: SILICON, 200V, 3A          | 03508         | 1N5624           | - 274           |
| A32CR15                                                                                                         | 152-0581-00                                     |                 |                      | SEMICOND DEVICE:SILICON, 20V, 1A            | 80009         | 152-0581-00      |                 |
| A32F12                                                                                                          | 159-0016-00                                     |                 |                      | FUSE, CARTRIDGE: 3AG, 1.5A, 250V, FAST-BLOW | 71400         | AGC 1 1/2        |                 |
| A32Q14                                                                                                          | 151-0521-00                                     |                 |                      | TRANSISTOR: 200V, 8.0A                      | 03508         | C122B            |                 |
| A32R12                                                                                                          | 308-0244-00                                     |                 |                      | RES.,FXD,WW:0.3 OHM,10%,2W                  | 91637         | RS2B162ER3000K   |                 |
| A32R13                                                                                                          | 315-0221-00                                     |                 |                      | RES.,FXD,CMPSN:220 OHM,5%,0.25W             | 01121         | CB2215           |                 |
| A32R14                                                                                                          | 315-0102-00                                     |                 |                      | RES.,FXD,CMPSN:1K OHM,5%,0.25W              | 01121         | CB1025           |                 |
| A32R15                                                                                                          | 315-0331-00                                     |                 |                      | RES.,FXD,CMPSN:330 OHM,5%,0.25W             | 01121         | CB3315           |                 |
| A32S110                                                                                                         | 260-1721-00                                     |                 |                      | SWITCH, ROCKER:8, SPST, 125MA, 30VDC        | 007 <b>79</b> | 435166-5         | 21 <b>2</b> -01 |
| A32VR13                                                                                                         | 152-0243-00                                     |                 |                      | SEMICOND DEVICE: ZENER, 0.4W, 15V, 5%       | 14552         | TD3810983        |                 |
| A32VR16                                                                                                         | 152-0195-00                                     |                 |                      | SEMICOND DEVICE:ZENER,0.4W,5.1V,5%          | 04713         | SZ11755          |                 |
|                                                                                                                 |                                                 |                 |                      |                                             |               |                  | ngabi           |
| A33                                                                                                             | alle alle alle fait inte anno ann ann ann agus  |                 |                      | CKT BOARD ASSY:X-Y COMPENSATION             |               |                  |                 |
| A33C822                                                                                                         | 283-0603-00                                     |                 |                      | CAP., FXD, MICA D:113PF, 2%, 300V           | 00853         | D153F1130G0      |                 |
| A33C825                                                                                                         | 283-0668-00                                     |                 |                      | CAP., FXD, MICA D: 184PF, 1%, 500V          | 00853         | D155F1840F0      | any the         |
| A33C827                                                                                                         | 283-0677-00                                     |                 |                      | CAP., FXD, MICA D:82PF, 1%, 500V            | 00853         | D155E820F0       |                 |
| A33C832                                                                                                         | 281-0118-00                                     |                 |                      | CAP., VAR, MICA D:8-90PF, 175V              | 52769         | GSM231           |                 |
| A33C835                                                                                                         | 283-0668-00                                     |                 |                      | CAP.,FXD,MICA D:184PF,1%,500V               | 00853         | D155F1840F0      |                 |
|                                                                                                                 |                                                 |                 |                      |                                             |               |                  |                 |
| A33C837                                                                                                         | 283-0677-00                                     |                 |                      | CAP.,FXD,MICA D:82PF,1%,500V                | 00853         | D155E820F0       |                 |
| A33CR820                                                                                                        | 152-0141-02                                     |                 |                      | SEMICOND DEVICE: SILICON, 30V, 150MA        | 01295         | 1N4152R          |                 |
| A33K822                                                                                                         | 148-0034-00                                     |                 |                      | RELAY, ARMATURE: DPDT, 15VDC, 600 OHM       | 80009         | 148-0034-00      |                 |
| A33K838                                                                                                         | 148-0034-00                                     |                 |                      | RELAY, ARMATURE: DPDT, 15VDC, 600 OHM       | 80009         | 148-0034-00      |                 |
| A33L822                                                                                                         | 108-0719-00                                     |                 |                      | COIL, RF: 805NH                             | 80009         | 108-0719-00      |                 |
| A33L825                                                                                                         | 108-0719-00                                     |                 |                      | COIL, RF:805NH                              | 80009         | 108-0719-00      |                 |
| A33L827                                                                                                         | 108-0718-00                                     |                 |                      | COIL, RF: 1.75UH                            | 80009         | 108-0718-00      | -57. Relation   |
| A33L832                                                                                                         | 108-0719-00                                     |                 |                      | COIL, RF: 805NH                             | 80009         | 108-0719-00      | يەر.            |
| A33L835                                                                                                         | 108-0719-00                                     |                 |                      | COIL, RF: 805NH                             | 80009         | 108-0719-00      |                 |
| A33R822                                                                                                         | 321-0068-00                                     |                 |                      | RES., FXD, FILM: 49.9 OHM, 1%, 0.125W       | 91637         | MFF1816G49R90F   |                 |
| A33R832                                                                                                         | 321-0068-00                                     |                 |                      | RES., FXD, FILM: 49.9 OHM, 1%, 0.125W       | 91637         | MFF1816G49R90F   |                 |

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## Replaceable Electrical Parts-7854 Service

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|           |               | Tektronix                                         | Serial/Model No. |                                                                              | Mfr   |                  |
|-----------|---------------|---------------------------------------------------|------------------|------------------------------------------------------------------------------|-------|------------------|
|           | Component No. | Part No.                                          | Eff Dscont       | Name & Description                                                           |       | Mfr Part Number  |
|           | A36           | and call one was and a set and also also will get |                  | CKT BOARD ASSY:ELECTRONICS                                                   |       |                  |
|           | A36C210       | 281-0775-00                                       |                  | CAP., FXD, CER DI:0.1UF.20%.50V                                              | 72982 | 8005D9AABZ5U104M |
|           | A36C330       | 281-0775-00                                       |                  | CAP., FXD, CER DI:0.10F, 20%, 50V                                            | 72982 | 8005D9AABZ5U104M |
|           | A36C410       | 281-0775-00                                       |                  | CAP., FXD, CER DI:0.1UF, 20%, 50V                                            | 72982 | 8005D9AABZ5U104M |
|           | A36R110       | 315-0221-00                                       |                  | RES., FXD, CMPSN: 220 OHM, 5%, 0.25W                                         | 01121 | CB2215           |
|           | A36R210       | 315-0221-00                                       |                  | RES., FXD, CMPSN: 220 OHM, 5%, 0.25W                                         |       | CB2215           |
| ·         | A36R430       | 315-0223-00                                       |                  | RES.,FXD,CMPSN:22K OHM,5%,0.25W                                              | 01101 | CB2235           |
|           | A36R530       | 315-0223-00                                       |                  | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W                                         | 01121 | CB2235<br>CB2235 |
|           | A36R531       | 315-0223-00                                       |                  | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W                                         | 01121 | CB2235<br>CB2235 |
|           | A36R532       | 315-0223-00                                       |                  | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W                                         | 01121 | CB2235<br>CB2235 |
|           | A36R541       | 315-0223-00                                       |                  | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W                                         | 01121 | CB2235<br>CB2235 |
|           | A36R542       | 315-0223-00                                       |                  | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W                                         | 01121 |                  |
|           | A36R543       | 315-0223-00                                       |                  | RES.,FXD,CMPSN:22K OHM,5%.0.25W                                              | 01121 | CB2235           |
|           | A36R544       | 315-0223-00                                       |                  | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W                                         | 01121 | CB2235<br>CB2235 |
| 1.00M     | A36R545       | 315-0223-00                                       |                  | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W                                         | 01121 | CB2235<br>CB2235 |
|           | A36R630       | 315-0223-00                                       |                  | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W                                         | 01121 | СВ2235<br>СВ2235 |
|           | A36R631       | 315-0223-00                                       |                  | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W                                         | 01121 | CB2235           |
|           | A36R632       | 315-0223-00                                       |                  | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W                                         | 01121 |                  |
| in Sandh. | A36R641       | 315-0223-00                                       |                  | RES., FXD, CMPSN: 22K OHM, 5%, 0, 25W                                        | 01101 | 000005           |
|           | A36R642       | 315-0223-00                                       |                  | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W                                         | 01121 | CB2235           |
|           | A36R643       | 315-0223-00                                       |                  | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W<br>RES., FXD, CMPSN: 22K OHM, 5%, 0.25W | 01121 | CB2235           |
|           | A36R644       | 315-0223-00                                       |                  |                                                                              | 01121 | CB2235           |
| • ····    | A36R645       | 315-0223-00                                       |                  | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W                                         | 01121 | CB2235           |
|           | A36U320       | 156-0469-00                                       |                  | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W                                         | 01121 | CB2235           |
|           |               | 150 0409-00                                       |                  | MICROCIRCUIT, DI: 3-LINE TO 8-LINE DECODER                                   | 01295 | SN74LS138N       |
|           | A36U520       | 156-0470-02                                       |                  | MICROCIRCUIT, DI:8 INP DATA SEL W/3 STATE                                    | 01295 | SN74LS251        |
| ر         | A36U620       | 156-0470-02                                       |                  | MICROCIRCUIT, DI:8 INP DATA SEL W/3 STATE                                    | 01295 | SN74LS251        |

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### **Replaceable Electrical Parts---7854**

|                    | Tektronix                  | Serial/Model No. |                                 | Mfr                  |
|--------------------|----------------------------|------------------|---------------------------------|----------------------|
| Component No.      | Part No.                   | Eff Dscont       | Name & Description              | Code Mfr Part Number |
| A37                |                            |                  | CKT BOARD ASSY: BUTTON          |                      |
| A37DS820           | 150-1036-00                |                  | LAMP, LED: RED, 3.0V, 40MA      | 01295 TIL 209A       |
| A37DS1000          | 150-1036-00                |                  | LAMP, LED: RED, 3.0V, 40MA      | 01295 TIL 209A       |
|                    |                            |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A375110            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S210            | 131-2202-00                |                  |                                 | 52961 ENG#8000       |
| A37S220            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S230            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S240            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S250            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A375260            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S270            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| \$37\$300          | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| \$37\$310          | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
|                    |                            |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| S37S320            | 131-2202-00                |                  |                                 | 52961 ENG#8000       |
| \$37\$330          | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52501 ERG#0000       |
| A37S350            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A375360            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S370            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S410            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S420            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S430            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S450            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S460            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
|                    |                            |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S470            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S510            | 131-2202-00                |                  |                                 | 52961 ENG#8000       |
| A37S520            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S530            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52901 ENGr0000       |
| A37S550            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S560            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S570            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S610            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
|                    | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S620<br>A37S630 | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
|                    | 101 0000 00                |                  | CONTACT FILC . DEDVITIM CODDED  | 52961 ENG#8000       |
| A37S650            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S660            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER |                      |
| A37S670            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S710            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S720            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A375730            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37\$750           | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S760            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S770            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
|                    | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S810            |                            |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S820<br>A37S830 | 131-2202-00<br>131-2202-00 |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
|                    | 101 1202 00                |                  |                                 |                      |
| A37S850            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S860            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S870            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S910            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S920            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S930            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S950            | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
|                    | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A375960            |                            |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S970            | 131-2202-00                |                  |                                 | 52961 ENG#8000       |
| A37S1010           | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52961 ENG#8000       |
| A37S1020           | 131-2202-00                |                  | CONTACT, ELEC: BERYLLIUM COPPER | 52501 2038 0000      |

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| Man-and   |               | Tektronix   | Serial/M | odel No. |                                 | Mfr   |                 |
|-----------|---------------|-------------|----------|----------|---------------------------------|-------|-----------------|
|           | Component No. | Part No.    | Eff      | Dscont   | Name & Description              | Code  | Mfr Part Number |
|           | A37S1030      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A37S1050      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
| 8-1       | A37S1060      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A37S1070      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A37S1110      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A37S1120      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A37S1130      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A37S1150      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A37S1160      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A37S1210      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
| an the    | A37S1240      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A37S1250      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A37S1260      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A37S1270      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
| u withink | A37S1310      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A37S1330      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A3751340      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A37S1350      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
| Theorem   | A37S1360      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A37S1370      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A37S1400      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A3751410      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
| SHORN-Y   | A37S1430      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A3751440      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A37S1450      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
|           | A37S1460      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |
| gome f    | A37S1470      | 131-2202-00 |          |          | CONTACT, ELEC: BERYLLIUM COPPER | 52961 | ENG#8000        |

## Replaceable Electrical Parts-7854 Service

| Component No.                                                | Tektronix<br>Part No.                                     | Serial/Model No.<br>Eff Dscont | Name & Description                                  | Mfr<br>Code | Mfr Part Number |
|--------------------------------------------------------------|-----------------------------------------------------------|--------------------------------|-----------------------------------------------------|-------------|-----------------|
| a alawalawa kuma bilaya kata kata kata kata kata kata kata k | нитерни ул тура поло-алистикалар от и ото его коладор ула |                                | CHASSIS PARTS                                       |             |                 |
| 16                                                           | 290-0628-00                                               |                                | CAP., FXD, ELCTLT: 950UF, +50-10%, 200V             | 56289       | 36D7560         |
| 17                                                           | 290-0628-00                                               |                                | CAP., FXD, ELCTLT: 950UF, +50-10%, 200V             | 56289       | 36D7560         |
| 37                                                           | 285-0938-00                                               |                                | CAP., FXD, PLSTC: 0.03UF, 5%, 600V                  | 56289       | AF8B1G303J004   |
| 33                                                           | 283-0001-00                                               |                                | CAP.,FXD,CER DI:0.005UF,+100-0%,500V                | 72982       |                 |
| -5                                                           | 119-1048-00                                               |                                | CKT BOARD ASSY: DELAY LINE                          | 80009       | 119-1048-00     |
| 4                                                            | 150-0048-01                                               |                                | LAMP, INCAND: 5V, 0.06A, SEL                        | 08806       | 683AS15         |
| 5                                                            | 150-0048-01                                               |                                | LAMP, INCAND: 5V, 0.06A, SEL                        | 08806       | 683AS15         |
| 15                                                           | 150-1061-00                                               |                                | LT EMITTING DIO:RED,660NM,50MA MAX                  | 27014       | SJ62775         |
| 114                                                          | 150-0048-01                                               |                                | LAMP, INCAND: 5V, 0.06A, SEL                        | 08806       | 683AS15         |
| 120                                                          | 150-0048-01                                               |                                | LAMP, INCAND: 5V, 0.06A, SEL                        | 08806       |                 |
| 121                                                          | 150-0048-01                                               |                                | LAMP, INCAND: 5V, 0.06A, SEL                        | 08806       |                 |
| 0                                                            | 159-0017-00                                               |                                | FUSE,CARTRIDGE:3AG,4A,250V,FAST BLOW                | 71400       | MTH4            |
| .10                                                          | 119-0420-00                                               |                                | FILTER, RFI: 6A, 250VAC, 400HZ                      | 02777       | F-11935-6       |
| 1                                                            | 108-0544-00                                               |                                | COIL, TUBE DEFLE: TRACE ROTATOR                     | 80009       | 108-0544-00     |
| 2                                                            | 108-0605-00                                               |                                | COIL, TUBE DEFLE: Y AXIS ALIGNMENT                  | 80009       | 108-0605-00     |
| 7                                                            | 108-0761-00                                               |                                | COIL, RF: 1MH                                       | 80009       | 108-0761-00     |
| 1                                                            | 108-0685-00                                               |                                | COIL, RF: 80NH                                      | 80009       | 108-0685-00     |
| 2                                                            | 108-0685-00                                               |                                | COIL, RF: 80NH                                      | 80009       | 108-0685-00     |
| 8                                                            | 151-0656-00                                               |                                | TRANSISTOR: SILICON, NPN                            | 04713       | SJE1972         |
| 4                                                            | 151-0632-00                                               |                                | TRANSISTOR: SILICON, NPN                            | 04713       | SJE1946         |
| 0                                                            | 151-0632-00                                               |                                | TRANSISTOR: SILICON, NPN                            | 04713       |                 |
| 8                                                            | 151-0657-00                                               |                                | TRANSISTOR: SILICON, PNP                            | 04713       |                 |
| 4                                                            | 151-0656-00                                               |                                | TRANSISTOR: SILICON, NPN                            | 04713       |                 |
| 4                                                            | 151-0657-00                                               |                                | TRANSISTOR: SILICON, PNP                            | 04713       |                 |
| 22                                                           | 151-0349-00                                               |                                | TRANSISTOR: SILICON, NPN, SEL FROM MJE2801          | 04713       | SJE924          |
| 26                                                           | 151-0477-00                                               |                                | TRANSISTOR: SILICON, NPN                            | 04713       | SJE374          |
| 5                                                            | 311-1375-00                                               |                                | RES.,VAR,NONWIR:PNL,10K OHM,1W                      | 01121       | 73M1G040L103M   |
| 13                                                           | 307-0292-15                                               |                                | RES.,FXD,FILM:182 OHM W/PEAKING COIL                | 80009       | 307-0292-15     |
| 0                                                            | 260-1709-00                                               |                                | SWITCH, PUSH: POWER                                 | 77342       |                 |
| 2                                                            | 260-1300-00                                               |                                | SWITCH, SLIDE: DPDT, 3A, 125VAC                     | 82389       |                 |
| 5                                                            | 260-0247-00                                               |                                | SWITCH, PUSH: SPST, 1A, 115VAC                      | 81073       | 30YY1009        |
| 6                                                            | 260-1812-00                                               |                                | SWITCH,SLIDE:DPDT,0.5A,125VAC/VDC                   | 82389       | 11P-1076        |
| 2                                                            | 260-0677-00                                               |                                | SWITCH, THRMSTC: NC, OPEN 70, CL53.5, 10A, 240V     | 73803       | 20700LA506-2054 |
| 9                                                            | 260-0450-00                                               |                                | SWITCH, SLIDE: 3 POS, DOUBLE POLE                   | 82389       | 11D-1007        |
| 10                                                           | 120-1183-00                                               |                                | XFMR, PWR, STPDN: HIGH FREQUENCY                    | 80009       | 120-1183-00     |
| 21                                                           | 154-0644-09                                               |                                | ELECTRON TUBE:CRT,P11,INT SCALE<br>(OPTION 78 ONLY) | 80009       | 154-0644-09     |
| 21                                                           | 154-0644-05                                               |                                | ELECTRON TUBE:CRT,P31 PHOSPHOR                      | 80009       | 154-0644-05     |

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# **DIAGRAMS AND CIRCUIT BOARD ILLUSTRATIONS**

#### Symbols

Graphic symbols and class designation letters are based on ANSI Standard Y32.2-1975.

Logic symbology is based on ANSI Y32.14-1973 in terms of positive logic. Logic symbols depict the logic function performed and may differ from the manufacturer's data.

The overline on a signal name indicates that the signal performs its intended function when it is in the low state.

Abbreviations are based on ANSI Y1.1-1972.

Other ANSI standards that are used in the preparation of diagrams by Tektronix, Inc. are:

Y14.15, 1966 Drafting Practices.
Y14.2, 1973 Line Conventions and Lettering.
Y10.5, 1968 Letter Symbols for Quantities Used in Electrical Science and Electrical Engineering.
American National Standard Institute

1430 Broadway New York, New York 10018

#### **Component Values**

Electrical components shown on the diagrams are in the following units unless noted otherwise:

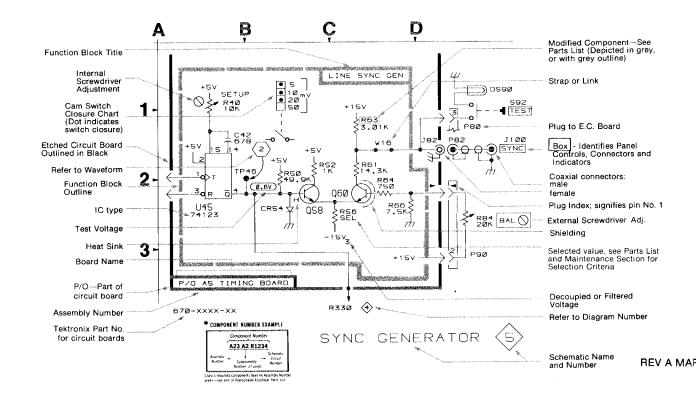
Capacitors = Values one or greater are in picofarads (pF). Values less than one are in microfarads  $(\mu F)$ .

Resistors = Ohms ( $\Omega$ ).

## ---- The information and special symbols below may appear in this manual.------

#### **Assembly Numbers and Grid Coordinates**

Each assembly in the instrument is assigned an assembly number (e.g., A20). The assembly number appears on the circuit board outline on the diagram, in the title for the circuit board component location illustration, and in the lookup table for the schematic diagram and corresponding component locator illustration. The Replaceable Electrical Parts list is arranged by assemblies in numerical sequence; the components are listed by component number \*(see following illustration for constructing a component number). The schematic diagram and circuit board component location illustration have grids. A lookup table with the grid coordinates is provided for ease of locating the component. Only the components illustrated on the facing diagram are listed in the lookup table. When more than one schematic diagram is used to illustrate the circuitry on a circuit board, the circuit board illustration may only appear opposite the first diagram on which it was illustrated; the lookup table will list the diagram number of other diagrams that the circuitry of the circuit board appears on.



| BOARD LOCATOR         | Assembly<br>Number                                                        | Board<br>Name                                                    |                                                      | Board<br>Location(Unit)                                                                 | Schematic<br>Location                       |
|-----------------------|---------------------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------|
| BY<br>ASSEMBLY NUMBER | A1<br>A2<br>A3<br>A4                                                      | Graticule<br>Mode Sw<br>Front Par<br>Front Par                   | Lights<br>ritch<br>nel Keyboard Elect.<br>nel Button | Display<br>Acquisition<br>Display<br>Display                                            | 17<br>2<br>18,36<br>18                      |
|                       | A5<br>A6<br>A7<br>A8                                                      | Intensity<br>Pot Adjus<br>Aux Regu<br>Mother                     | st                                                   | Display<br>Display<br>Display<br>Display                                                | 2,14,17<br>14,17<br>38<br>37                |
|                       | A9<br>A10<br>A11<br>A12                                                   |                                                                  |                                                      | Acquisition<br>Acquisition<br>Acquisition<br>Power Supply                               | 10<br>10<br>3,4,5,6,10<br>15                |
|                       | A13<br>A14<br>A15<br>A16                                                  | Trigger A<br>Logic<br>Signal Ou<br>Fan                           |                                                      | Acquisition<br>Acquisition<br>Acquisition<br>Display                                    | 5,6<br>12<br>16                             |
|                       | A17<br>A18<br>A19<br>A20                                                  | Vertical A                                                       | hannel Switch                                        | Display<br>Display<br>Acquisition<br>Display                                            | 11<br>9<br>7<br>14                          |
|                       | A21<br>A22<br>A23<br>A24                                                  | Z-Axis<br>Low Volta<br>Inverter<br>Delay Lin                     | age Regulator<br>e                                   | Display<br>Power Supply<br>Power Supply<br>Display                                      | 13,14<br>16<br>15<br>9                      |
|                       | A25<br>A26<br>A27<br>A28                                                  | Digitizer<br>Control Lo<br>MPU<br>RAM                            | ogic                                                 | Display<br>Display<br>Display<br>Display                                                | 8,20,26<br>21,22,23,24,25<br>27,28,36<br>30 |
|                       | A29<br>A30<br>A31<br>A32                                                  | Display<br>GPIB<br>ROM<br>Rear Pane                              | el Connector                                         | Display<br>Display<br>Display<br>Display                                                | 31,32,33,34<br>35<br>29<br>36               |
|                       | A33<br>A34<br>A35<br>A36<br>A37                                           | X-Y Comp<br>Display Fo<br>Display Fo<br>Calculator<br>Calculator | ollower<br>ollower<br>r Keyboard                     | Acquisition<br>Acquisition<br>Acquisition<br>Waveform Calculator<br>Waveform Calculator | 10<br>3<br>3<br>19,36<br>19                 |
| BOARD LOCATOR         | Board<br>Name                                                             |                                                                  | Assembly<br>Number                                   | Board<br>Location(Unit)                                                                 | Schematic<br>Location                       |
| BY<br>BOARD NAME      | Aux Regulator<br>Calculator Keyt<br>Calculator Butt<br>Control Logic      |                                                                  | A7<br>A36<br>A37<br>A26                              | Display<br>Waveform Calculator<br>Waveform Calculator<br>Display                        | 38<br>19,36<br>19<br>21,22,23,24,25         |
|                       | Control Rectifie<br>Delay Line<br>Digitizer<br>Display Followe            |                                                                  | A12<br>A24<br>A25<br>A34                             | Power Supply<br>Display<br>Display<br>Acquisition                                       | 15<br>9<br>8,20,26<br>3                     |
|                       | Display Followe<br>Display<br>Fan<br>Front Panel Key                      |                                                                  | A35<br>A29<br>A16<br>A3                              | Acquisition<br>Acquisition<br>Display<br>Display                                        | 3<br>31,32,33,34<br>16<br>18,36             |
|                       | Front Panel But<br>GPIB<br>Graticule Lights<br>High Voltage               |                                                                  | A4<br>A30<br>A1<br>A20                               | Display<br>Display<br>Display<br>Display                                                | 18<br>35<br>17<br>14                        |
|                       | Horizontal Char<br>Horizontal Amp<br>Horizontal Inter<br>Intensity Contro | lifier<br>connect                                                | A9<br>A17<br>A10<br>A5                               | Acquisition<br>Display<br>Acquisition<br>Display                                        | 10<br>11<br>10<br>2,14,17                   |
|                       | Inverter<br>Logic<br>Low Voltage Re<br>MPU                                | egulator                                                         | A23<br>A14<br>A22<br>A27                             | Power Supply<br>Acquisition<br>Power Supply<br>Display                                  | 15<br>4<br>16<br>27,28,36                   |
|                       | Main Interface<br>Mode Switch                                             |                                                                  | A11<br>A2                                            | Acquisition<br>Acquisition                                                              | 3,4,5,6,10                                  |
|                       | Mother<br>Pot Adjust                                                      |                                                                  | A8<br>A6                                             | Display<br>Display                                                                      | 37<br>14,17                                 |

Trigger Amplifier Vertical Amplifier Vertical Channel Switch X-Y Compensation Z-Axis A13 A18 A19 A33 A21 Acquisition Display Acquisition Acquisition Display

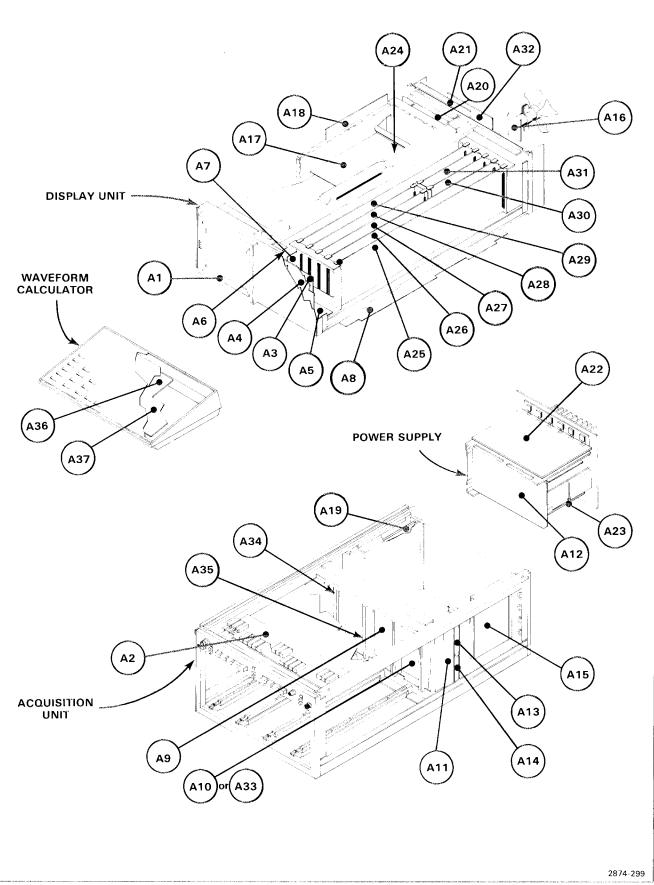
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Figure 7-1. 7854 Circuit B

5,6 9 7 10 13,14



7854 Circuit Board Locations.

7854

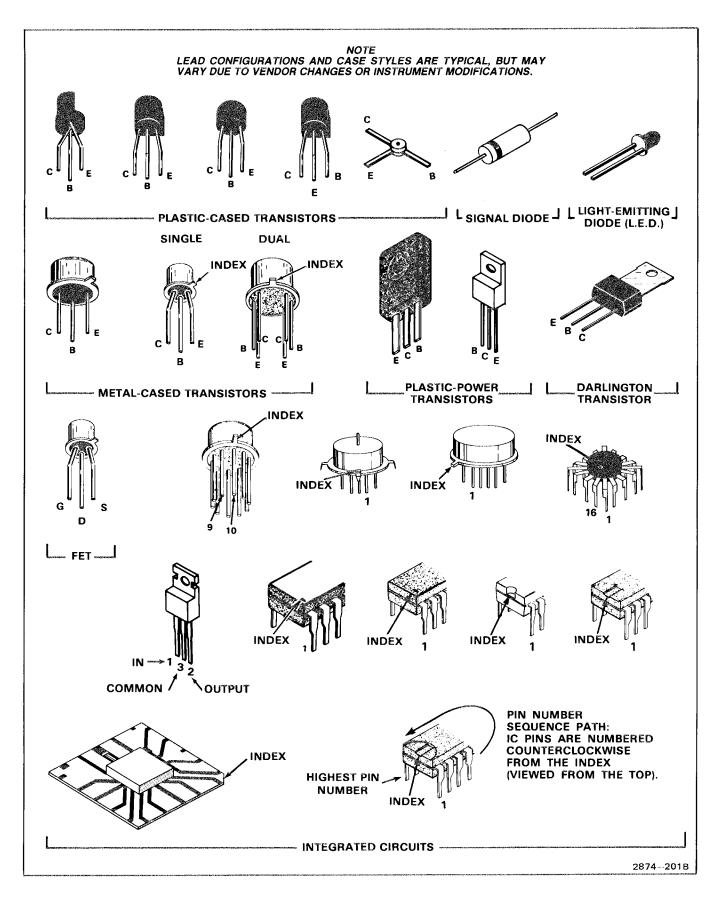


Figure 7-2. Semiconductor Lead Configurations.

|       | SCHEM<br>NUMBER |    | CIRCUIT<br>NUMBER      | SCHEM | SCHEM |
|-------|-----------------|----|------------------------|-------|-------|
| C37   | 15              | D1 | L37                    | 15    | D1    |
| C83   | 9               | G3 | L81                    | 9     | G1    |
|       | -               |    | L82                    | 9     | G2    |
| DL64  | 10              | G3 |                        |       |       |
| DL141 | 8               | G2 | P10                    | 15    | A4    |
|       |                 |    | P11                    | 15    | A3    |
| DS2   | 2               | A1 | P17                    | 17    | D1    |
| DS4   | 2               | A2 | P57                    | 17    | F5    |
| DS5   | 2               | A2 | P64                    | 38    | A3    |
| DS42  | 17              | E1 | P65                    | 13    | F3    |
| DS43  | 17              | E1 | P83                    | 13    | F2    |
| DS44  | 17              | E1 | P83                    | 15    | F5    |
| DS114 | 2               | H4 | P132                   | 13    | A1    |
| DS120 | 2               | H5 | P207                   | 9     | E3    |
| DS121 | 2               | H5 |                        |       |       |
|       |                 |    | R55                    | 17    | D1    |
| E5    | 10              | G1 | R81                    | 9     | G1    |
| E6    | 10              | G1 | R82                    | 9     | G2    |
|       |                 |    | R83                    | 9     | G1    |
| F10   | 15              | A3 |                        |       |       |
| FL10  | 15              | A3 | S10 ·                  | 15    | A3    |
|       |                 |    | S15                    | 36    | A3    |
| J1    | 2               | A1 | S16                    | 36    | A4    |
| J13   | 36              | A3 | S72                    | 15    | E4    |
| J14   | 36              | A3 |                        |       |       |
| J15   | 36              | A3 | T1 <b>1</b> 0          | 15    | E2    |
| L21   | 14              | E1 |                        |       |       |
| L22   | 14              | E1 |                        |       |       |
|       |                 |    | NAME OF COMMONSTRATION |       |       |

## **CHASSIS MOUNTED PARTS**

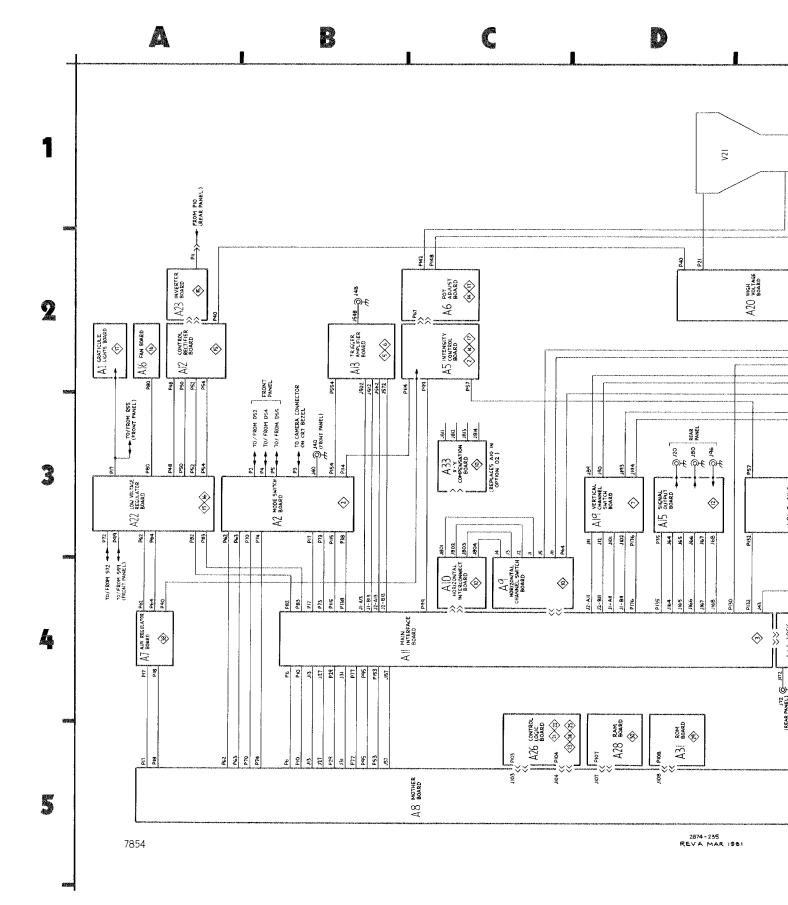


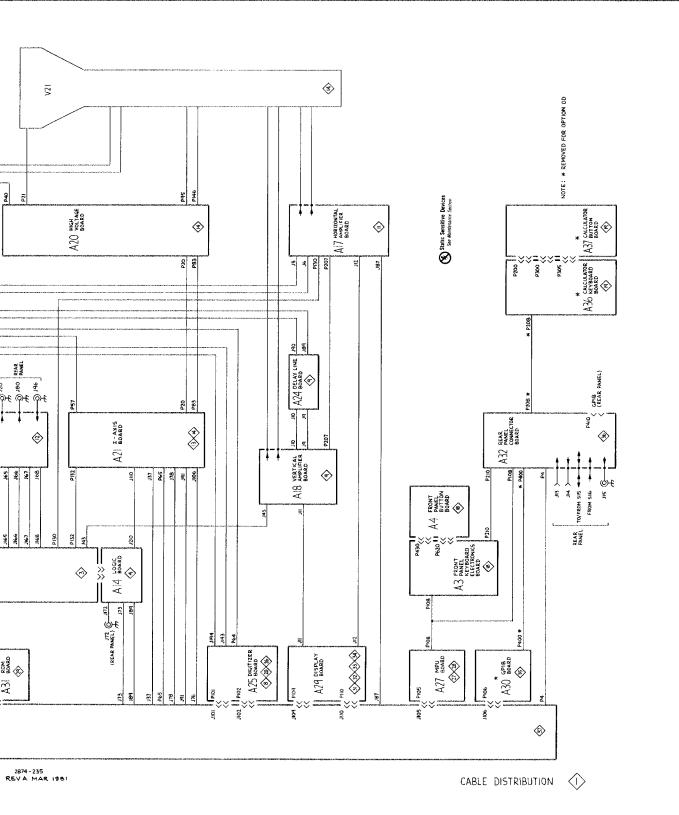
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G

Cable Distribution

Reverse Side

7854

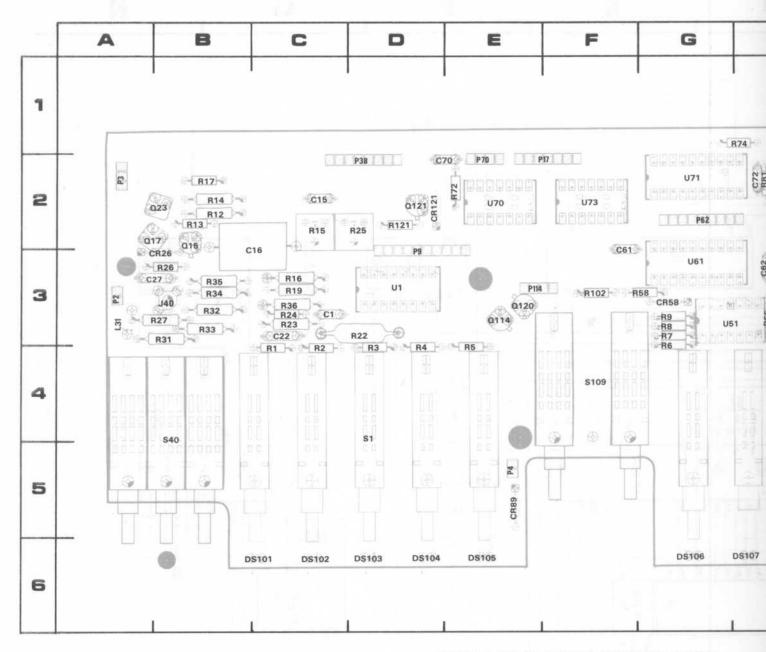


Figure 7-3. A2-Mode Switch circuit board assembly.

COMPONENT NUMBER EXAMPLE

|                    | Component Number                |
|--------------------|---------------------------------|
|                    | A23 A2 R1234                    |
| Assembly<br>Number | Subassembly<br>Number (if used) |

prefix-see end of Replaceable Electrical Parts List.

Static Sensitive Devices See Maintenance Section

MODE

В

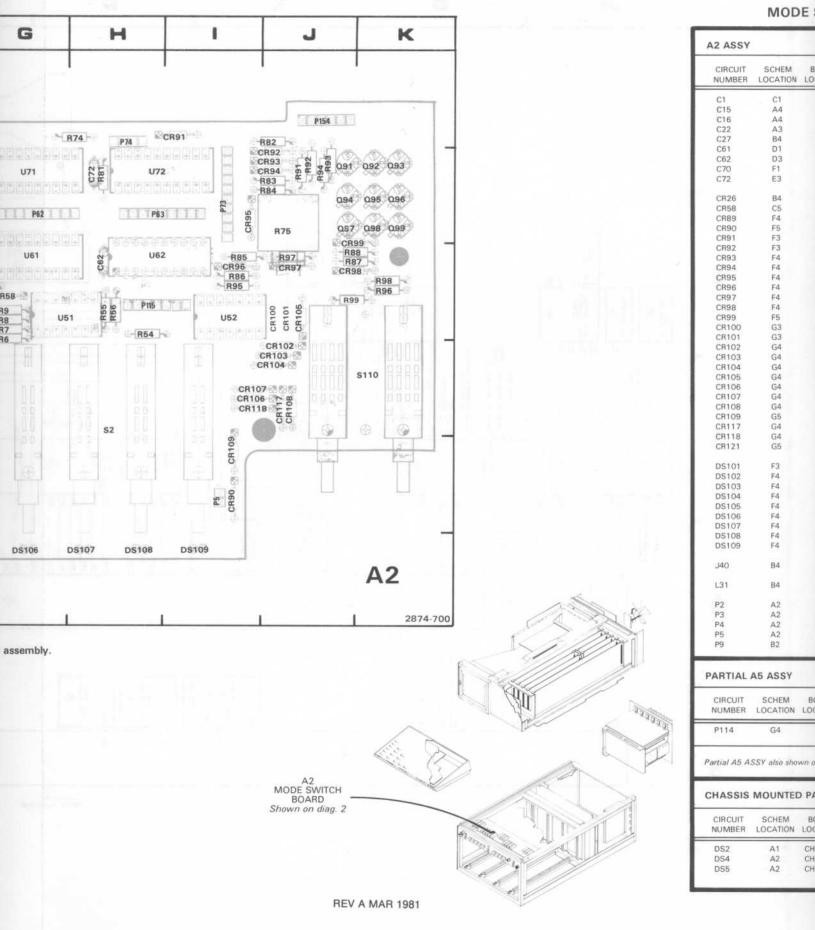
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CH

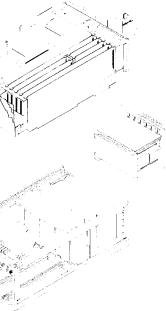
CH

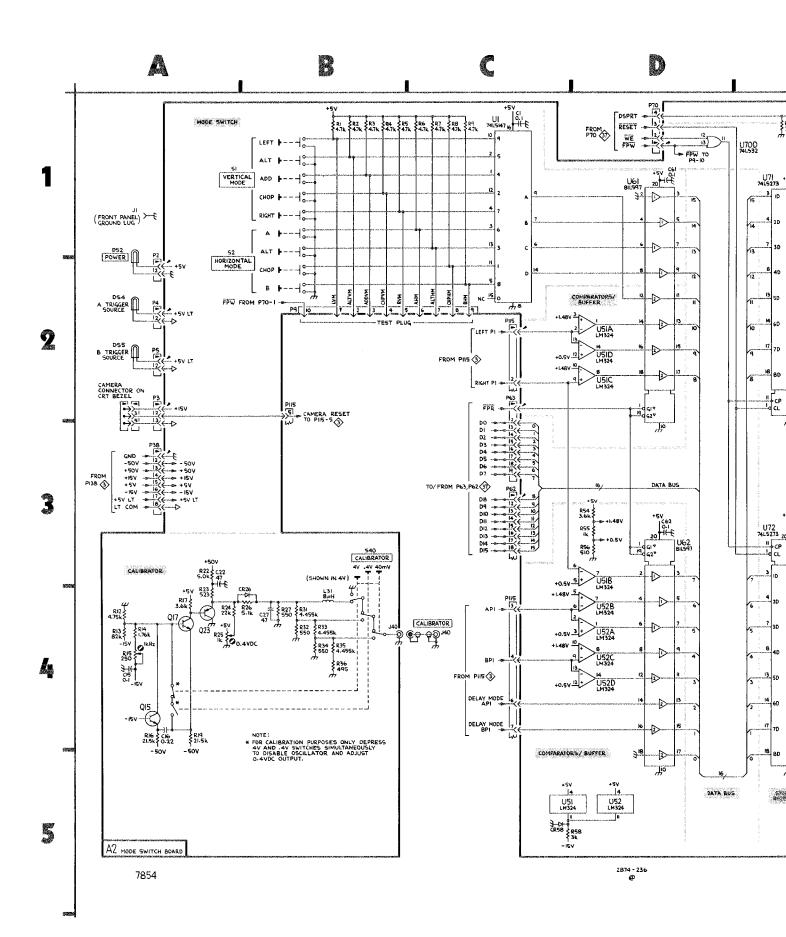
CH

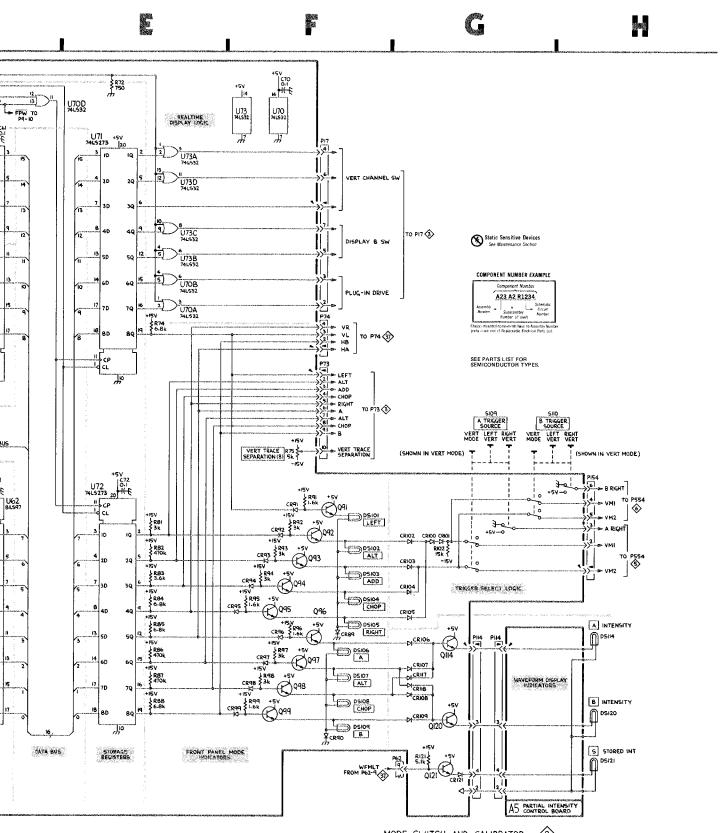


| A2 ASSY                    |                                          |                   |                                              |                                          |                                                |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                   |
|----------------------------|------------------------------------------|-------------------|----------------------------------------------|------------------------------------------|------------------------------------------------|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| CIRCUIT<br>NUMBER          | SCHEM<br>LOCATION                        | BOARD<br>LOCATION | CIRCUIT<br>NUMBER                            | SCHEM<br>LOCATION                        | BOARD<br>LOCATION                              | CIRCUIT<br>NUMBER                        | SCHEM<br>LOCATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | BOARD<br>LOCATION                                                 |
| C1                         | C1                                       | C3                | P17                                          | F1                                       | E2                                             | R35                                      | B4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | B3                                                                |
| C15                        | A4                                       | C2                | P38                                          | A3                                       | D2                                             | R36                                      | B4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | C3                                                                |
| C16                        | A4                                       | C3                | P62                                          | C3                                       | G2                                             | R54                                      | D3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | H3                                                                |
| C22                        | A3                                       | C3                | P62                                          | G5                                       | G2                                             | R55                                      | D3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | H3                                                                |
| C27                        | B4                                       | B3                | P63                                          | C2                                       | H2                                             | R56                                      | D3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | H3                                                                |
| C61                        | D1                                       | F3                | P70                                          | D1                                       | E2                                             | R58                                      | C5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | F3                                                                |
| C62                        | D3                                       | H3                | P73                                          | F2                                       | 12                                             | R72                                      | E1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | E2                                                                |
| C70                        | F1                                       | D2                | P74                                          | F2                                       | H1                                             | R74                                      | E2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | H1                                                                |
| C72                        | E3                                       | H2                | P114                                         | G4                                       | E3                                             | R75                                      | F3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | J2                                                                |
| CR26                       | В4                                       | B3                | P115<br>P115                                 | B2<br>C2                                 | Н3<br>Н3                                       | R81<br>R82                               | E3<br>E4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | H2                                                                |
| CR58                       | C5                                       | G3                | P115                                         | C4                                       | H3                                             | R83                                      | E4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | J1<br>J2                                                          |
| CR89                       | F4                                       | E5                | P154                                         | H3                                       | JI                                             | R84                                      | E4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | J2                                                                |
| CR90                       | F5                                       | 15                |                                              |                                          |                                                | R85                                      | E4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 13                                                                |
| CR91                       | F3                                       | 11                | Q15                                          | A4                                       | 82                                             | R86                                      | E4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 13                                                                |
| CR92                       | F3                                       | J2                | Q17                                          | A4                                       | B2                                             | R87                                      | E4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | J3                                                                |
| CR93                       | F4                                       | J2                | Q23                                          | A4                                       | B2                                             | R88                                      | E4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | J3                                                                |
| CR94                       | F4                                       | J2                | Q91                                          | F3                                       | J2                                             | R91                                      | F3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | J2                                                                |
| CR95                       | F4                                       | 12                | Q92                                          | F3                                       | К2                                             | R92                                      | F3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | J2                                                                |
| CR96                       | F4                                       | 13                | Q93                                          | F4                                       | K2                                             | R93                                      | F4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | J2                                                                |
| CR97                       | F4                                       | J3                | Q94                                          | F4                                       | J2                                             | R94                                      | F4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | J2                                                                |
| CR98                       | F4                                       | J3                | Q95                                          | F4                                       | К2                                             | R95                                      | F4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 13                                                                |
| CR99                       | F5                                       | J2                | Q96                                          | F4                                       | K2                                             | R96                                      | F4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | КЗ                                                                |
| CR100                      | G3                                       | J3                | Q97                                          | F4                                       | J2                                             | R97                                      | F4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | J3                                                                |
| CR101                      | G3                                       | J3                | 098                                          | F4                                       | К2                                             | R98                                      | F4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | КЗ                                                                |
| CR102                      | G4                                       | J4                | Q99                                          | F5                                       | K2                                             | R99                                      | F4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | К3                                                                |
| CR103                      | G4                                       | J4                | 0114                                         | G4                                       | E3                                             | R102                                     | G4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | F3                                                                |
| CR104                      | G4                                       | J4                | Q120                                         | G5                                       | E3                                             | R121                                     | G5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | D2                                                                |
| CR105                      | G4                                       | J3<br>14          | Q121                                         | G5                                       | D2                                             | 61                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 54                                                                |
| CR106                      | G4<br>G4                                 | 14                | R1                                           | B1                                       | C4                                             | S1                                       | A1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | D4                                                                |
| CR107<br>CR108             | G4<br>G4                                 | J4                | R2                                           | 81                                       | C4<br>C4                                       | S2<br>S40                                | A1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | H4                                                                |
| CR108                      | G5                                       | 15                | R3                                           | B1                                       | D4                                             | S109                                     | В3<br>G3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | В4<br>F4                                                          |
| CR117                      | G4                                       | J4                | R4                                           | B1                                       | D4                                             | S110                                     | G3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | κ4                                                                |
| CR118                      | G4<br>G4                                 | 14                | R5                                           | B1                                       | E4                                             | 3110                                     | 03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | K4                                                                |
| CR121                      | G5                                       | D2                | R6                                           | C1                                       | G3                                             | U1                                       | C1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | D3                                                                |
| GITTET                     | 00                                       | 52                | R7                                           | C1                                       | G3                                             | U51A                                     | D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | G3                                                                |
| DS101                      | F3                                       | C6                | R8                                           | C1                                       | G3                                             | U51B                                     | D3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | G3                                                                |
| DS102                      | F4                                       | C6                | R9                                           | C1                                       | G3                                             | U51C                                     | D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | G3                                                                |
| DS103                      | F4                                       | D6                | R12                                          | A4                                       | B2                                             | U51D                                     | D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | G3                                                                |
| DS104                      | F4                                       | D6                | R13                                          | A4                                       | B2                                             | U52A                                     | D4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 13                                                                |
| DS105                      | F4                                       | E6                | R14                                          | A4                                       | B2                                             | U52B                                     | D4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 13                                                                |
| DS106                      | F4                                       | G6                | R15                                          | A4                                       | B2                                             | U52C                                     | D4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 13                                                                |
| DS107                      | F4                                       | H6                | R16                                          | A4                                       | B2                                             | U52D                                     | D4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 13                                                                |
| DS108                      | F4                                       | H6                | R17                                          | A4                                       | B1                                             | U61                                      | D1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | G3                                                                |
| DS109                      | F4                                       | 16                | R19                                          | A4                                       | C3                                             | U62                                      | D3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | H3                                                                |
|                            |                                          |                   | R22                                          | A3                                       | D3                                             | U70A                                     | E2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | E1                                                                |
| J40                        | B4                                       | B3                | R23                                          | A4                                       | C3                                             | U70B                                     | E2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | E1                                                                |
| 1.01                       |                                          | 4.2               | R24                                          | A4                                       | C3                                             | U71                                      | E1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | G2                                                                |
| L31                        | В4                                       | A3                | R25                                          | A4                                       | D2                                             | U72                                      | E3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | H2                                                                |
| P2                         | 4.2                                      | 4.2               | R26                                          | B4                                       | B3                                             | U73A                                     | E1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | F1                                                                |
| P2<br>P3                   | A2<br>A2                                 | A3<br>A2          | R27<br>R31                                   | В4<br>В4                                 | ВЗ<br>ВЗ                                       | U73B<br>U73C                             | E2<br>E2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | F1<br>F1                                                          |
| P4                         | A2<br>A2                                 | E5                | R31                                          | B4<br>B4                                 | B3                                             | U73C                                     | EZ<br>E1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | F1<br>F1                                                          |
| P5                         | A2                                       | 15                | R33                                          | B4                                       | B3                                             | 0,00                                     | L I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | , ,                                                               |
| P9                         | B2                                       | D3                | R34                                          | B4                                       | B3                                             |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                   |
| Collina pro sus construint | a an |                   |                                              |                                          |                                                | สีนกระสองสมาราชสาราช                     | STREET, ST |                                                                   |
| PARTIAL                    | A5 ASSY                                  |                   |                                              |                                          |                                                |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                   |
| CIRCUIT                    | SCHEM                                    | BOARD             | CIRCUIT                                      | SCHEM                                    | BOARD                                          | CIRCUIT                                  | SCHEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | BOARD                                                             |
|                            | LOCATION                                 |                   | NUMBER                                       | LOCATION                                 |                                                | NUMBER                                   | LOCATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                   |
| P114                       | G4                                       | C1                |                                              | an anna an an anna an anna an anna an an |                                                |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                   |
| Partial A5 A               | SSY also sho                             | wn on diagram     | s 14 and 17                                  |                                          | an a sa an |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 556 January 200 1995 In Carrier David Carrier Control and Carrier |
|                            |                                          | -                 |                                              |                                          | o di Managana ang Pa                           | an a |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                   |
| CHASSIS                    | MOUNTED                                  | PARTS             | 0-1100, Data 12-10-10, Ja Taula Malaka - 44- |                                          |                                                | 0 11 11 11 11 11 11 11 11 11 11 11 11 11 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | a Milan kaya na sana ya                                           |
| CIRCUIT<br>NUMBER          | SCHEM<br>LOCATION                        | BOARD<br>LOCATION | CIRCUIT<br>NUMBER                            | SCHEM<br>LOCATION                        | BOARD<br>LOCATION                              | CIRCUIT<br>NUMBER                        | SCHEM<br>LOCATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                   |
| DS2                        | A1                                       | CHASSIS           | DS114                                        | H4                                       | CHASSIS                                        | J1                                       | A1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CHASSIS                                                           |
| DS4                        | A1<br>A2                                 | CHASSIS           | DS120                                        | H5                                       | CHASSIS                                        |                                          | ~                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0170010                                                           |
| DS5                        | A2                                       | CHASSIS           | DS121                                        | H5                                       | CHASSIS                                        | 1                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                   |
|                            |                                          |                   |                                              |                                          |                                                | 1                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                   |

## MODE SWITCH AND CALIBRATOR DIAGRAM 2







MODE SWITCH AND CALIBRATOR

2 Mode Switch and Calibrator

Reverse Side

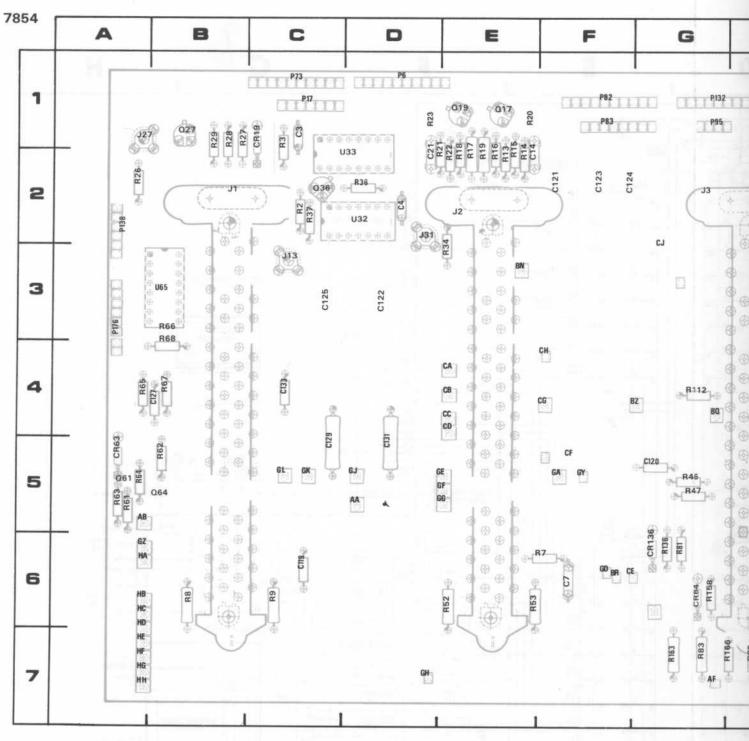


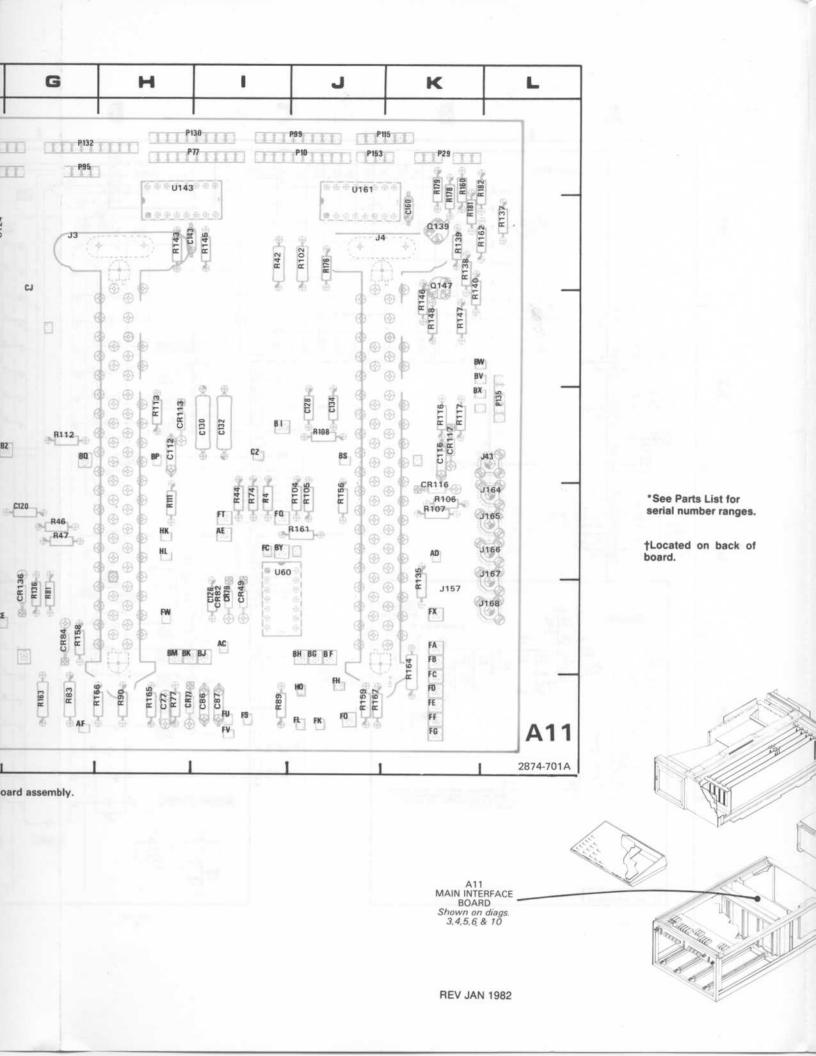
Figure 7-4. A11-Main Interface circuit board assembly.

COMPONENT NUMBER EXAMPLE

|                    | Component Numb                  | er                             |
|--------------------|---------------------------------|--------------------------------|
| 1                  | A23 A2 R123                     | 4                              |
| Assembly<br>Number | Subassembly<br>Number (if used) | Schematic<br>Circuit<br>Number |

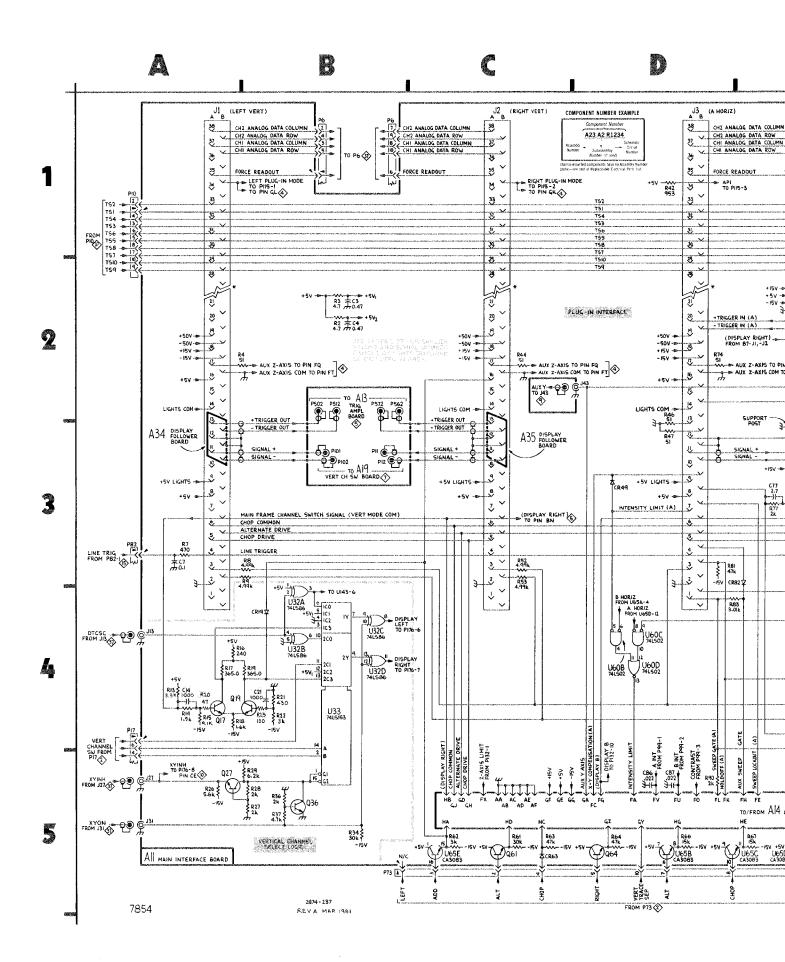
Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

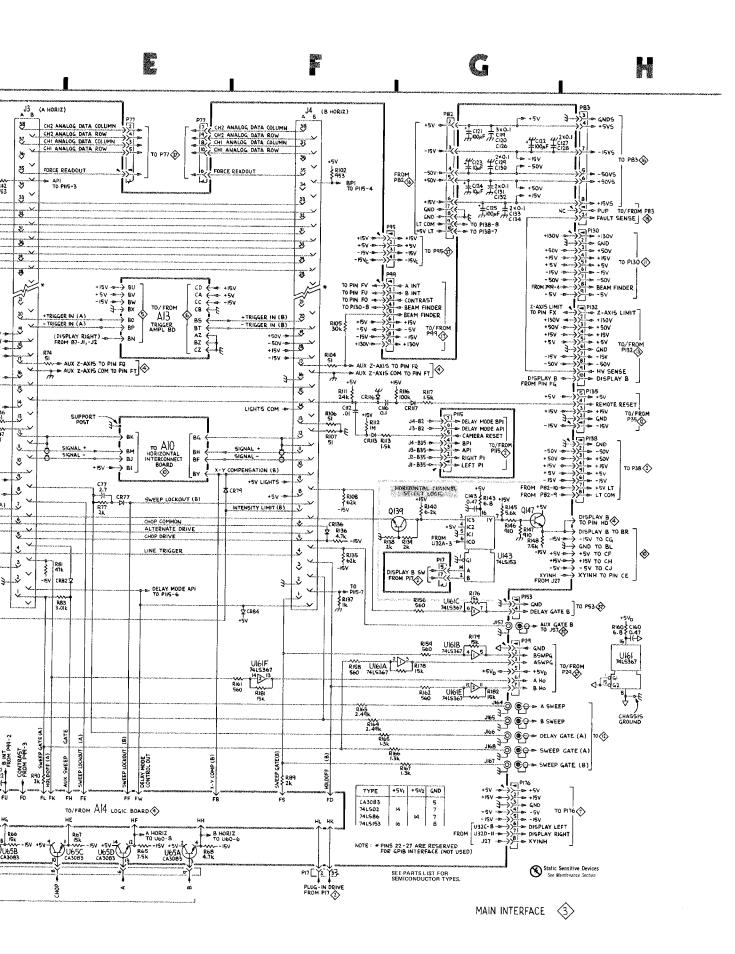
Static Sensitive Devices See Maintenance Section



| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER           | SCHEM<br>LOCATION | BOARD |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----------------------------|-------------------|-------|
| C3†               | B2                | C1                | P73               | В5                | C1                | R83                         | D4                | G7    |
| C4†               | B2                | D2                | P77               | E1                | G7                | R89                         | F5                | 17    |
| C7                | A3                | F6                | P82               | A3                | F1                | R90                         | D5                | H7    |
| C14†              | A4                | E2                | P82               | G1                | F1                | R102                        | F1                | J2    |
| C21†              | B4                | E2                | P83               | H1                | F1                | R104                        | F2                | J5    |
| C77               | E3                | H7                | P95               | F1                | G1                | R105                        | F2                | J5    |
| C86               | D5                | 17                | P99               | F2                | J1                | R106                        | F2                | K5    |
| C87               | D5                | 17                | P115              | G2                | J1                | R107                        | F3                | K5    |
| C112              | F2                | H4                | P130              | H1                | G7                | R108                        | F3                | J4    |
| C116              | F2                | K4                | P132              | H2                | G1                | R111                        | F2                | H5    |
| C119              | G1                | C6                | P135              | H2                | L4                | R112                        | F3                | G4    |
| C120              | G1                | G5                | P138              | H3                | A2                | R113                        | F3                | H4    |
| C121              | G1                | F2                | P153              | G4                | J1                | R116                        | G2                | К4    |
| C122              | G1                | D3                | P176              | G5                | A3                | R117                        | G2                | К4    |
| C123              | G1                | F2                | Q17†              | A4                | E1                | R135                        | F3                | K5    |
| C124              | G1                | F2                | Q19†              | B4                | E1                | R136                        | F3                | G6    |
| C125              | G1                | C3                | Q27†              | A5                | B1                | R137                        | F4                | 1.2   |
| C126              | G1                | 16                | Q36†              | B5                | C2                | R138                        | F3                | K2    |
| C127              | G1                | B4                | Q61               | C5                | A5                | R139                        | G3                | K2    |
| C128              | G1                | J4                | Q64               | D5                | A5                | R140                        | G3                | K2    |
| C129              | G1                | C4                | Q139              | G3                | K2                | R143                        | G3                | H2    |
| C130              | G1                | 14                | Q147              | G3                | K2                | R145                        | G3                | 12    |
| C131              | G1                | D5                |                   |                   |                   | R146                        | G3                | КЗ    |
| C132              | G1                | 14                | R2                | B2                | C2                | R147                        | G3                | КЗ    |
| C133              | G1                | C4                | R3†               | 82                | C1                | R148                        | G3                | КЗ    |
| C134              | G1                | J4                | 'R4               | A2                | C2                | R156                        | G4                | J5    |
| C143              | G3                | H2                | R7                | A3                | F6                | R158                        | F4                | G6    |
| C160              | H4                | K2                | R8                | B3                | C6                | R159                        | G4                | J7    |
| 00404             | -                 |                   | R13†              | A4                | E2                | R160                        | H4                | K1    |
| CR19†             | B4                | C1                | R14†              | A4                | E2                | R161                        | F4                | J5    |
| CR49              | D3                | 16                | R15†              | A4                | E2                | R162                        | G4                | K2    |
| CR63              | C5                | A5                | R16†              | A4                | E2                | R163                        | F4                | G7    |
| CR77              | E3                | H7                | R17†              | A4                | E2                | R164                        | F4                | K6    |
| CR79              | F3                | 16                | R18†              | A4                | E2                | R165                        | F4                | H7    |
| CR82<br>CR84      | D3<br>F4          | G6                | R20*†             | A4                | E1                | R166                        | G5                | G7    |
|                   | F4<br>F3          | H6                | R21†              | B4                | D2                | R167                        | G5                | J7    |
| CR113<br>CR116    | F2                | H4                | R22†              | B4                | E1                | R176                        | G4                | J2    |
| CR117             | G2                | K5<br>K4          | R23*†             | B4                | D1                | R178                        | G4                | K1    |
| CR136             | 62<br>F3          | G6                | R26†              | A5                | A2                | R179                        | G4                | К1    |
| Ch130             | FS                | 60                | R27†              | B5                | B1                | R181                        | F4                | K2    |
| J1                | A1                | B2                | R28†<br>R29†      | B5                | B1                | R182                        | G4                | K1    |
| J2                | C1                | E2                | R34†              | B5                | B1                | 112244                      |                   |       |
| J3                | D1                | G2                | R36†              | 85<br>85          | E3<br>C2          | U32A†                       | B4                | D2    |
| 34                | F1                | J2                | R37†              | B5                |                   | U32B†                       | B4                | D2    |
| J13               | A4                | C3                | R42               | D1                | C2<br>12          | U32Ct                       | B4                | D2    |
| J27               | A5                | A1                | R44               | C2                | 15                | U32D†                       | B4                | D2    |
| J31               | A5                | D2                | R46               | D2                | G5                | U33 †                       | B4                | D2    |
| J43               | C2                | L4                | R47               | D3                | G5<br>G5          | U60B                        | D4                | 15    |
| J157              | G4                | Кб                | R52               | C3                | E6                | UGOC                        | D4                | 15    |
| J164              | G4                | L5                | R53               | C3                | E6                | UGOD                        | D4                | 15    |
| J165              | G4                | L5                | R61               | C5                | A5                | U65A<br>U65B                | E5                | 83    |
| J166              | G4                | L5                | R62               | C5                | 85                |                             | D5                | B3    |
| J167              | G5                | L5                | R63               | C5                | AS                | U65C                        | E5<br>E5          | B3    |
| J168              | G4                | LG                | R64               | D5                | A5                | U65D<br>U65E                | E5<br>C5          | B3    |
| T. HOLES          |                   | 100               | R65               | E5                | A0<br>A4          | U143                        | C5                | B3    |
| P6                | B1                | D1                | R66               | D5                | B3                | (3) (2) (2) (2) (3) (4) (4) | G3                | G7    |
| P10               | A1                | J1                | R67               | E5                | B3<br>B4          | U161A                       | F4                | J1    |
| P17               | A4                | C1                | R68               | E5                | B4<br>B3          | U161B                       | G4                | J1    |
| P17               | F5                | C1                | R74               | D2                | 15                | U161C                       | G4                | J1    |
| P17               | G3                | C1                | R74               | E3                |                   | U161E                       | G4                | J1    |
| P29               | G4                | K1                | R81               | D3                | H7<br>G6          | U161F                       | F4                | J1    |

## MAIN INTERFACE DIAGRAM 3





Main Interface Reverse

e Side A14 7854

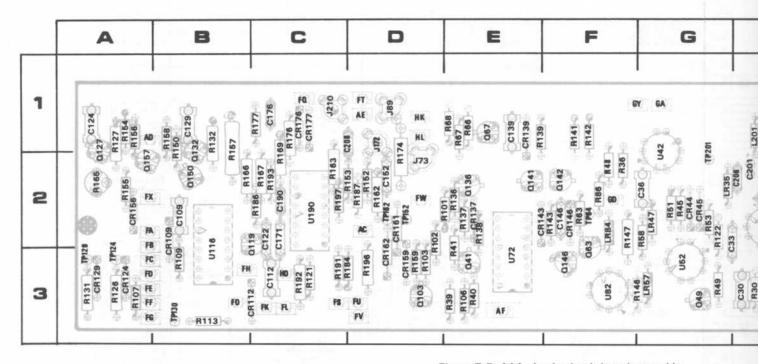


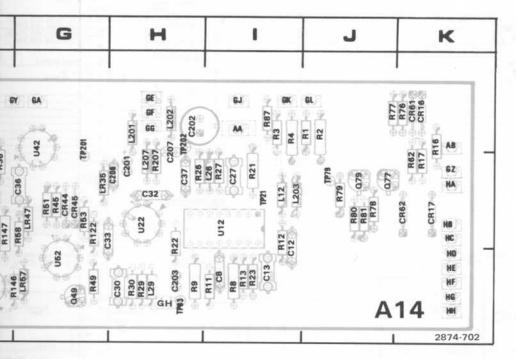
Figure 7-5. A14-Logic circuit board assembly.

#### COMPONENT NUMBER EXAMPLE

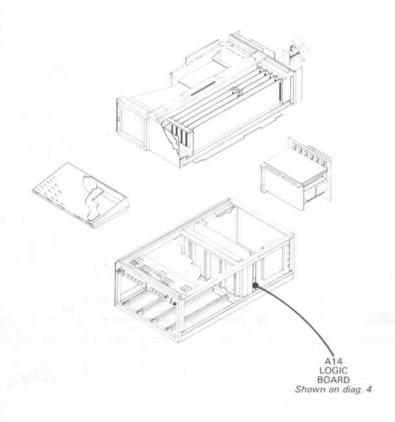
|                    | Component Number                |                                |
|--------------------|---------------------------------|--------------------------------|
| 33                 | A23 A2 R1234                    |                                |
| Assembly<br>Number | Subassembly<br>Number (if used) | Schematic<br>Circuit<br>Number |

Chassis-mounted components have no Assembly Numb prefix—see end of Replaceable Electrical Parts List.

Static Sensitive Devices See Maintenance Section



d assembly.



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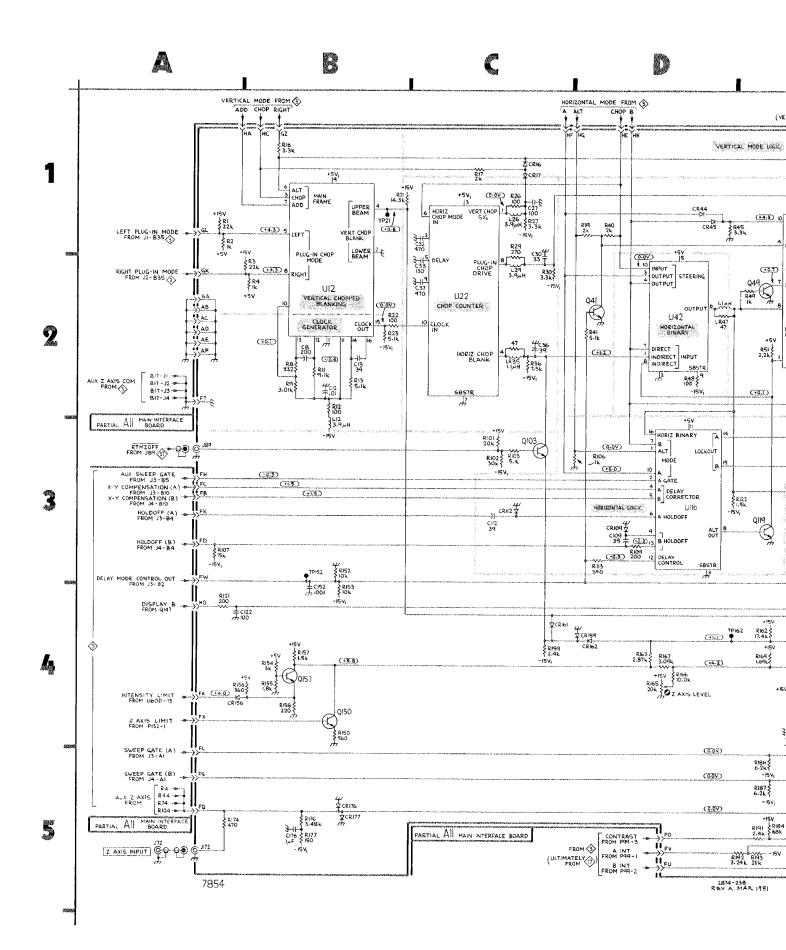
| A14 ASSY          |                   |                   |                   |                   |                   |                   |                   |                   |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION |
| C8                | В2                | F3                | Q41               | D2                | E3                | R121              | A4                | C3                |
| C12               | B2                | F3                | Q49               | E2                | G3                | R122              | E3                | G2                |
| C13               | B2                | F3                | Q63               | G1                | F2                | R126              | F3                | A3                |
| C27               | C1                | 12                | Q67               | F2                | E1                | R127              | G3                | A1                |
| C30               | C2                | H3                | 077               | F1                | J2                | R131              | G3                | A3                |
| C32               | C1                | H2                | 079               | F1                | J2                | R132              | G3                | B1                |
| C33<br>C36        | C2<br>C2          | G2<br>G2          | Q103<br>Q119      | C3                | D3                | R136              | E3                | E2                |
| C30<br>C37        | C2                | H2                | 0119              | E3<br>G3          | C2                | R137              | E3                | E2                |
| C109              | D3                | B2                | Q127              | G3                | A1<br>B1          | R138<br>B139      | F3                | E2                |
| C112              | C3                | C3                | Q132              | E3                | E2                | R139              | F3<br>F3          | E1                |
| C122              | A4                | C2                | Q141              | F3                | E2                | R141              | F3<br>F3          | E3<br>E3          |
| C124              | F3                | A1                | Q142              | F3                | F2                | R142              | F3                | F2                |
| C129              | G3                | B1                | Q146              | G3                | F3                | R146              | G3                | F3                |
| C139              | F3                | E1                | Q150              | B4                | B2                | R147              | G3                | F2                |
| C146              | G3                | F2                | Q157              | B4                | A2                | R150              | B4                | B1                |
| C152              | B4                | D2                |                   |                   |                   | R152              | B3                | D2                |
| C171              | E4                | C2                | R1                | A1                | J1                | R153              | B4                | C2                |
| C176              | B5                | C1                | R2                | A1                | J1                | R154              | B4                | A1                |
| C190              | E3                | C2                | R3                | B2                | 11                | R155              | B4                | A2                |
| C201              | G4                | H2                | R4                | B2                | 11                | R156              | A4                | A1                |
| C202              | G4                | H1                | R8                | B2                | F3                | R157              | B4                | B1                |
| C203              | G4                | H3                | R9                | B2                | нз                | R158              | B4                | B1                |
| C206              | G4                | H2                | R11               | B2                | F3                | R159              | C4                | D3                |
| C207              | G4                | H2                | R12               | 82                | 12                | R162              | E4                | D2                |
| C208              | G4                | C1                | R13<br>R16        | B2                | F3                | R163              | D4                | C2                |
| CR16              | C1                | К1                | R16               | B1                | K1                | R165              | D4                | A2                |
| CR17              | C1                | K2                | R21               | C1<br>B1          | K2<br>12          | R166<br>R167      | D4                | B2                |
| CR44              | D1                | G2                | R22               | B2                | H2                | R169              | D4<br>E4          | C2<br>C1          |
| CR45              | D1                | G2                | R23               | B2                | F3                | B174              | A5                | D1                |
| CR61              | F1                | К1                | R26               | C1                | H2                | B176              | B5                | C1                |
| CR62              | F1                | К2                | R27               | C1                | 12                | R177              | B5                | C1                |
| CR109             | D3                | B2                | R29               | C2                | НЗ                | R184              | E5                | C3                |
| CR112             | C3                | C3                | R30               | C2                | H3                | R186              | E6                | C2                |
| CR124             | F3                | A3                | R36               | C2                | F2                | R187              | E5                | D2                |
| CR129             | G3                | A3                | R39               | D1                | E3                | R191              | E5                | C3                |
| CR137             | F3                | E2                | R40               | D1                | E3                | R192              | E5                | C3                |
| CR139<br>CR143    | F3<br>F3          | E1                | R41               | D2                | E3                | R193              | E5                | C2                |
| CR143<br>CR146    | G3                | E2<br>F2          | R45<br>R48        | D1                | G2                | R196              | E5                | D3                |
| CR146<br>CR156    | 63<br>A4          | A2                | R48<br>R49        | D2<br>E2          | F2<br>G3          | R197              | E5                | C2                |
| CR159             | D4                | D3                | R51               | E2                | G2                | R207              | G4                | H2                |
| CR161             | C4                | D2                | R53               | G2                | G2<br>G2          | TP21              | B1                | 12                |
| CR162             | D4                | D3                | R58               | E2                | G2                | TP79              | G1                | J2                |
| CR176             | B5                | C1                | R62               | F1                | K2                | TP83              | G1                | H3                |
| CR177             | B5                | C1                | R63               | F1                | F2                | TP84              | G2                | F2                |
|                   |                   |                   | R66               | F2                | E1                | TP124             | F3                | A3                |
| J73               | F2                | D2                | R67               | F2                | E1                | TP129             | G3                | A3                |
| J89               | A3                | D1                | R68               | F2                | E1                | TP130             | F3                | B3                |
| J172              | A5                | D1                | R76               | F1                | К1                | TP152             | B3                | D2                |
| J210              | G5                | C1                | R77               | F1                | J1                | TP162             | D4                | D2                |
| 1.10              | <b>D</b> 2        | 12                | R78               | F1                | J2                | TP201             | G4                | G1                |
| L12               | B3                | 12                | R79               | F1                | J2                | TP202             | G4                | H1                |
| L26<br>L29        | C1<br>C2          | 12<br>H3          | R80               | F1                | J2                |                   | 86                |                   |
| L29<br>L201       | G4                | H3<br>H1          | R81<br>R86        | F1<br>G2          | J2<br>F2          | U12               | 82                | 12                |
| L201              | G4<br>G4          | H1                | R87               | G2<br>G2          | F2<br>11          | U22<br>U42        | C2<br>D2          | H2                |
| L202              | G4                | 12                | R101              | C3                | E2                | U52               | E2                | G1<br>G3          |
| L200              | G4                | H2                | R102              | C3                | D2                | U72               | F2                | E3                |
|                   |                   |                   | R103              | C3                | D3                | U82               | G2                | F3                |
| LR35              | C2                | G2                | R106              | D3                | E3                | U116              | D3                | B3                |
| LR47              | D2                | G2                | R107              | A3                | A3                | U190              | E4                | C2                |
| LR57              | E2                | G3                | R109              | D3                | в3                |                   |                   |                   |
| LR84              | G2                | F2                | R113              | D3                | B3                |                   |                   |                   |

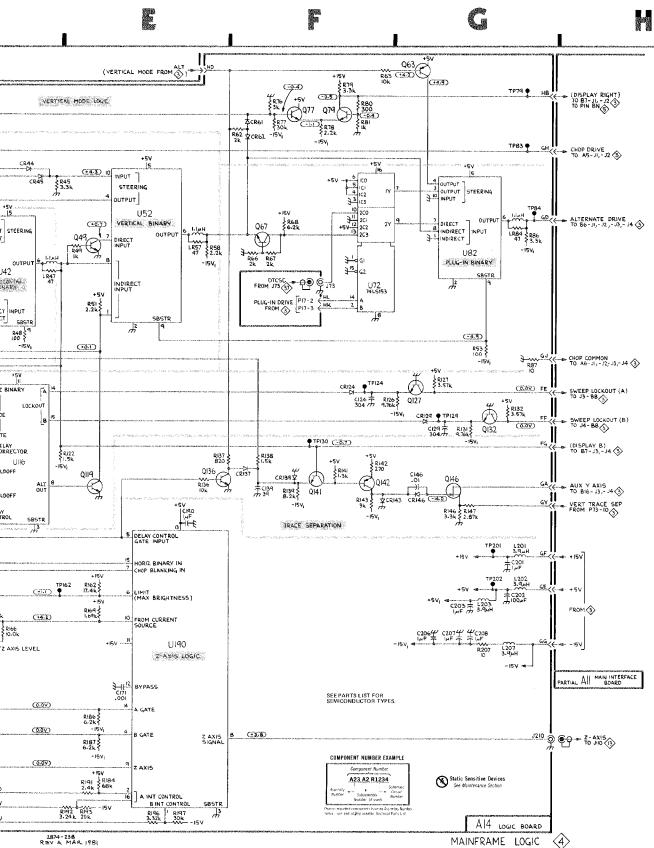
## MAINFRAME LOGIC DIAGRAM 4

#### **VOLTAGE CONDITIONS**

The voltages shown were taken with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B); READOUT INTENSITY (OFF). No plug-in units were installed.

Voltage Conditions. The voltages on the diagram were taken using a digital multimeter with a 10 M $\Omega$  input impedance (Tektronix DM 501 Digital Multimeter installed in a TM 501 Power Module or a Tektronix 7D13 Digital Multimeter used with a readout-equipped 7000-Series Oscilloscope).





Reverse Side

Mainframe

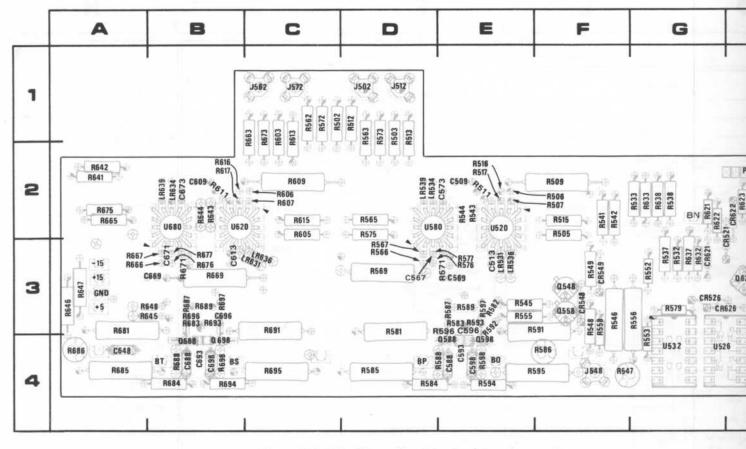


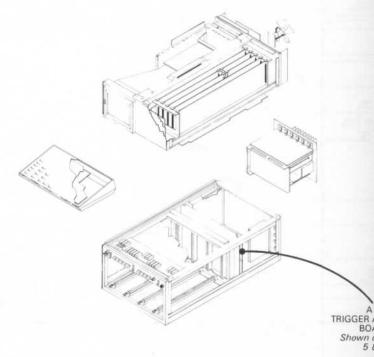
Figure 7-6. A13-Trigger Amplifier circuit board assembly.



#### COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix-see end of Replaceable Electrical Parts List.



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A13 TRIGGER AMPLIFIER BOARD Shown on diags. 5 & 6

## A TRIGGER SELECTOR DIAGRAM 5

| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------|
| C509              | C1                | E2                | R533              | D4                | G2    |
| C513              | D3                | E3                | R537              | C3                | G3    |
| C567              | D4                | E3                | R538              | D3                | G2    |
| C569              | C4                | E3                | R541              | E3                | F2    |
| C573              | D5                | E2                | R542              | E3                | F2    |
| C588              | F2                | E4                | R543              | E5                | E2    |
| C593              | F3                | E4                | R544              | E1                | E2    |
| C596              | F3                | E3                | R545              | F1                | E3    |
| C598              | F4                | E4                | R546              | F1                | F3    |
| 0000              | 14                | E.4               | R547              | F1                | F4    |
| CR521             | C2                | H2                | R548              | F1                | F4    |
|                   | B3                | H2                |                   | F1                |       |
| CR522<br>CR526    | C3                | G3                | R549              | F1                | F3    |
|                   |                   |                   | R552              | 1.0101            | G3    |
| CR548             | F1                | F3                | R553              | F1                | G4    |
| CR549             | G1                | F3                | R555              | F2                | E3    |
| 10.00             | 1212              |                   | R556              | F1                | G3    |
| J502              | A1                | D1                | R558              | F2                | F3    |
| J512              | A2                | D1                | R562              | B4                | C1    |
| J548              | G1                | F4                | R563              | 84                | D1    |
| J562              | A4                | C1                | R565              | D4                | D2    |
| J572              | A5                | C1                | R566              | D4                | C3    |
|                   |                   |                   | R567              | D4                | C3    |
| LR531             | D2                | E3                | R569              | C5                | C3    |
| LR534             | D4                | D2                | R571              | D5                | E3    |
| LR536             | D3                | E3                | R572              | B5                | C1    |
| LR539             | D3                | D2                | R573              | B5                | D1    |
|                   |                   |                   | R575              | D5                | D2    |
| P554              | A2                | H2                | R576              | D5                | E3    |
|                   |                   |                   | R577              | D5                | E3    |
| Q524              | B3                | H3                | R579              | G4                | G3    |
| Q548              | F1                | F3                | R581              | F3                | C3    |
| Q558              | F2                | F3                | R582              | F3                | E3    |
| Q588              | F2                | E4                | R583              | F3                | E3    |
| 0598              | F4                | E4                | R584              | F2                | D4    |
|                   |                   |                   | R585              | G1                | D4    |
| R502              | A1                | C1                | R586              | F3                | F4    |
| R503              | B1                | D1                | R587              | G3                | E3    |
| R505              | D1                | F2                | R588              | F3                | E4    |
| R506              | D1                | F2                | R589              | G3                | E3    |
| R507              | DI                | F2                | R591              | F3                | F3    |
| R509              | C2                | F2                | R592              | F4                | E3    |
| R511              | D3                | E2                | R593              | F3                | E3    |
| R512              | B2                | D1                | R594              | G4                | E4    |
| R513              | B2                | D1                | R595              | G4<br>G4          | E4    |
| R515              | D2                | F2                | R595              | F3                | E3    |
| R516              | D2                | E2                | R596              | G3                | E3    |
| R517              | D2<br>D2          | E2                | R597              | G3<br>F4          |       |
| R521              | C2                | H2                | 1030              | 14                | E4    |
| R521              | B3                |                   | 11520             | D1                | E2    |
|                   |                   | G3                | U520              |                   |       |
| R523              | B3                | H2                | U526B             | C4                | G4    |
| R524              | B3                | H3                | U526C             | C3                | G4    |
| R526              | C3                | H4                | U532B             | C3                | G4    |
| R527              | C4                | H2                | U532C             | C3                | G4    |
| R532              | D2                | G3                | U580              | D5                | D2    |

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#### **VOLTAGE CONDITIONS**

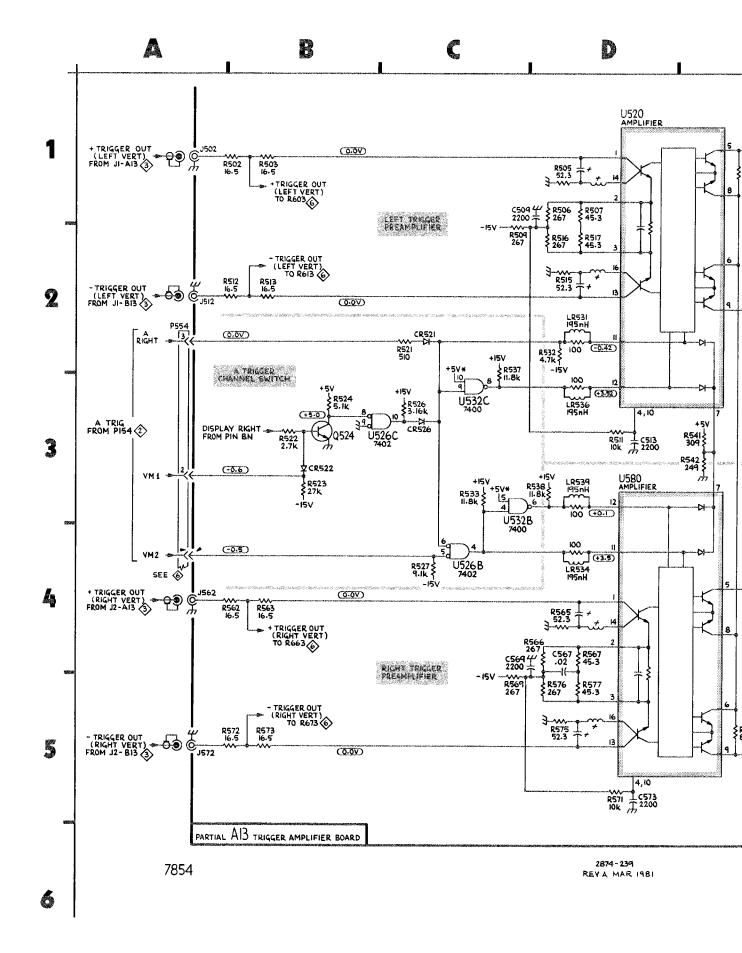
The voltages shown were taken with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B). All variable controls were set to mid-range. No plug-in units were installed.

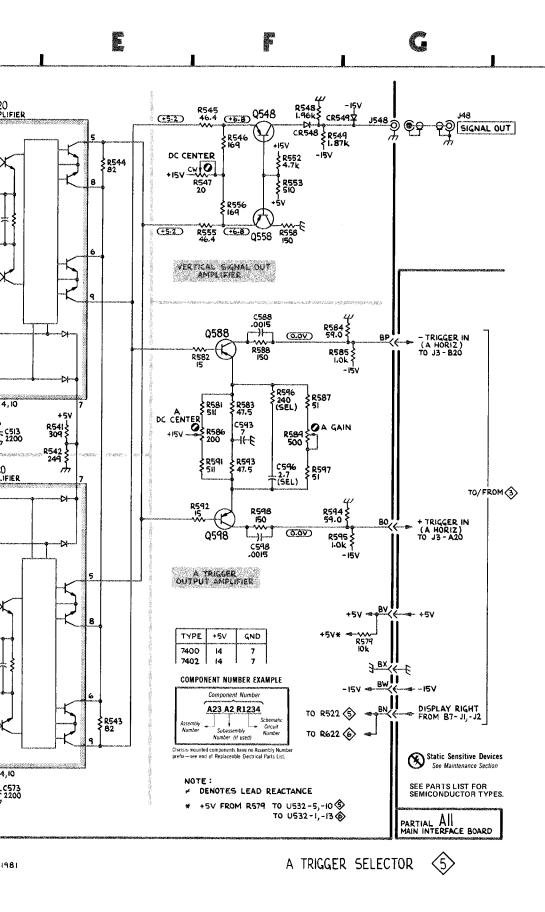
**Voltage Conditions.** The voltages on the diagram were taken using digital multimeter with a 10 M $\Omega$  input impedance (Tektronix DM 501 Digital Multimeter installed in a TM 501 Power Module or a Tektronix 7D13 Digital Multimeter used with a readout-equipped 7000-Series Oscilloscope).

## Selectable Electrical Parts Table

#### For Diagram 5

| Component Number | Reason For Selection        | Component Value |
|------------------|-----------------------------|-----------------|
| A13R596          | To obtain trigger bandwidth | 10240Ω          |
| A13C596          |                             | 2.76.8 pF       |







Reverse Side

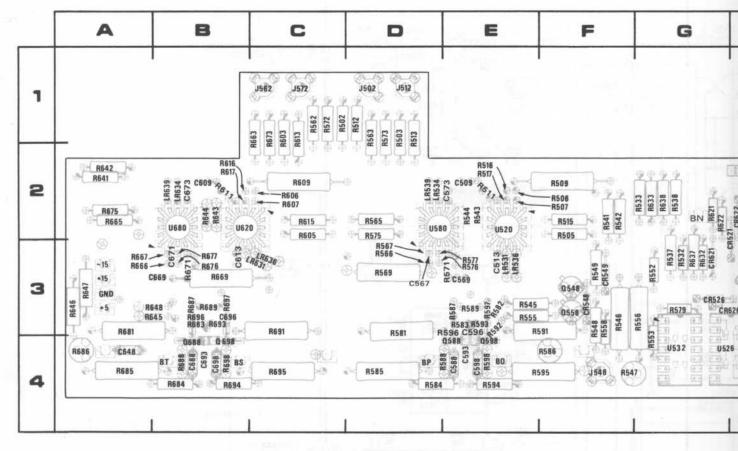


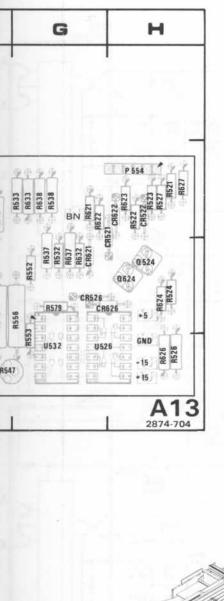
Figure 7-7. A13-Trigger Amplifier circuit board assembly.



COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix--see end of Replaceable Electrical Parts List.



A13 TRIGGER AMPLIFIER BOARD Shown on Diags. 5 & 6

## **B TRIGGER SELECTOR DIAGRAM 6**

| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD  |
|-------------------|-------------------|-------------------|-------------------|-------------------|--------|
| C609              | C1                | B2                | R633              | D4                | G2     |
| C613              | D3                | B3                | R637              | C2                | G3     |
| C648              | E3                | A4                | R638              | D3                | G2     |
| C669              | C4                | B3                | R641              | E3                | A2     |
| C671              | D5                | B3                | R642              | E3                | A2     |
| C673              | D5                | B2                | R643              | E5                | B2     |
| C688              | F2                | B4                | R644              | E1                | B2     |
| C693              | F3                | B4                | R645              | F3                | B3     |
| C696              | F3                | B3                | R646              | E3                | A3     |
| C698              | F4                | B4                | R647              | E3                | A3     |
|                   |                   |                   | R648              | F3                | B3     |
| CR621             | C2                | G3                | R663              | B4                | C1     |
| CR622             | B3                | H2                | R665              | D4                | A2     |
| CR626             | C3                | G3                | R666              | D4                | A3     |
|                   |                   |                   | R667              | D4                | A3     |
| LR631             | D2                | C3                | R669              | C5                | B3     |
| LR634             | D4                | B2                | R671              | D5                | B3     |
| LR636             | D3                | C3                | R673              | 85                | C1     |
| LR639             | D3                | B2                | R675              | D5                | A2     |
| Contexto          |                   | water of          | R676              | D5                | B3     |
| P554              | A2                | H2                | R677              | D5                | B3     |
|                   |                   | 10000             | R681              | F3                | A3     |
| Q624              | B3                | нз                | R683              | F3                | В3     |
| Q688              | F2                | B4                | R684              | G2                | B4     |
| Q698              | F4                | B4                | R685              | G2                | A4     |
|                   |                   |                   | R686              | F3                | A4     |
| R69               | C2                | B3                | R687              | G3                | B3     |
| R603              | B1                | C1                | R688              | F2                | B4     |
| R605              | D1                | C2                | R689              | G3                | B3     |
| R606              | D1                | C2                | R691              | F3                | C3     |
| R607              | D1                | C2                | R693              | F3                | B3     |
| R609              | D2                | C2                | R694              | G3                | B4     |
| R611              | D3                | B2                | R695              | G4                | C4     |
| R613              | B2                | C1                | R696              | F3                | B3     |
| R615              | D2                | C2                | R697              | G3                | B3     |
| R616              | D2                | B2                | R698              | F4                | B4     |
| R617              | D2                | B2                |                   | 1414              | 174231 |
| R621              | C2                | G2                | U526A             | C4                | G4     |
| R622              | B3                | G2                | U526D             | C3                | G4     |
| R623              | B3                | H2                | U532A             | C3                | G4     |
| R624              | 83                | H3                | U532D             | C3                | G4     |
| R626              | C3                | H4                | U620              | D1                | B2     |
| R627              | C4                | H2                | U680              | D5                | B2     |
| R632              | D2                | G3                |                   |                   |        |

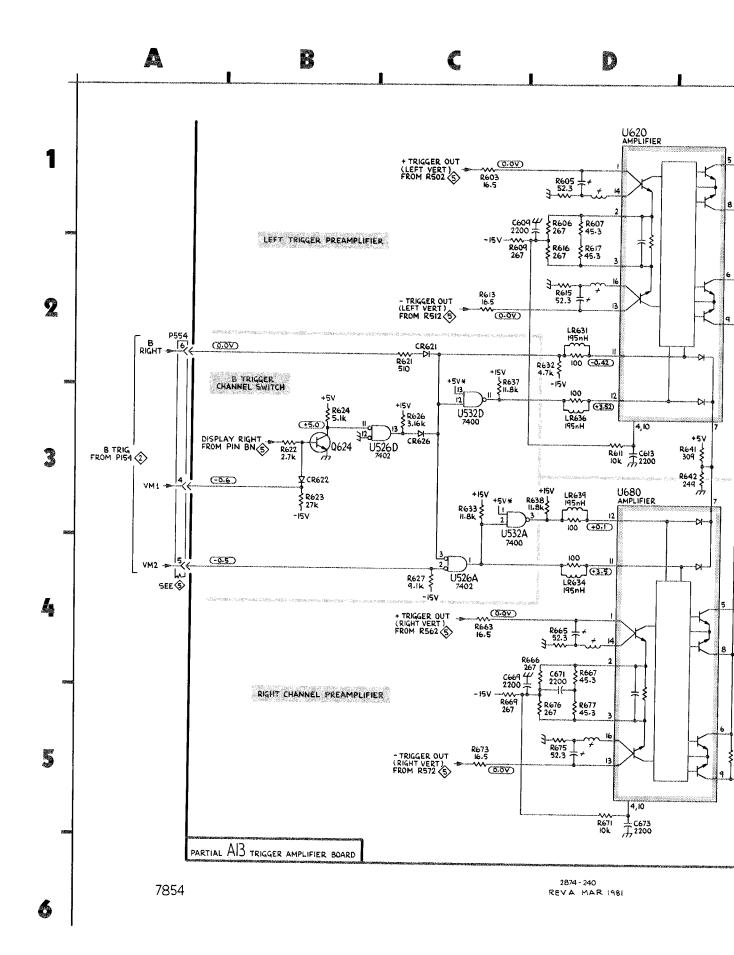
#### VOLTAGE CONDITIONS

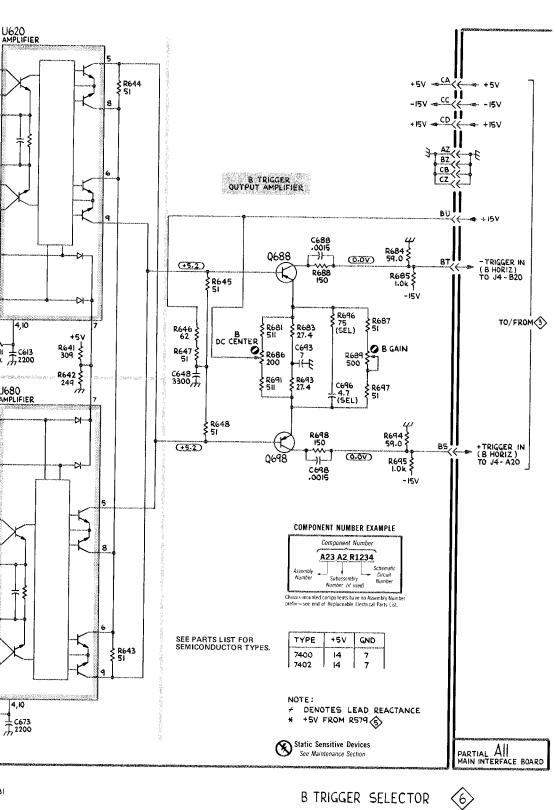
The voltages shown were taken with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B). All variable controls were set to midrange. No plug-in units were installed.

Voltage Conditions. The voltages on the diagram were taken using a digital multimeter with a 10 M $\Omega$  input impedance (Tektronix DM 501 Digital Multimeter installed in a TM 501 Power Module or a Tektronix 7D13 Digital Multimeter used with a readout-equipped 7000-Series Oscilloscope.

#### Selectable Electrical Parts Table For Diagram 6

| Component Number | Reason For Selection | Component Value |
|------------------|----------------------|-----------------|
| R696             | To obtain            | <b>10240</b> Ω  |
|                  | trigger              |                 |
| C696             | bandwidth            | 2.76.8 pF       |





G

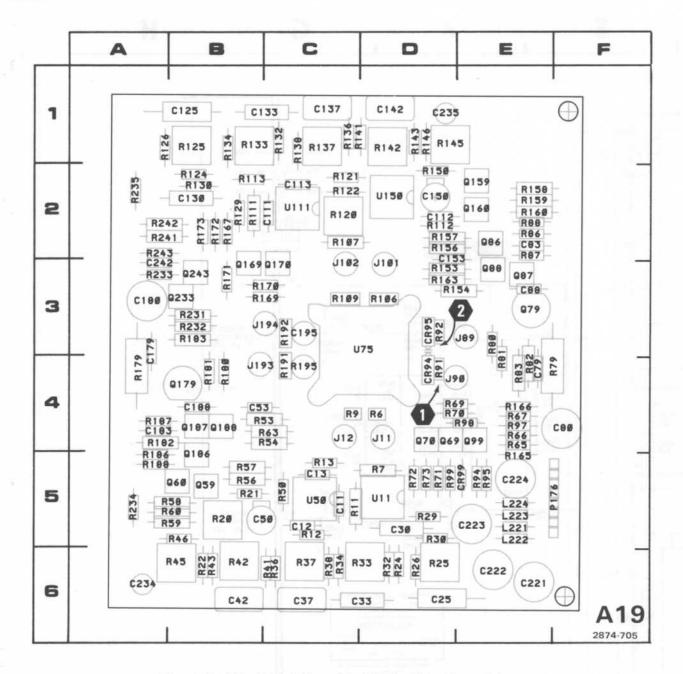
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6 B Trigger Selector

Reverse Side

31

7854





#### COMPONENT NUMBER EXAMPLE

Assembly A19

|                    | Component Numbe                 | r                              |
|--------------------|---------------------------------|--------------------------------|
|                    | A23 A2 R1234                    | Ē.                             |
| Assembly<br>Number | Subassembly<br>Number (if used) | Schematic<br>Circuit<br>Number |

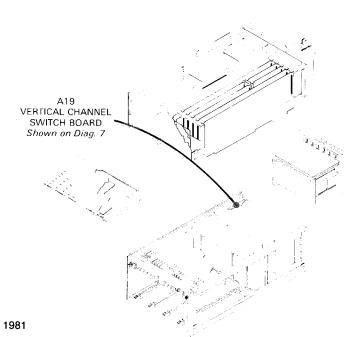
Chassis-mounted components have no Assembly Numbe prefix—see end of Replaceable Electrical Parts List.

Static Sensitive Devices See Maintenance Section

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### VERTICAL CHANNEL SWITCH

| A19 ASSY                                     |                                  |                                  | CM#100286497549300                           |                                        |                                  |
|----------------------------------------------|----------------------------------|----------------------------------|----------------------------------------------|----------------------------------------|----------------------------------|
| CIRCUIT<br>NUMBER                            | SCHEM<br>LOCATION                | BOARD<br>LOCATION                | CIRCUIT<br>NUMBER                            | SCHEM<br>LOCATION                      | BOAR                             |
| C11<br>C12<br>C13<br>C25                     | B1<br>B2<br>B2<br>B2<br>B2       | C5<br>C5<br>C5<br>D6             | Q159<br>Q160<br>Q169<br>Q170                 | D4<br>D4<br>C3<br>D3                   | E2<br>E2<br>B3<br>C3             |
| C30<br>C33<br>C37<br>C42<br>C50<br>C53       | B2<br>B2<br>C2<br>C2<br>D1       | D5<br>D6<br>C6<br>B6<br>C5<br>C4 | Q179<br>Q186<br>Q187<br>Q188<br>Q233<br>Q243 | E3<br>E3<br>F3<br>F3<br>C4<br>D5       | 84<br>85<br>84<br>83<br>83       |
| C79<br>C80<br>C83<br>C88<br>C111             | E1<br>E1<br>E2<br>F2<br>B3       | E4<br>F4<br>E2<br>E3<br>C2       | R6<br>R7<br>R9<br>R11                        | A1<br>A2<br>B1<br>B1                   | D4<br>D5<br>C4<br>C5             |
| C112<br>C113<br>C125<br>C130<br>C133<br>C133 | 83<br>83<br>84<br>84<br>84       | D2<br>C2<br>B1<br>B2<br>C1       | R12<br>R13<br>R20<br>R21<br>R22              | B2<br>B2<br>A2<br>A2<br>B2             | C5<br>C5<br>B5<br>B5<br>B6       |
| C137<br>C142<br>C150<br>C153<br>C179<br>C180 | B4<br>C4<br>C3<br>E3<br>E3       | C1<br>D1<br>D2<br>D3<br>A3<br>A3 | R24<br>R25<br>R26<br>R29<br>R30<br>R32       | 82<br>82<br>82<br>82<br>82<br>82<br>82 | D6<br>D6<br>D5<br>D5<br>D5<br>D6 |
| C183<br>C188<br>C195<br>C221<br>C222         | E4<br>F3<br>F3<br>B4<br>B4       | A4<br>B4<br>C3<br>E6<br>E6       | R33<br>R34<br>R36<br>R37<br>R38              | B2<br>B2<br>C2<br>C2<br>C2             | D6<br>C6<br>C6<br>C6<br>C6       |
| C223<br>C224<br>C234<br>C235<br>C242         | 85<br>85<br>C4<br>C5<br>D5       | D5<br>E5<br>A6<br>D1<br>A3       | R41<br>R42<br>R43<br>R45<br>R46              | C2<br>C2<br>C2<br>C2<br>C2<br>C2       | C6<br>B6<br>B6<br>B6<br>B5       |
| CR94<br>CR95<br>CR99                         | F1<br>F2<br>F3                   | D4<br>D3<br>E5                   | R50<br>R53<br>R54<br>R56<br>R57              | C2<br>D1<br>D2<br>D2<br>D2             | 85<br>C4<br>C4<br>85<br>85       |
| J11<br>J12<br>J89<br>J90<br>J101             | A1<br>A1<br>F2<br>F1<br>A3       | D4<br>C4<br>E3<br>E4<br>D3       | R58<br>R59<br>R60<br>R63<br>R65              | D2<br>D2<br>D1<br>B2                   | 85<br>85<br>85<br>C4<br>E4       |
| J102<br>J193<br>J194<br>L221<br>L222         | A3<br>F3<br>F4<br>A4<br>A4       | C3<br>C4<br>C3<br>E5<br>E5       | R66<br>R67<br>R69<br>R70<br>R71<br>R72       | B2<br>B2<br>C2<br>C2<br>C3<br>C2       | E4<br>E4<br>E4<br>D5<br>D5       |
| L223<br>L224<br>P176<br>P176                 | A4<br>A5<br>A2<br>A4             | E5<br>E5<br>F5<br>F5             | R73<br>R79<br>R80<br>R81<br>R82              | C2<br>E1<br>E2<br>E1<br>E2             | D5<br>E4<br>E3<br>E4<br>E4<br>E4 |
| P176<br>Q59<br>Q60<br>Q69                    | F2<br>D2<br>D2<br>C2             | F5<br>B5<br>B5<br>D4             | R83<br>R86<br>R87<br>R88<br>R91              | E2<br>E1<br>F1<br>F2<br>F2             | E4<br>E2<br>E2<br>E2<br>D4       |
| 070<br>079<br>086<br>087<br>088<br>099       | C2<br>E1<br>E2<br>F1<br>F2<br>F2 | D4<br>E3<br>E2<br>E3<br>E3<br>E4 | R92<br>R94<br>R95<br>R97<br>R98<br>R99       | F2<br>F1<br>F2<br>F2<br>F2<br>F3       | D3<br>E5<br>E5<br>E4<br>E4<br>D5 |



REV A MAR 1981

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| A19 ASS           | Y PARTIAL         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                          |                    |                   |                   |                   |
|-------------------|-------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|--------------------|-------------------|-------------------|-------------------|
| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION        | CIRCUIT<br>NUMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | SCHEM<br>LOCATION                        | BOARD<br>LOCATION  | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION |
| C11               | B1                | C5                       | Q159                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | D4                                       | E2                 | R106              | A4                | D3                |
| C12               | B2                | C5                       | Q160                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | D4                                       | E2                 | R107              | A4                | C2                |
| C13               | B2                | C5                       | Q169                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | C3                                       | B3                 | R109              | B3                | C3                |
| C25<br>C30        | B2<br>B2          | D6<br>D5                 | Q170<br>Q179                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | D3<br>E3                                 | C3<br>B4           | R111              | B3                | B2                |
| C33               | B2<br>B2          | D5<br>D6                 | Q186                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | E3                                       | B4<br>B5           | R112<br>R113      | B3<br>B3          | D2<br>B2          |
| C37               | B2                | C6                       | Q187                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | F3                                       | B4                 | R120              | A4                | C2                |
| C42               | C2                | B6                       | Q188                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | F3                                       | B4                 | R121              | A4                | C2                |
| C50               | C2                | C5                       | Q233                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | C4                                       | B3                 | R122              | B4                | C2                |
| C53               | D1                | C4<br>E4                 | Q243                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | D5                                       | В3                 | R124              | B4                | B2                |
| C79<br>C80        | E1<br>E1          | E4<br>F4                 | R6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | A1                                       | D4                 | R125<br>R126      | B4<br>B4          | B1<br>A1          |
| C83               | E2                | E2                       | R7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | A2                                       | D5                 | R129              | 84<br>84          | B2                |
| C88               | F2                | E3                       | R9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | В1                                       | C4                 | R130              | B4                | B2                |
| C111              | В3                | C2                       | R11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | B1                                       | C5                 | R132              | B4                | C1                |
| C112              | 83                | D2                       | R12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | B2                                       | C5                 | R133              | B4                | B1                |
| C113<br>C125      | 83<br>84          | C2<br>B1                 | R13<br>R20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | B2<br>A2                                 | C5<br>B5           | R134<br>R136      | В4<br>С4          | B1<br>C1          |
| C125              | B4<br>B4          | B1<br>B2                 | R20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | A2<br>A2                                 | B5                 | R130              | C4<br>C4          | C1                |
| C133              | B4                | C1                       | R22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | B2                                       | B6                 | R138              | C4<br>C4          | C2                |
| C137              | B4                | C1                       | R24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | B2                                       | D6                 | R141              | C4                | C1                |
| C142              | C4                | D1                       | R25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | B2                                       | D6                 | R142              | C4                | D1                |
| C150<br>C153      | C4<br>D3          | D2<br>D3                 | R26<br>R29                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | B2<br>B2                                 | D6<br>D5           | R143              | C4                | D1                |
| C153              | E3                | A3                       | R30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | B2                                       | D5<br>D5           | R145<br>R146      | C4<br>C4          | D1<br>D1          |
| C180              | E3                | A3                       | R32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | B2                                       | D6                 | R150              | C4<br>C4          | D2                |
| C183              | E <b>4</b>        | A4                       | R33                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 82                                       | D6                 | R153              | D3                | D3                |
| C188              | F3                | B4                       | R34                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | B2                                       | C6                 | R154              | D4                | D3                |
| C195              | F3                | C3                       | R36                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | C2                                       | C6                 | R156              | D4                | D2                |
| C221<br>C222      | 84<br>84          | E6<br>E6                 | R37<br>R38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | C2<br>C2                                 | C6<br>C6           | R157<br>R158      | D4<br>D4          | D2                |
| C223              | B5                | D5                       | R41                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | C2                                       | C6                 | R158              | D4<br>D4          | E2<br>E2          |
| C224              | B5                | E5                       | R42                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | C2                                       | B6                 | R160              | D4                | E2                |
| C234              | C4                | A6                       | R43                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | C2                                       | B6                 | R163              | D3                | D3                |
| C235              | C5                | D1                       | R45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | C2                                       | B6                 | R165              | C3                | E5                |
| C242              | D5                | A3                       | R46<br>R50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | C2<br>C2                                 | B5<br>85           | R166              | C3                | E4                |
| CR94              | F1                | D4                       | R53                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | D1                                       | C4                 | R167<br>R169      | C3<br>D2          | B2<br>C3          |
| CR95              | F2                | D3                       | R54                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | D2                                       | C4                 | B170              | D3                | C3                |
| CR99              | F3                | E5                       | R56                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | D2                                       | <b>B</b> 5         | R171              | D3                | B3                |
|                   |                   |                          | R57                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | D2                                       | B5                 | R172              | D3                | B2                |
| J11               | A1<br>A1          | D4<br>C4                 | R58                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | D2                                       | B5                 | R173              | D3                | B2                |
| J12<br>J89        | F2                | E3                       | R59<br>R60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | D2<br>D2                                 | B5<br>B5           | R179<br>R180      | E3<br>E3          | A4<br>B4          |
| J90               | F1                | E4                       | R63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | D2                                       | C4                 | R180              | E3<br>E3          | B4<br>B4          |
| J101              | A3                | D3                       | R65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | B2                                       | E4                 | R182              | E3                | A4                |
| J102              | A3                | C3                       | R66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | B2                                       | E4                 | R183              | E4                | ВЗ і              |
| J193<br>J194      | F3<br>F4          | C4<br>C3                 | R67<br>R69                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | B2<br>C2                                 | E4                 | R186              | E3                | A5                |
| 0194              | F4                |                          | R70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | C2<br>C2                                 | E4<br>E4           | R187<br>R188      | F3<br>F4          | A4<br>A5          |
| L.221             | A4                | E5                       | R71                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | C3                                       | D5                 | R191              | F3                | C4                |
| L222              | A4                | E5                       | R72                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | C2                                       | D5                 | R192              | F4                | C3                |
| L223              | A4                | E5                       | R73                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | C2                                       | D5                 | R195              | F3                | C4                |
| L224              | A5                | E5                       | R79                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | E1                                       | E4                 | R231              | B4                | B3                |
| P176              | A2                | F5                       | R80<br>R81                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | E2<br>E1                                 | E3<br>E4           | R232<br>R233      | B5<br>C4          | B3<br>A3          |
| P176              | A4                | F5                       | R82                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | E2                                       | E4                 | R234              | C4<br>C4          | A5                |
| P176              | F2                | F5                       | R83                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | E2                                       | E4                 | R235              | C5                | A2                |
| 0.55              |                   |                          | R86                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | E1                                       | E2                 | R241              | D4                | A2                |
| Q59               | D2<br>D2          | B5<br>B5                 | R87                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | F1<br>F2                                 | E2                 | R242              | D5                | A2                |
| 060<br>069        | C2                | В5<br>D4                 | R88<br>R91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | F2<br>F2                                 | E2<br>D4           | R243              | D4                | A2                |
| Q70               | C2                | D4                       | R92                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | F2<br>F2                                 | D3                 | U11               | B2                | D5                |
| Q79               | E1                | E3                       | R94                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | F1                                       | E5                 | U50               | C2                | C5                |
| Q86               | E2                | E2                       | R95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | F2                                       | E5                 | U75               | D1                | D3                |
| Q87               | F1                | E3                       | R97                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | F2                                       | E4                 | U111              | B4                | C2                |
| Q88<br>Q99        | F2<br>F2          | E3<br>E4                 | R98<br>R99                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | F2<br>F3                                 | E4<br>D5           | U150              | C4                | D2                |
|                   |                   |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                          |                    |                   |                   |                   |
|                   |                   | nervarin stanssanders, d | TAXABLE PARTY AND A DESCRIPTION OF A DES | an a | uran somernersener | BRANKSTINDER DE   |                   | AND STREET OF     |

## VERTICAL CHANNEL SWITCH DIAGRAM 7



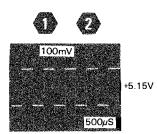
#### VOLTAGE AND WAVEFORM CONDITIONS

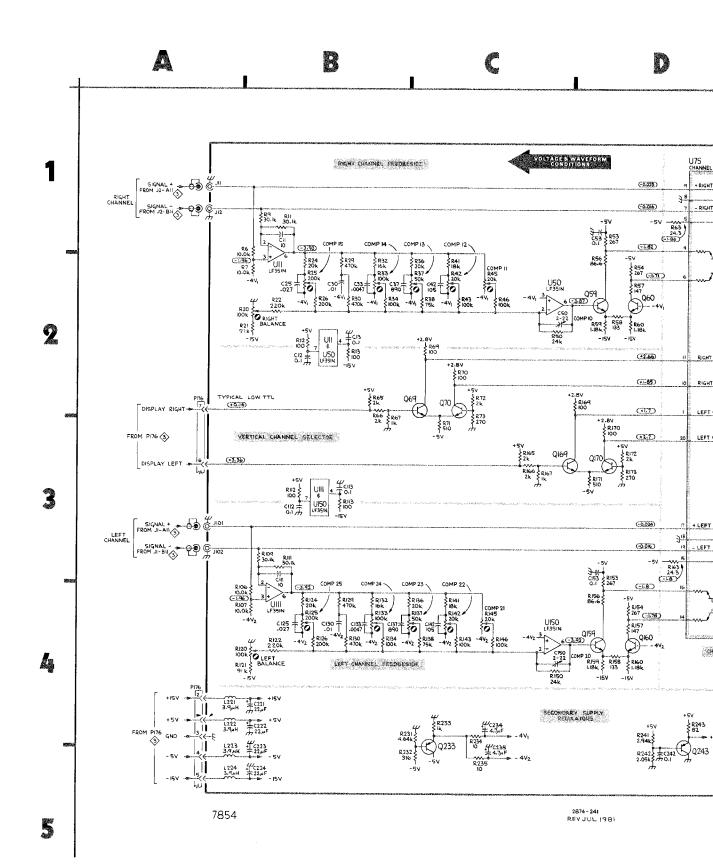
The voltages and waveforms shown were obtained with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B); READOUT INTENSITY (OFF).

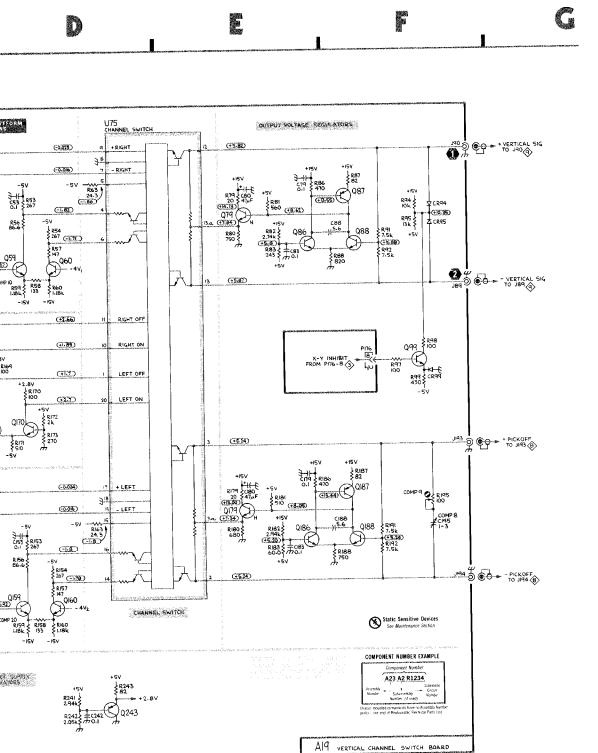
**Voltage Conditions.** The voltages were taken with a digital multimeter with a 10 M $\Omega$  input impedance (Tektronix DM 501 Digital Multimeter installed in a TM 501 Power Module or Tektronix 7D13 Digital Multimeter used with a readout-equipped 7000-Series Oscilloscope).

Waveform Conditions. The waveforms shown below were obtained using a test oscilloscope system with 10 M $\Omega$  impedance, at least 60 MHz bandwidth and 10X probe (Tektronix 7603 Oscilloscope, 7B92 Time Base, 7A13 Differential Comparator and P6063A Probe).

A Calibration Fixture (Tektronix 067-0587-01 with controls set as follows: REP RATE (1 KHz); STEP RESPONSE (+); AMPLITUDE (6 divisions) was installed in the LEFT VERT compartment of the 7854 and a 7B80 Time Base with controls set as follows: TRIGGERING (P-P AUTO, AC, INT); TIME/DIV (1 ms) was installed in the B Horizontal compartment of the 7854.







2874-241 REV JUL 1981 VERTICAL CHANNEL SWITCH

Switch

A 20

7854

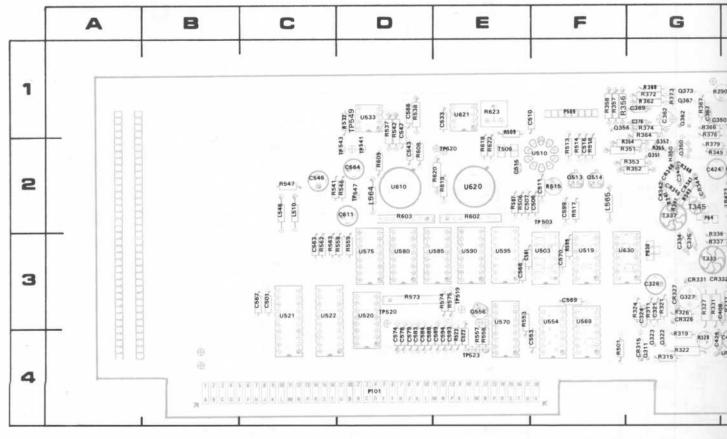


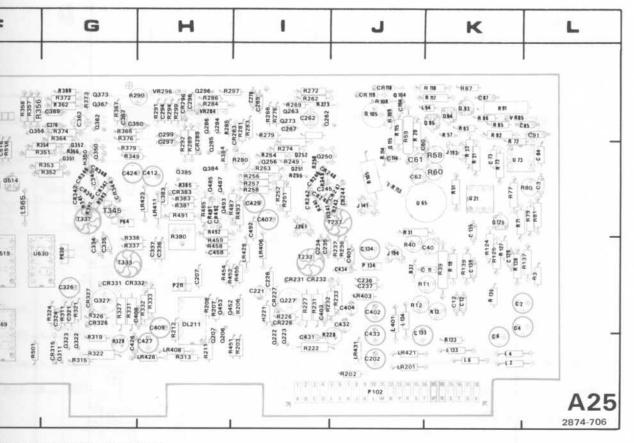
Figure 7-9. A25-Digitizer circuit board assen



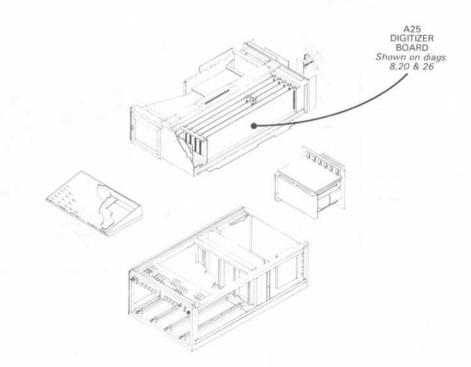
#### COMPONENT NUMBER EXAMPLE

|                    | Component Number                | er                             |
|--------------------|---------------------------------|--------------------------------|
|                    | A23 A2 R123                     | 4                              |
| Assembly<br>Number | Subassembly<br>Number (if used) | Schematic<br>Circuit<br>Number |

Chassis-mounted components have no Assembly Number prefix-see end of Replaceable Electrical Parts List.



Digitizer circuit board assembly.



REV A MAR 1981

### **VERTICAL PICKOFF AMPLIFIER DIAGRAM 8**

| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION                      | BOARD<br>LOCATIO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------|-------------------|-------------------|-------------------|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C2                | B1                | КЗ                | R11               | В3                                     | J3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C3                | B1                | ∟2                | R12               | в3                                     | J3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C4                | B1                | кз                | R13               | B3                                     | КЗ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C6                | B2                | К4                | R19               | C3                                     | К3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C11               | B3                | J3                | R20               | С3                                     | J1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C12               | B3                | КЗ                | R21               | C3                                     | К2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C13               | B3                | КЗ                | R22               | C3                                     | К2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C23               | C3                | *                 | R23               | C3                                     | •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C24               | D3                | *                 | R24               | D3                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| C30               | D2                | *                 | R30               | D2                                     | *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C33               | C2                | •                 | R31               | D2                                     | J2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C40               | C3                | J3                | R32               | D2                                     | •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C42               | C3                | •                 | R33               | C2                                     | *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C50               | D4                | •                 | R34               | C2                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| C52               | D4                | •                 | R37               | C2                                     | J3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C53               | C4                | *                 | R39               | C3                                     | КЗ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C60               | C4                | J2                | R40               | C3                                     | J3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C61               | C4                | J2                | R43               | C3                                     | *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C62               | C4                | J2                | R50               | D5                                     | *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C73               | C1                | K2                | R51               | D4                                     | K2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C84               | D1                | L2                | R53               | C4                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| C85               | E1                | L1                | R54               | C4                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| C87               | E1<br>F1          | K1                | R57               | C4                                     | K1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C91               | E2                | L1<br>J1          | R58<br>R59        | C4                                     | K2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C104<br>C105      | E2<br>E2          | ۱ ل<br>*          | R59<br>R60        | C4<br>C4                               | J1<br>K2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| C105<br>C106      | EZ<br>F2          | *                 | R60<br>R63        | C4<br>C4                               | K2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C114              | E3                | J2                | R71               | C1                                     | К2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C122              | E4                | *                 | R72               | C1                                     | K1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C129              | F4                | КЗ                | R73               | C1                                     | К2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C133              | B5                | J3                | B77               | D1                                     | К2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C134              | B5                | J3                | R79               | D1                                     | L2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C135              | <b>B</b> 5        | К2                | R80               | D1                                     | K2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C139              | C5                | K3                | R81               | D2                                     | L2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                   |                   |                   | R85               | E1                                     | K1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| CR118             | F3                | J1                | R86               | E1                                     | К1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| CR119             | F3                | J1                | R87               | E1                                     | К1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                   |                   |                   | R91               | F1                                     | К1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| J141              | F2                | J2                | R92               | E1                                     | К1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| J193              | A4                | К2                | R93               | E1                                     | K1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| J194              | A2                | J3                | R103              | E2                                     | ٠                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| J241              | G2                | 12                | R105              | F2                                     | J1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                   |                   |                   | R106              | F2                                     | *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| L2                | B1                | К4                | R108              | F2                                     | J1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| L4                | B1                | K4                | R109              | F2                                     | J1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| L6                | B2                | К4                | R114              | E3                                     | J2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| L94               | E2                | К1                | R115              | F3                                     | J1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| L103              | E2                | *                 | R117              | F3                                     | К1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| L133              | A5                | K4                | R118              | F3                                     | К1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| L134              | B5                | 13                | R122              | E5                                     | •<br>KO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| LR113             | E <b>2</b>        | 10                | R124              | F4                                     | K3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| LNII3             | E3                | J2                | R125<br>R126      | F4<br>E4                               | КЗ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| P102              | A 1               | J4                | R126              | E4                                     | K 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| P102<br>P102      | A1<br>A5          | J4<br>J4          | R127<br>R133      | F4<br>85                               | КЗ<br>К4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| P102<br>P134      | 85<br>B5          | J4<br>J3          | R133              | 85<br>85                               | к4<br>КЗ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                   | 20                | 00                | R135              | C5                                     | K3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Q93               | E1                | К1                | R138              | C5                                     | K3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Q94               | E1                | K1                | R139              | C5                                     | K3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Q95               | E1                | K1                |                   |                                        | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Q104              | E2                | J1                | U21               | C3                                     | К2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Q105              | F2                | J1                | U65               | D2                                     | J2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Q115              | F3                | J2                | U73A              | C1                                     | К2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Q125              | F4                | K2                | U73B              | D1                                     | K2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                   |                   |                   | ļ                 |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| R3                | B1                | L3                | VR85              | D1                                     | K1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                   |                   | own on diagrai    |                   |                                        | and a subscription of the |
| HASSIS            | MOUNTED           | PARTS             | ·                 | ······································ | 5-404 6 (1****************************                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION                      | BOARD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

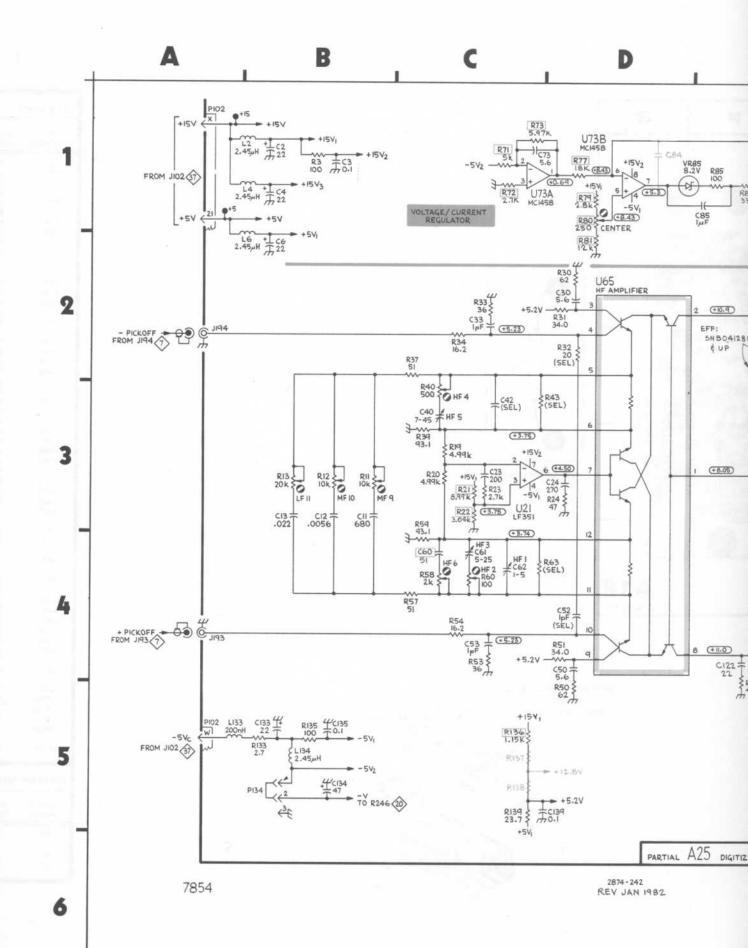
#### **VOLTAGE CONDITIONS**

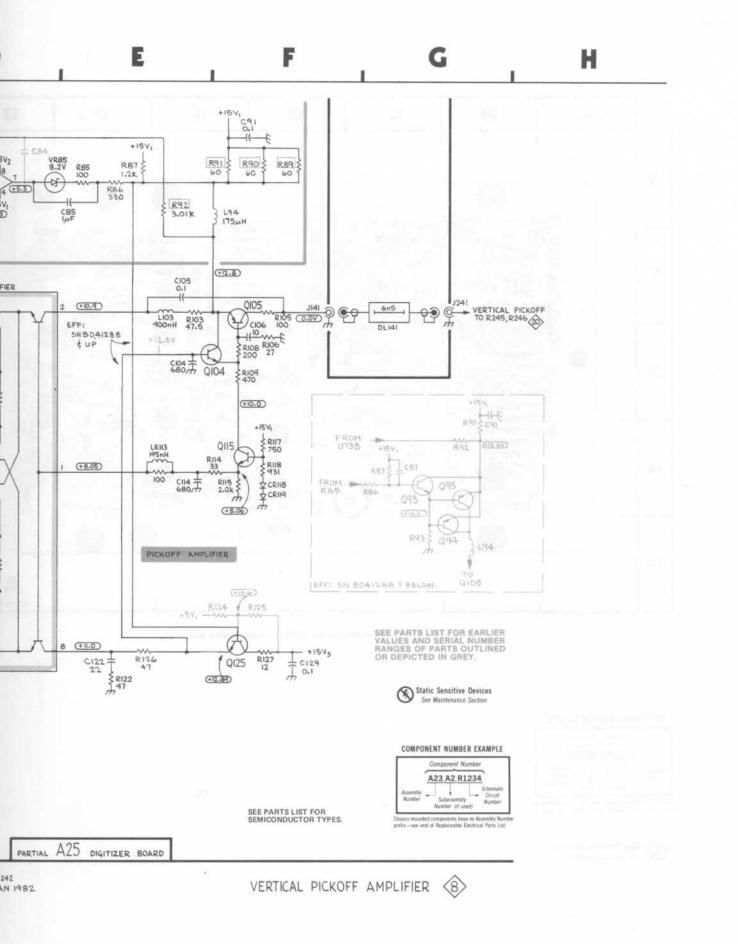
The voltages shown were taken with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HOPIZONTAL MODE (B); READOUT INTENSITY (OFF). No plug-in units were installed.

Voltage Conditions. The voltages on the diagram were taken using a digital multimeter with a 10 M $\Omega$  input impedance (Tektronix DM 501 Digital Multimeter installed in a TM 501 Power Module or a Tektronix 7D13 Digital Multimeter used with a readout-equipped 7000-Series Oscilloscope.

### Selectable Electrical Parts Table For Diagram 8

| Component Number | Reason For Selection                | Component Value            |
|------------------|-------------------------------------|----------------------------|
| A25R32           |                                     | 20                         |
| A25R43           | See Vertical Amplifier Replacement, | See Table 3-5<br>Section 3 |
| A25R63           | Section 3 Maintenance.              | Maintenance                |
| A25C42           |                                     | 4.7 pF                     |
| A25C52           |                                     | 1 pF                       |





Amplifier

Reverse Side

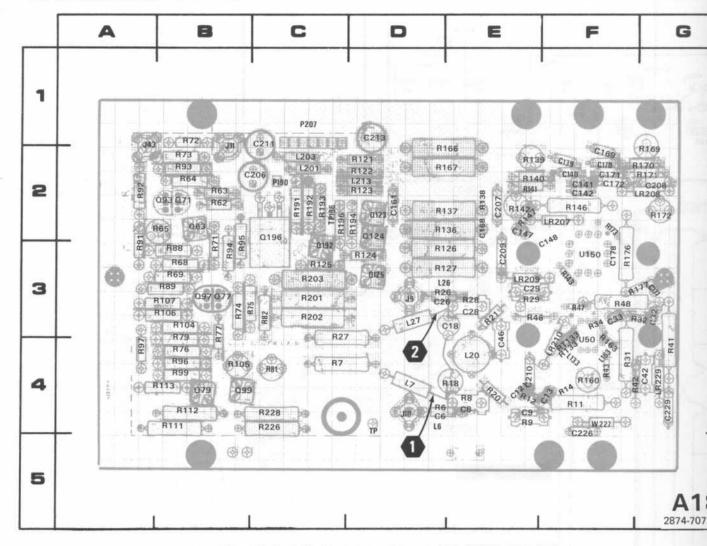
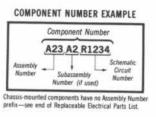
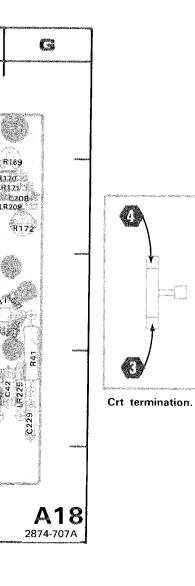


Figure 7-10. A18-Vertical Amplifier circuit board assembly.

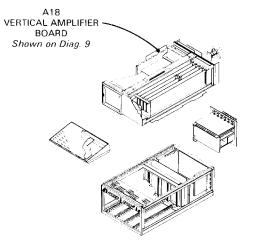


Static Sensitive Devices See Maintenance Section

## VERTICAL A



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| A18 ASS           |                   |          |                   |
|-------------------|-------------------|----------|-------------------|
| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION |          | CIRCUIT<br>NUMBER |
| C6                | B1                | D4       | P207              |
| C8<br>C9          | C1<br>C1          | E4<br>E4 | Q63               |
| C12               | C1                | E4<br>E4 | Q71               |
| C12               | C1                | F4       | 077               |
| C18               | B2                | E3       | 079               |
| C26               | B2                | E3       | Q93               |
| C28               | C2                | E3       | Q97               |
| C29               | C2                | E3       | 099               |
| C32<br>C33        | C2<br>C2          | G3<br>F3 | Q123<br>Q124      |
| C42               | C2                | G4       | Q125              |
| C46               | C2                | E4       | Q192              |
| C139              | E1                | F2       | Q196              |
| C140              | E1                | F2       | DE                |
| C141<br>C142      | E1<br>E1          | F2<br>F2 | R6<br>R7          |
| C142<br>C147      | F1                | E2       | R8                |
| C148              | F1                | F3       | R9                |
| C161              | E2                | D2       | R11               |
| C168              | E2                | E2       | R12               |
| C169<br>C170      | E2<br>E2          | F2<br>F2 | R14               |
| C170<br>C171      | E2<br>E2          | F2<br>F2 | R18<br>R20        |
| C172              | E2<br>E2          | F2<br>F2 | R20               |
| C177              | F3                | G3       | R26               |
| C178              | F2                | F3       | R27               |
| C206              | F4                | C2       | R28               |
| C207<br>C208      | F4<br>F4          | E2<br>G2 | R29<br>R31        |
| C208<br>C209      | F4<br>F4          | E3       | R31               |
| C210              | F4                | E4       | R34               |
| C211              | F4                | C2       | R41               |
| C213              | F4                | D1       | R42               |
| C226<br>C229      | F4<br>F4          | F5<br>G4 | R43<br>R46        |
| 6229              | F4                | 04       | R46<br>R47        |
| J9                | B2                | D3       | R48               |
| J10               | B1                | D4       | R62               |
| J11               | A3                | B2       | R63               |
| J43               | A4                | A2       | R64               |
| L6                | B1                | D4       | R65<br>R68        |
| L6<br>L7          | в:<br>B1          | D4<br>D4 | R69               |
| L20               | C2                | E4       | R71               |
| L26               | B2                | E3       | R72               |
| L27               | B2                | D3       | R73               |
| L133              | D1                | F4       | R74               |
| L163<br>L201      | D2<br>E3          | F4<br>C2 | R75<br>R76        |
| L201<br>L203      | E3<br>E4          | C2       | R76<br>R77        |
| L213              | E5                | D2       | R79               |
|                   |                   |          | R81               |
| LR207             | F4                | F2       | R82               |
| LR208             | F4                | G2       | R88               |
| LR209<br>LR210    | F4<br>F4          | E3<br>F4 | R89<br>R91        |
| LR210<br>LR229    | F4<br>G4          | F4<br>G4 | R91<br>R92        |
|                   | UT.               | 5,       | R93               |
| P190              | F3                | C2       | R94               |
|                   | MOUNTEE           |          |                   |
| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION |          | CIRCUIT<br>NUMBER |
| C83               | G3                | CHASSIS  |                   |
| L81               | G1                | CHASSIS  | R81               |
| L82               | G2                | CHASSIS  | R82               |
|                   |                   |          | 1                 |

| A18 ASS           |                   |                    |                   |                   |                                               |                                           |                          |                                            |
|-------------------|-------------------|--------------------|-------------------|-------------------|-----------------------------------------------|-------------------------------------------|--------------------------|--------------------------------------------|
| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION  | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION                             | CIRCUIT<br>NUMBER                         | SCHEM<br>LOCATION        | BOARD<br>LOCATION                          |
| C6                | B1                | D4                 | P207              | A3                | C1                                            | R95                                       | C4                       | В3                                         |
| C8                | C1                | E4                 | 0.00              |                   |                                               | R96                                       | C4                       | B4                                         |
| C9                | C1                | E4                 | Q63               | B4                | B2                                            | R97                                       | C4                       | A4                                         |
| C12               | C1<br>C1          | E4<br>F4           | Q71               | 84<br>C4          | B2                                            | R99                                       | C4                       | B4                                         |
| C13<br>C18        | B2                | F4<br>E3           | Q77<br>Q79        | C4<br>C3          | B3<br>B4                                      | R104<br>R105                              | C4<br>C4                 | В3<br>В4                                   |
| C26               | B2                | E3                 | Q93               | B4                | B2                                            | R106                                      | C4                       | B4<br>B3                                   |
| C28               | C2                | E3                 | 097               | C4                | B3                                            | R107                                      | C4                       | B3                                         |
| C29               | C2                | E3                 | Q99               | C4                | B4                                            | R111                                      | C4                       | B4                                         |
| C32               | C2                | G3                 | Q123              | D3                | D2                                            | R112                                      | C4                       | B4                                         |
| C33               | C2                | F3                 | Q124              | D3                | D2                                            | R113                                      | C4                       | B4                                         |
| C42<br>C46        | C2<br>C2          | G4<br>E4           | Q125<br>Q192      | D3<br>F3          | D3<br>C3                                      | R121<br>R122                              | D3                       | D2                                         |
| C139              | E1                | F2                 | Q192<br>Q196      | F3                | C2                                            | R122                                      | D3<br>D3                 | D2<br>D2                                   |
| C140              | E1                | F2                 | 0150              | 15                | 02                                            | R123                                      | D3                       | D3                                         |
| C141              | E1                | F2                 | R6                | B1                | D4                                            | R125                                      | D3                       | C3                                         |
| C142              | E1                | F2                 | R7                | B1                | C4                                            | R126                                      | D3                       | E3                                         |
| C147              | F1                | E2                 | R8                | C1                | E4                                            | R127                                      | D3                       | E3                                         |
| C148              | F1                | F3                 | R9                | C1                | E4                                            | R133                                      | D1                       | F4                                         |
| C161              | E2                | D2                 | R11               | C1                | F4                                            | R136                                      | E1                       | E2                                         |
| C168<br>C169      | E2<br>E2          | E2<br>F2           | R12<br>R14        | C1<br>D1          | E4<br>F4                                      | R137<br>R138                              | E2<br>E1                 | E2<br>E2                                   |
| C109              | E2                | F2                 | R18               | B2                | E4                                            | R139                                      | E1                       | E2<br>E2                                   |
| C171              | E2                | F2                 | R20               | C2                | E4                                            | R140                                      | E1                       | E2                                         |
| C172              | E2                | F2                 | R21               | C2                | E3                                            | R141                                      | E1                       | C2                                         |
| C177              | F3                | G3                 | R26               | 82                | E3                                            | R142                                      | £1                       | E2                                         |
| C178              | F2                | F3                 | R27               | B2                | C4                                            | R143                                      | F1                       | F3                                         |
| C206              | F4                | C2                 | R28               | C2                | E3                                            | R146                                      | E1                       | F2                                         |
| C207              | F4<br>F4          | E2                 | R29               | C2                | E3<br>F4                                      | R147                                      | F1                       | E2                                         |
| C208<br>C209      | F4<br>F4          | G2<br>E3           | R31<br>R32        | C3<br>C2          | F4<br>G3                                      | R160<br>R163                              | D2<br>D2                 | F4<br>F4                                   |
| C209              | F4                | E4                 | R34               | D2                | F3                                            | R165                                      | E1                       | F4<br>E2                                   |
| C211              | F4                | C2                 | R41               | C2                | G4                                            | R167                                      | E1                       | E2                                         |
| C213              | F4                | D1                 | R42               | C2                | F4                                            | R169                                      | E1                       | G2                                         |
| C226              | F4                | F5                 | R43               | C2                | F4                                            | R170                                      | E1                       | G2                                         |
| C229              | F4                | G4                 | R46               | C2                | E3                                            | R171                                      | E1                       | G2                                         |
|                   | ~~                |                    | R47               | C2                | F3                                            | R172                                      | E1                       | G2                                         |
| J9<br>J10         | B2<br>B1          | D3<br>D4           | R48<br>R62        | C2<br>B4          | F3<br>B2                                      | R173                                      | F2                       | F2                                         |
| J11               | A3                | B2                 | R62               | B4<br>B4          | 82<br>82                                      | R176<br>R177                              | E1<br>F3                 | F3<br>G3                                   |
| J43               | A4                | A2                 | R64               | B4                | B2                                            | R191                                      | F3                       | C2                                         |
|                   |                   |                    | R65               | B4                | B2                                            | R192                                      | F3                       | C2                                         |
| L6                | B1                | D4                 | R68               | В4                | 83                                            | R193                                      | F3                       | C2                                         |
| L7                | B1                | D4                 | R69               | B4                | B3                                            | R194                                      | F3                       | D2                                         |
| L20               | C2                | E4                 | R71               | B4                | B3                                            | R196                                      | F3                       | C2                                         |
| L26               | B2                | E3                 | R72               | B4                | B1                                            | R201                                      | F4                       | C3                                         |
| L27<br>L133       | B2<br>D1          | D3<br>F4           | R73<br>R74        | В4<br>В4          | B2<br>B3                                      | R202<br>R203                              | F4<br>F4                 | C3<br>C3                                   |
| L163              | D2                | F4                 | R75               | C3                | B3                                            | R203                                      | F4<br>F4                 | C3<br>C4                                   |
| L201              | E3                | C2                 | R76               | C3                | B4                                            | R228                                      | F4                       | C4                                         |
| L203              | E4                | C2                 | R77               | C4                | B3                                            |                                           |                          |                                            |
| L213              | E5                | D2                 | R79               | C4                | B4                                            | RT133                                     | D1                       | F4                                         |
| 10007             | F 4               | r'a                | R81               | B3                | C4                                            | TOTOO                                     | 50                       |                                            |
| LR207<br>LR208    | F4<br>F4          | F2<br>G2           | R82<br>R88        | C3<br>B4          | C3<br>B3                                      | TP196                                     | F3                       | C2                                         |
| LR208             | F4<br>F4          | E3                 | R89               | В4<br>В4          | B3                                            | U50                                       | D1                       | F4                                         |
| LR210             | F4                | F4                 | R91               | B4                | A3                                            | U150                                      | F1                       | F4<br>F3                                   |
| LR229             | G4                | G4                 | R92               | B4                | A2                                            |                                           |                          | . –                                        |
|                   |                   | ~ ~                | R93               | B4                | B2                                            | W227                                      | G4                       | F4                                         |
| P190              | F3                | C2                 | R94               | B4                | B3                                            |                                           |                          |                                            |
| CHASSIS           | MOUNTED           | PARTS              |                   |                   |                                               |                                           |                          |                                            |
| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION  | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION                             | CIRCUIT<br>NUMBER                         | SCHEM<br>LOCATION        | BOARD<br>LOCATION                          |
| C83               | G3                | CHASSIS            |                   |                   | NITE CORE OF CONTRACTOR OF THE ADDRESS OF THE | R83                                       | G1                       | CHASSIS                                    |
|                   |                   |                    |                   |                   |                                               | -                                         |                          |                                            |
| L81               | G1                | CHASSIS            | R81               | G1                | CHASSIS                                       |                                           |                          |                                            |
| L82               | G2                | CHASSIS            | R82               | G2                | CHASSIS                                       |                                           |                          |                                            |
|                   |                   | NGW STATE OF STATE | l.                |                   | AND MADE OF THE                               | Sanata kana kana kana kana kana kana kana | CONCLUMENTS OF THE OWNER | TO REAL CONTRACTOR OF THE REAL PROPERTY OF |

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### **VERTICAL AMPLIFIER DIAGRAM 9**

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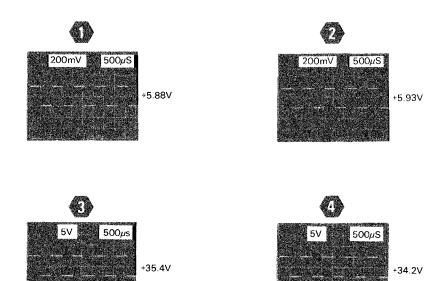
#### **VOLTAGE AND WAVEFORM CONDITIONS**

The voltages and waveforms were taken with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B); READOUT INTENSITY (OFF). No plug-in units were installed.

**Voltage Conditions.** The voltages on the diagram were taken using a digital multimeter with a 10 M $\Omega$  input impedance (Tektronix DM 501 Digital Multimeter installed in a TM 501 Power Module or a Tektronix 7D13 Digital Multimeter used with a readout-equipped 7000-Series Oscilloscope).

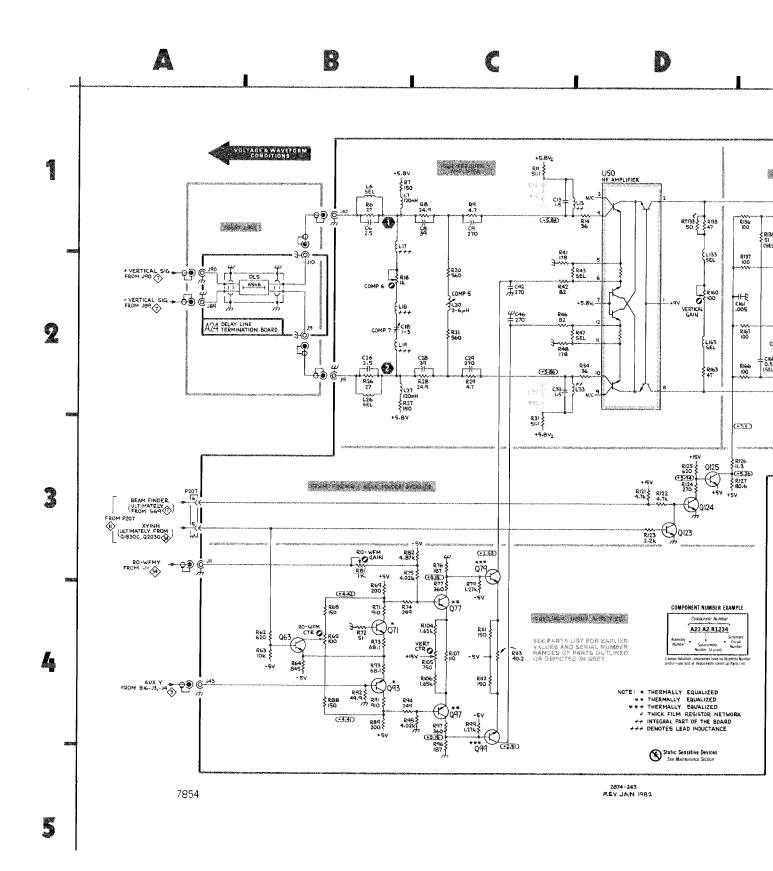
Waveform Conditions. The waveforms shown below were obtained using a test oscilloscope system with 10 M $\Omega$  input impedance, at least 60 MHz bandwidth and 10X probe (Tektronix 7603 Oscilloscope, 7B92 Time Base, 7A13 Differential Comparator and P6063A Probe).

A Calibration Fixture (Tektronix 067-0587-01) with controls set as follows: REP RATE (1 KHz); STEP RESPONSE (+); AMPLITUDE (adjust to 6 divisions) was installed in the LEFT VERT compartment of the 7854 and a 7880 Time Base with controls set as follows: TRIGGERING (P-P AUTO, AC, INT); TIME/DIV (1 ms) was installed in the B HORIZ compartment of the 7854.



### Selectable Electrical Parts Table For Diagram 9

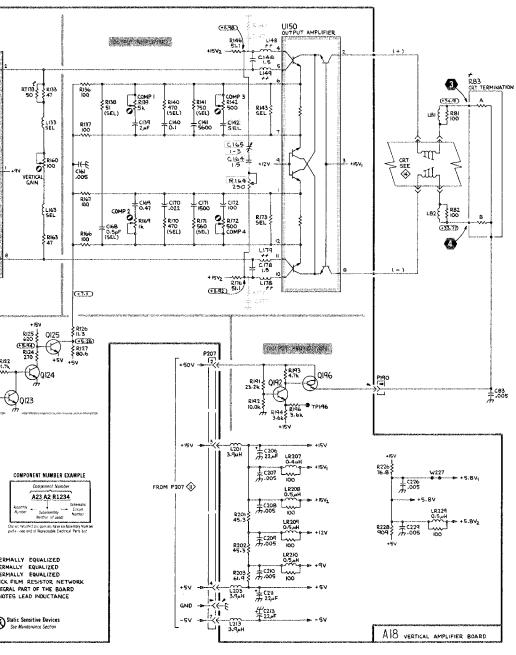
| Component Number | Reason For Selection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Component Value           |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| A18R43           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           |
| A18R47           | See Vertical Amplifier Replacement,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | See Table 3-5,            |
| A18R143          | Section 3 Maintenance.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Section 3<br>Maintenance. |
| A18R173          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           |
| A18R138          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           |
| A18R140          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           |
| A18R141          | Thermal and high frequency Compensation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | $\pm 50\%$ of value.      |
| A18R170          | <b>3 (a) (b) (</b> |                           |
| A18R171          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           |
| A18C168          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           |
| A18L26           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Maximum wire              |
| A18L6            | Bandwidth                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | length on inch.           |
| A18L133          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           |
| A18L163          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           |





Solution Vertical Amplifier

Reverse Side





7854

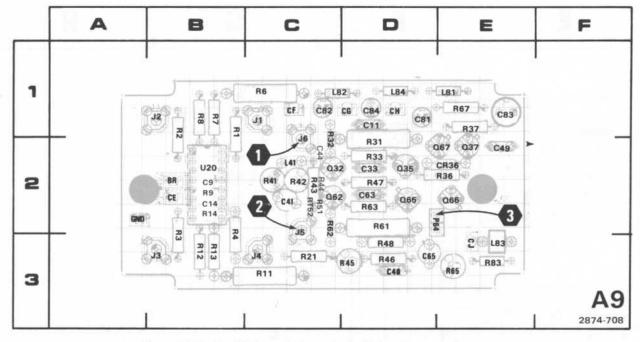


Figure 7-11. A9-Horizontal Channel circuit board assembly.



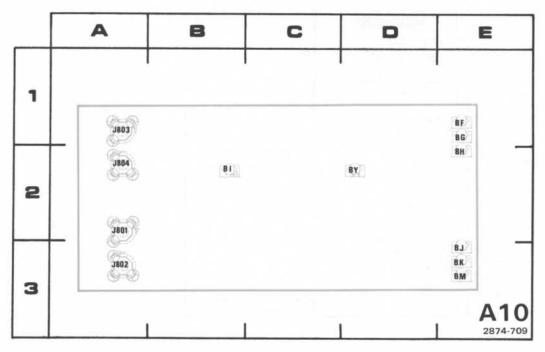
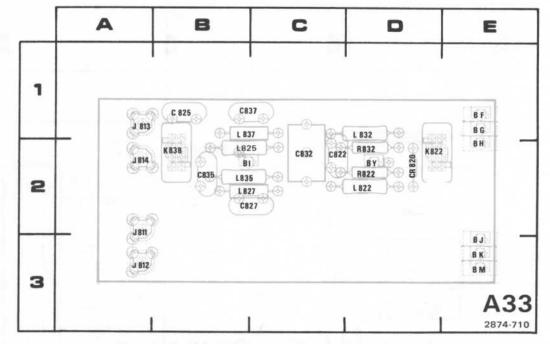


Figure 7-12. A10-Horizontal Interconnect circuit board assembly.

Assemblies A9, A10 & A33





R44 ited on of board.

Static Sensitive Devices See Maintenance Section COMPONENT NUMBER EXAMPLE Component Number A23 A2 R1234

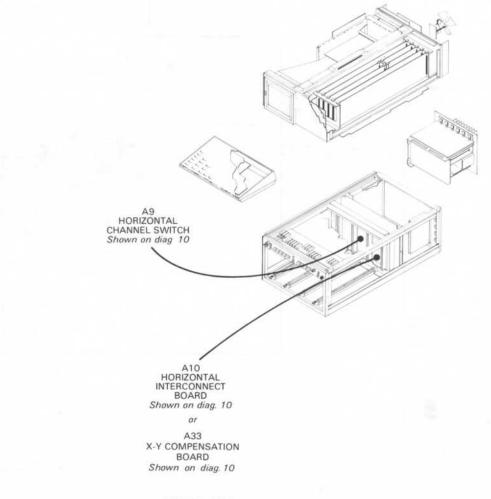
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Subassembly Number (if used) Chassis-mounted components have no Assembly Number prefix---see end of Replaceable Electrical Parts List.

Assembly

Number

Schematic Circuit Number



# HORIZ. CHANNEL SWITCH AND PICKOFF AMPLIFIER DIAGRAM 10

| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD    | CIRCUIT           | SCHEM<br>LOCATION | BOARD                                     |
|-------------------|-------------------|----------|-------------------|-------------------|-------------------------------------------|
| С9                | D1                | B2       | R1                | C1                | B1                                        |
| C11               | D2                | D1       | R2                | C2                | B1                                        |
| C14               | D2                | B2       | R3                | C2                | B3                                        |
| C33               | E2                | D2       | R4                | C2                | B3                                        |
| C40               | F1                | D3       | R6                | D1                | C1                                        |
| C41               | F2                | C2       | R7                | D1                | B1                                        |
| C44               | F2                | •        | R8                | D1                | B1                                        |
| C49               | E3                | E2       | R9                | D1                | B2                                        |
| C63               | F2                | D2       | R11               | D2                | C3                                        |
| C65               | F3                | D3       | R12               | D2                | B3                                        |
| C81<br>C82        | D3<br>D3          | D1<br>C1 | R13<br>R14        | D2<br>D2          | B3                                        |
| C82               | D3                | E1       | R21               | D2<br>D3          | 82<br>C3                                  |
| C84               | D3                | D1       | R31               | E1                | D2                                        |
| CDDC              | 50                | 52       | R32               | E2                | C2                                        |
| CR36              | E3                | E2       | R33               | E2                | D2                                        |
| J1                | C1                | C1       | R36               | E3                | D2                                        |
| J2                | C2                | B1       | R37               | E3                | E1                                        |
| J3                | C2                | B3       | R41               | E2                | C2                                        |
| J4                | C2                | C3       | R42               | E2                | C2                                        |
| յ5<br>J6          | F1<br>F1          | C2<br>C2 | R43<br>B44        | F2<br>F2          | C2                                        |
| 50                | FI                | 62       | R45               | F2                | D3                                        |
| L41               | E2                | C2       | R46               | F2                | D3                                        |
| L81               | C3                | E1       | R47               | E2                | D2                                        |
| L82               | C3                | C1       | R48               | E2                | D3                                        |
| L83               | C3                | E3       | R51               | F2                | G2                                        |
| L84               | C3                | D1       | R61               | F1                | D2                                        |
| DC 4              | 50                | 50       | R62<br>R63        | F2<br>F2          | C2                                        |
| P64               | F2                | D2       | R65               | F2<br>F3          | D2<br>E3                                  |
| Q32               | E2                | C2       | R67               | F3                | E1                                        |
| Q35               | E2                | D2       | R83               | D3                | E3                                        |
| Q37               | E3                | E2       |                   |                   |                                           |
| Q62               | F2                | C2       | RT52              | F2                | C2                                        |
| Q65               | F2                | D2       |                   |                   |                                           |
| Q66<br>Q67        | F3<br>F3          | E2<br>E2 | U20               | D1                | B2                                        |
| A10 ASS           | Y                 |          |                   |                   |                                           |
| CIRCUIT           | SCHEM             | BOARD    | CIRCUIT           | SCHEM             | BOARD                                     |
| NUMBER            | LOCATION          | LOCATION | NUMBER            | LOCATION          | LOCATION                                  |
| J801              | C1                | A2       | J803              | C2                | A1                                        |
| J802              | C2                | A3       | J804              | C2                | A2                                        |
| 433 ASS           |                   |          |                   | *****             | ar an |
| CIRCUIT           | SCHEM             | BOARD    | CIRCUIT           | SCHEM             | BOARD                                     |
| NUMBER            | LOCATION          | LOCATION | NUMBER            | LOCATION          | LOCATION                                  |
| C822              | B4                | C2       | K822              | B4                | D2                                        |
| C825              | C4                | B1       | к838              | C4                | B2                                        |
| C827              | B5                | B2       | ]                 |                   |                                           |
| C832              | B4                | C2       | L822              | B5                | D2                                        |
| C835              | C4                | B2       | L825              | 84                | B2                                        |
| C837              | B4                | B1       | L827<br>L832      | 85<br>84          | B2                                        |
| CR820             | В4                | D2       | L832              | В4<br>В4          | D1<br>B2                                  |
|                   |                   |          | L837              | 84                | B1                                        |
| J811              | C4                | A2       |                   |                   |                                           |
| J812              | C4                | A3       | R822              | B5                | D2                                        |
| J813<br>J814      | C4<br>C5          | A1<br>A2 | R832              | 84                | D2                                        |
|                   |                   |          |                   |                   |                                           |
| CHASSIS           | MOUNTED           | PARTS    |                   |                   | 000000 0000 0000 00000 000000 00000000    |
| CIRCUIT           | SCHEM             | BOARD    | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD                                     |
| NUMBER            | LOCATION          | LOCATION | NUNDER            | LOCATION          | COCATION                                  |

\*Located on back of board.

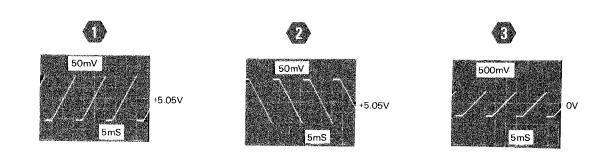
#### **VOLTAGE AND WAVEFORM CONDITIONS**

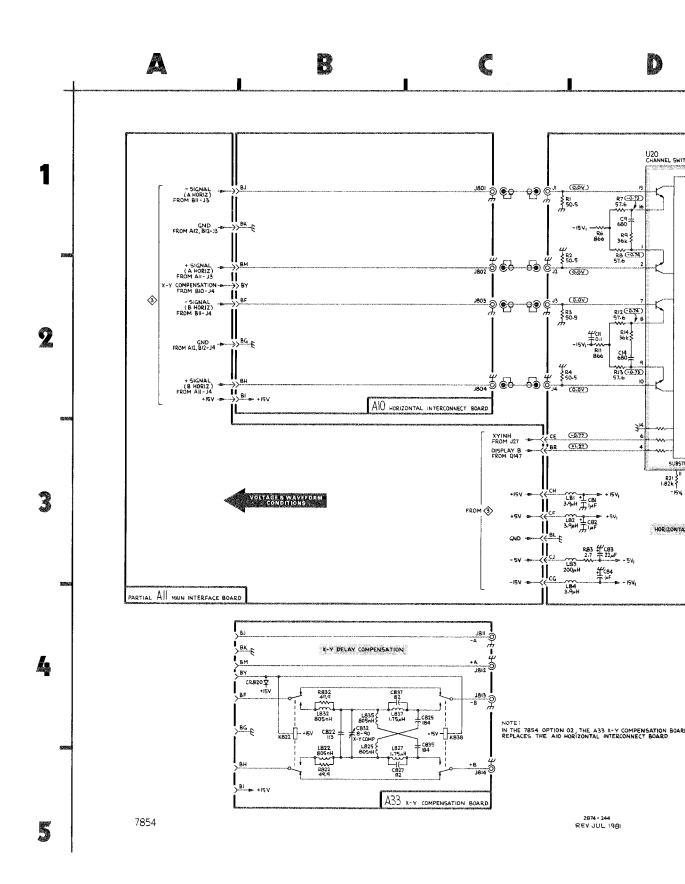
The voltage and waveforms were taken with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B); READOUT INTENSITY (OFF). No plug-in units were installed.

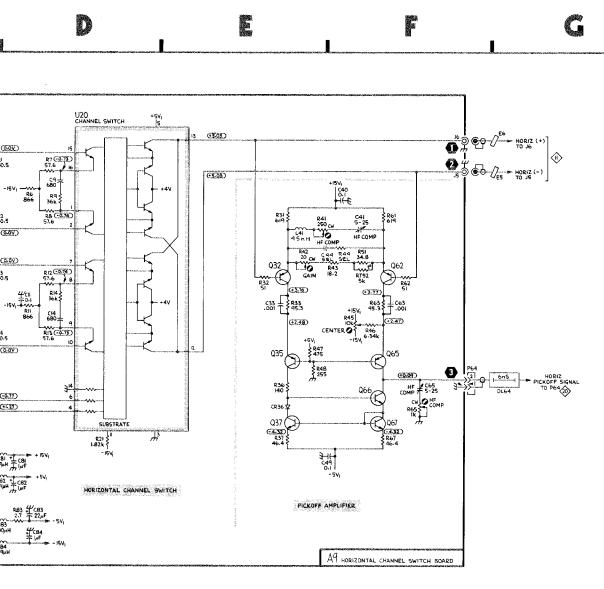
**Voltage Conditions.** The voltages on the diagram were taken using a digital multimeter with a 10 M $\Omega$  input impedance (Tektronix DM 501 Digital Multimeter installed in a TM 501 Power Module or a Tektronix 7D13 Digital Multimeter used with a readout-equipped 7000-Series Oscilloscope).

Waveform Conditions. The waveforms shown below were obtained using a test oscilloscope system with 10 M $\Omega$  input impedance, at least 60 MHz bandwidth and 10X probe (Tektronix 7603 Oscilloscope, 7B92 Time Base, 7A13 Differential Comparator and P6063A Probe).

A Calibration Fixture (Tektronix 067-0587-01) with controls set as follows: REP RATE (1 KHz); STEP RESPONSE (+); AMPLITUDE (adjust to 6 divisions) was installed in the LEFT VERT compartment of the 7854 and a 7880 Time Base with controls set as follows: TRIGGERING (P-P AUTO, AC, INT); TIME/DIV (1 ms) was installed in the B Horizontal compartment







Static Sensitive Devices See Maintenance Section

2, THE A33 X-Y COMPENSATION BOARD RIZONTAL INTERCONNECT BOARD



2874-244 REV JUL 1981

HORIZONTAL CHANNEL SWITCH AND PICKOFF AMPLIFIER

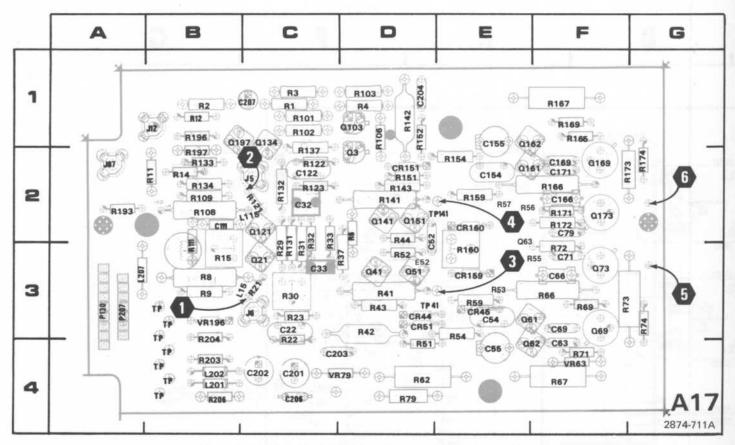
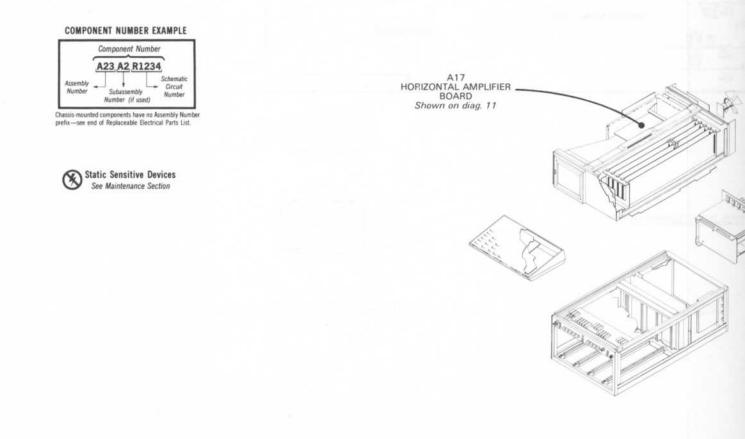


Figure 7-14. A17-Horizontal Amplifier circuit board assembly.



| CIRCUIT<br>NUMBER | SCHEM    | BOARD              |      | SCHEM<br>LOCATION | BOARD | CIRCUIT<br>NUMBER                        | SCHEM<br>LOCATION | BOARD    |
|-------------------|----------|--------------------|------|-------------------|-------|------------------------------------------|-------------------|----------|
|                   |          |                    |      |                   |       | na an a |                   |          |
| C22               | B1       | C3                 | Q61  | E1                | F3    | R71                                      | E1                | F4       |
| C32               | B2       | C2                 | Q62  | E1                | F4    | R72                                      | E1                | F3       |
| C33               | 82       | C3                 | Q63  | G3                | E3    | R73                                      | E1                | F3       |
| C52               | D2       | D2                 | Q69  | E1                | F3    | R74                                      | F1                | G3       |
| C54               | D2       | E3                 | Q73  | F2                | F3    | R79                                      | F2                | D4       |
| C55               | D2       | E4                 | Q103 | C2                | D1    | R101                                     | C2                | C1       |
| C63               | E1       | F4                 | Q121 | B3                | C2    | R102                                     | C2                | C1       |
| C66               | E1       | F3                 | Q134 | C2                | C1    | R103                                     | C2                | D1       |
| C69               | E1       | F3                 | Q141 | D3                | D2    | R106                                     | C3                | D1       |
| C71               | E2       | F3                 | Q151 | D2                | D2    | R108                                     | A2                | B2       |
| C79               | E2       | F2                 | Q161 | E3                | E2    | R109                                     | A2                | B2       |
| C111              | B2       | B2                 | Q162 | E2                | E1    | R111                                     | B2                | B3       |
| C122              | B3       | C2                 | Q169 | E3                | F2    | R121                                     | B3                | C2       |
| C154              | D2       | E2                 | Q173 | F2                | F2    | R122                                     | B3                | C2       |
| C155              | D2       | E1                 | Q197 | C3                | C1    | R123                                     | B3                | C2       |
| C166              | E3       | F2                 |      |                   |       | R131                                     | C2                | C3       |
| C169              | E3       | F2                 | R1   | C2                | C1    | R132                                     | C2                | C2       |
| C171              | E2       | F2                 | R2   | C1                | B1    | R133                                     | C2                | B2       |
| C201              | B3       | C4                 | R3   | C2                | C1    | R134                                     | C2                | B2       |
| C202              | B3       | C4                 | R4   | C2                | D1    | R137                                     | C3                | C2       |
| C203              | E3       | D4                 | R6   | C1                | D2    | R141                                     | D2                | D2       |
| C204              | E4       | D1                 | R8   | A1                | B3    | R142                                     | D2<br>D2          | D2<br>D1 |
| C206              | B3       | C4                 | R9   | A2                | B3    | R143                                     | D2<br>D3          | D2       |
| C207              | B4       | C1                 | R11  | C1                | B2    | R151                                     | D3<br>D2          | D2       |
| 0207              | 04       | 01                 | R12  | C1                | 81    | R151                                     | D2                | D2<br>D1 |
| CR44*             | D1       | D3                 | R14  | B2                | B2    |                                          |                   |          |
| CR45              | D1       | E3                 | R15  | B2                | B3    | R154                                     | D2                | E2       |
| CR45<br>CR51      | D2       | D3                 | R21  | Bt                | ŝ     | R159                                     | E2                | E2       |
| CR151             | D2       | D2                 | R22  | B1                | C4    | R160                                     | E2                | E3       |
| CR159 *           | E2       | E3                 | R23  | B1                | ŝ     | R165                                     | E3                | F1       |
| CR160 +           | E2       | E2                 |      |                   | C3    | R166                                     | E2                | F2       |
| 011100 +          | Let des  | <b>b b</b>         | R29  | B2                |       | R167                                     | E2                | F1       |
|                   |          |                    | R30  | B2                | C3    | R169                                     | E2                | F1       |
| E52               | D2       | D3                 | R31  | B2                | C3    | R171                                     | E2                | F2       |
|                   |          |                    | R32  | B2                | C3    | R172                                     | E2                | F2       |
| J5                | A3       | C2                 | R33  | B2                | C3    | R173                                     | E2                | F2       |
| J6                | A1       | C3                 | R37  | C1                | D3    | R174                                     | F2                | G2       |
| J12               | A1       | B1                 | R41  | D1                | D3    | R193                                     | A3                | A2       |
| J87               | A3       | A2                 | R42  | D1                | D3    | R196                                     | B3                | B1       |
|                   |          |                    | R43  | D1                | D3    | R197                                     | C3                | B2       |
| L15               | 81       | C3                 | R44* | D2                | D2    | R203                                     | E3                | B4       |
| L115              | B2       | C2                 | R51  | D2                | D4    | R204                                     | E4                | B4       |
| L201              | A3       | B4                 | 852  | D1                | D3    | R206                                     | A3                | B4       |
| L202              | A3       | B4                 | R53* | G3                | E3    | _                                        |                   |          |
| L207              | A4       | A3                 | R54  | D2                | E3    | TP41                                     | D1                | D3       |
|                   |          |                    | R55* | G3                | E2    | TP141                                    | D3                | E2       |
| P130              | A3       | A3                 | R56* | G3                | E2    | 4                                        |                   |          |
| P130              | E3       | A3                 | R57* | G3                | E2    | VR63                                     | E1                | F4       |
| P207              | c3       | A3                 | R59  | E2                | E3    | VR79                                     | F2                | D4       |
| . 207             | ~~~      | <i>/</i> <b>10</b> | R62  | E1                | D4    | VR196                                    | F2<br>B3          |          |
| Q3                | C2       | D2                 | R66  | E1                | F3    | VIC 190                                  | 53                | B3       |
|                   | B1       | C3                 | R67  | E1                | F4    |                                          |                   |          |
| Q21               | B1<br>D1 | D3                 | R69  | Et                | F3    | 1                                        |                   |          |
| Q41               |          |                    |      |                   |       |                                          |                   |          |
| Q51               | D2       | D3                 | 1    |                   |       | 1                                        |                   |          |

# HORIZONTAL AMPLIFIER DIAGRAM 11

\*See Parts List for serial number ranges.

6

2874-711A

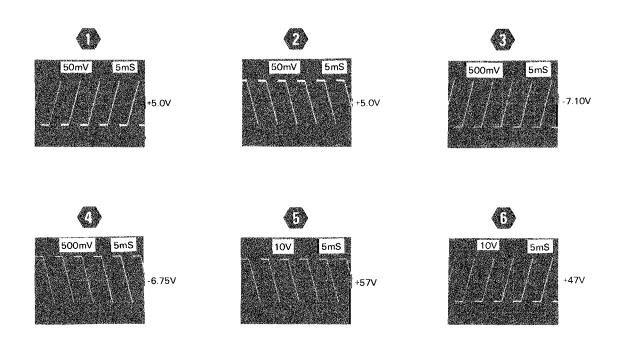
#### VOLTAGE AND WAVEFORM CONDITIONS

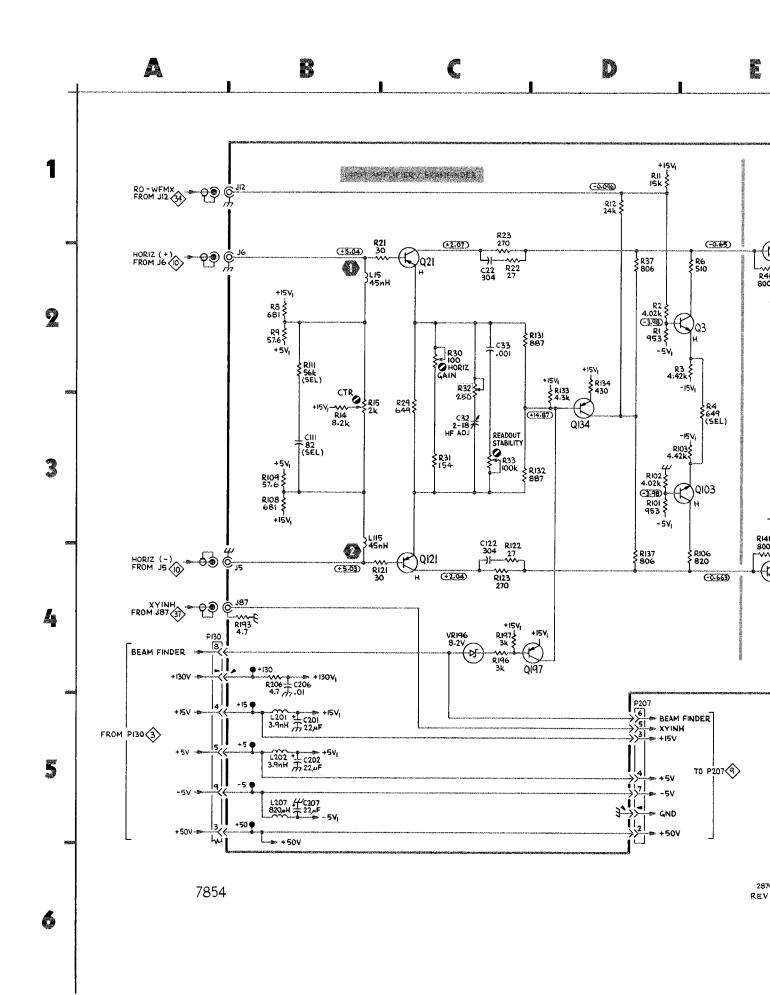
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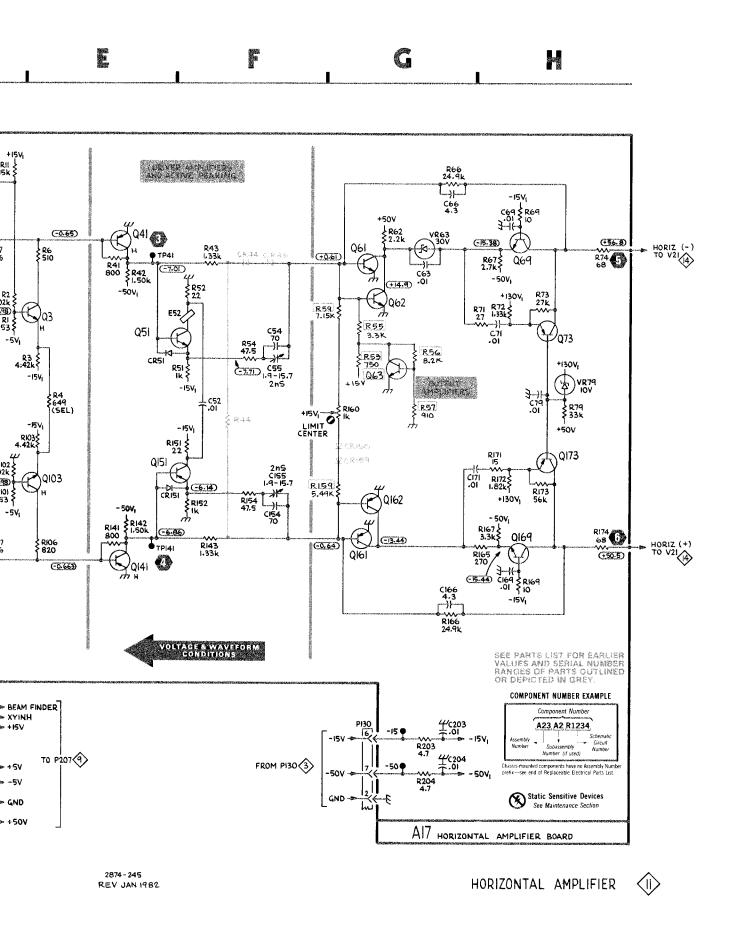
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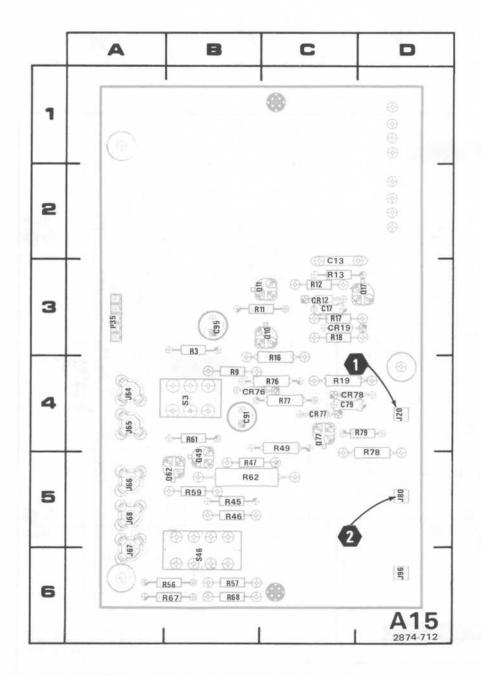






Horizontal Amplifier

Reverse Side A15





#### COMPONENT NUMBER EXAMPLE



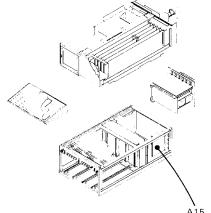
Chassis-mounted components have no Assembly Numbe prefix-see end of Replaceable Electrical Parts List.

> Static Sensitive Devices See Maintenance Section

> > RE

### **OUTPUT SIGNALS DIAGRAM 12**

| A15 ASSY                                                                                                                                                                  |                                                                                                                |                                                                                                                                                                      |  |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| CIRCUIT<br>NUMBER                                                                                                                                                         | SCHEM<br>LOCATION                                                                                              | BOARD<br>LOCATION                                                                                                                                                    |  |  |  |  |
| C13<br>C17<br>C79<br>C91<br>C95                                                                                                                                           | E2<br>E2<br>F2<br>C4<br>C5                                                                                     | ය<br>ය<br>ද<br>84<br>83                                                                                                                                              |  |  |  |  |
| CR12<br>CR19<br>CR76<br>CR77<br>CR78                                                                                                                                      | E2<br>E2<br>E3<br>E2<br>E2                                                                                     | ය ය<br>ස ය<br>ය                                                                                                                                                      |  |  |  |  |
| J20<br>J64<br>J65<br>J66<br>J67<br>J68<br>J80<br>J80<br>J96                                                                                                               | F2<br>C2<br>C2<br>C3<br>C3<br>F2<br>F5                                                                         | D4<br>A4<br>A5<br>A6<br>A5<br>D5<br>D6                                                                                                                               |  |  |  |  |
| P35                                                                                                                                                                       | <del>8</del> 4                                                                                                 | A3                                                                                                                                                                   |  |  |  |  |
| Q10<br>Q11<br>Q17<br>Q49<br>Q62<br>Q77                                                                                                                                    | D2<br>D2<br>E2<br>D3<br>D3<br>E2                                                                               | C3<br>B3<br>D3<br>B5<br>B5<br>C4                                                                                                                                     |  |  |  |  |
| R3<br>R9<br>R11<br>R12<br>R13<br>R16<br>R17<br>R18<br>R19<br>R45<br>R45<br>R46<br>R47<br>R49<br>R56<br>R47<br>R59<br>R61<br>R62<br>R67<br>R68<br>R76<br>R77<br>R78<br>R79 | C2<br>D2<br>D2<br>E1<br>D1<br>E2<br>F2<br>C2<br>D2<br>C3<br>D2<br>C3<br>D3<br>D3<br>C3<br>E3<br>E3<br>E2<br>F2 | 83<br>83<br>83<br>83<br>83<br>83<br>83<br>84<br>85<br>85<br>85<br>85<br>85<br>86<br>85<br>86<br>86<br>86<br>86<br>86<br>86<br>86<br>86<br>86<br>86<br>86<br>86<br>86 |  |  |  |  |
| S3<br>S46                                                                                                                                                                 | C2<br>C3                                                                                                       | B4<br>B6                                                                                                                                                             |  |  |  |  |



A15 SIGNAL OUTPUT BOARD Shown on diag. 12

REV A MAR 1981

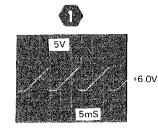
#### VOLTAGE AND WAVEFORM CONDITIONS

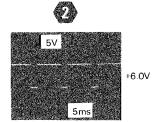
The voltages and waveforms were taken with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B); READOUT INTENSITY (OFF). No plug-in units were installed.

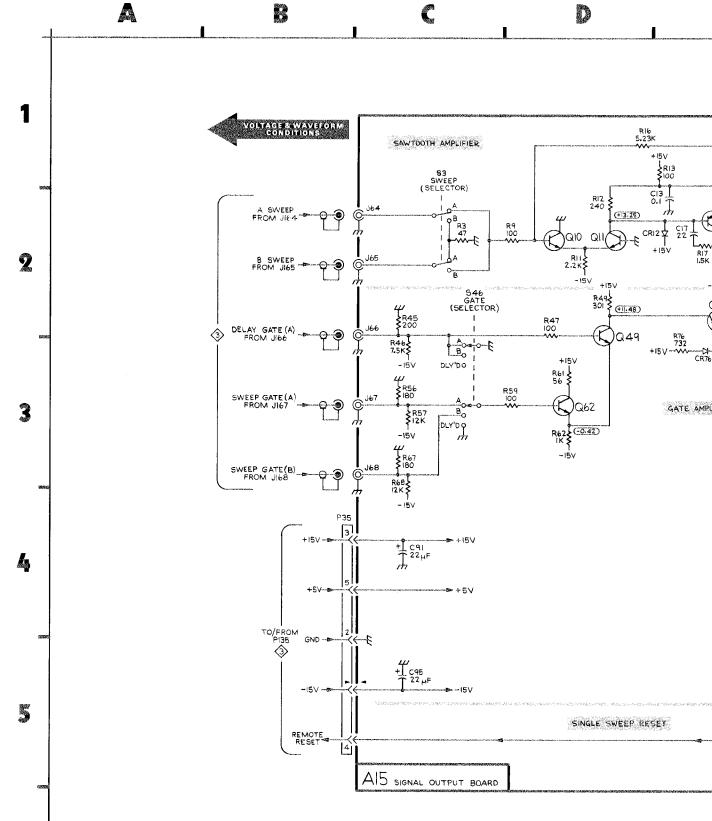
**Voltage Conditions.** The voltages on the diagram were taken using a digital multimeter with a 10 M $\Omega$  input impedance (Tektronix DM 501 Digital Multimeter installed in a TM 501 Power Module or a Tektronix 7D13 Digital Multimeter used with a readout-equipped 7000-Series Oscilloscope).

Waveform Conditions. The waveforms shown below were obtained using a test oscilloscope system with 10 MΩ input impedance, at least 60 MHz bandwidth and 10X probe (Tektronix 7603 Oscilloscope, 7B92 Time Base, 7A13 Differential Comparator and P6063A Probe).

A Calibration Fixture (Tektronix 067-0587-01) with controls set as follows: REP RATE (1 KHz); STEP RESPONSE (+); AMPLITUDE (adjust to 6 divisions) was installed in the LEFT VERT compartment of the 7854 and a 7880 Time Base with controls set as follows: TRIGGERING (P-P AUTO, AC, INT); TIME/DIV (1 ms) was installed in the B HORIZ compartment of the 7854.



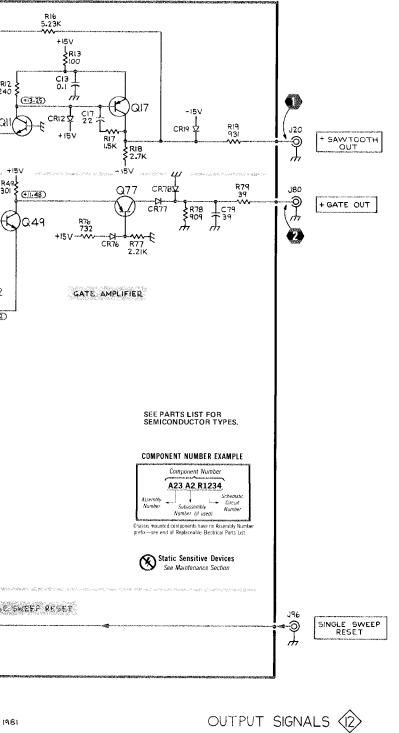












Reverse Side

12 Output Signals

1981

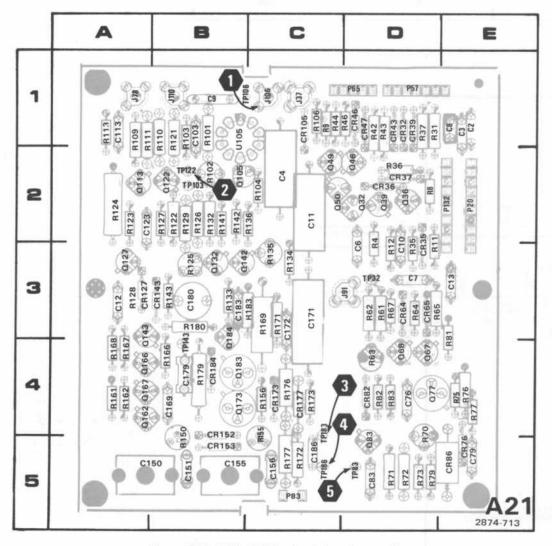
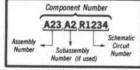


Figure 7-16. A21–Z-Axis circuit board assembly.



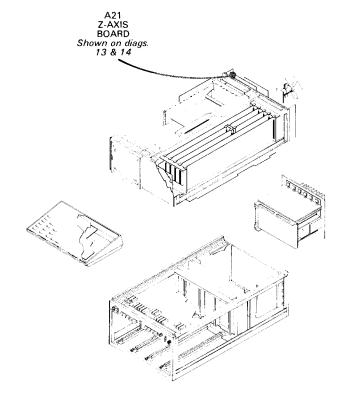
## COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Numbe prefix--see end of Replaceable Electrical Parts List.

# Z-AXIS AND FOCUS AMPLIFIER DIAGR

| SCHEM<br>LOCATION | BOARD<br>LOCATION                                                                      | CIRCUIT<br>NUMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | SCHEM<br>LOCATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | BOARD<br>LOCATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| B1                | F1                                                                                     | P57                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Δ2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | D1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R79                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| B1                | E1                                                                                     | P57                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | R81                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| B1                | C2                                                                                     | P57                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | C2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | D1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R82                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| B1                | D3                                                                                     | P65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | C2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | D1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R83                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| В2                | D3                                                                                     | P65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | C3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | D1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R101                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| B2                | E1                                                                                     | P83                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | F4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | C5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R102                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| B2                | B1                                                                                     | P132                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | C2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | E2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| B4                | A1                                                                                     | 068                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | E1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | D4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R123                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| B4                | A2                                                                                     | 077                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | D4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R124                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| D3                | В5                                                                                     | Q83                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | D5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| D3                | B5                                                                                     | Q105                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 83                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R126                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| D3                | B5                                                                                     | Q113                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | В3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R127                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| D3                | C5                                                                                     | Q122                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | В3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R128                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| E4                | B4                                                                                     | Q127                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | C4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R129                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                   |                                                                                        | Q132                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | C3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 83                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R132                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                   |                                                                                        | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | R133                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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|                   |                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | R135<br>R136                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| F4                | C5                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | R136                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                   |                                                                                        | 0173                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | F4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 84                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R142                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| D1                | D1                                                                                     | Q183                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | F4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R143                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| D2                | D3                                                                                     | Q184                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | F4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R150                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| D2                | D2                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | R155                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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|                   |                                                                                        | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | R171                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| E2                | D4                                                                                     | R37                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | D1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R172                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| F2                | E5                                                                                     | R42                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | D1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R173                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| B3                | C1                                                                                     | R43                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | D1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R176                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| C4                | A3                                                                                     | R44                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | C1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R177                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                   | B3                                                                                     | R46                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | C1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | R179                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                   |                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | R180                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                   |                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | R183                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                   |                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1 7022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                   |                                                                                        | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | TP32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                   | 04                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | TP83<br>TP103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| D1                | C1                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | TP103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| A3                | A1                                                                                     | R71                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | F1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | D5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | TP122                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| A4                | D3                                                                                     | R72                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | F1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | D5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | TP143                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| C3                | C1                                                                                     | R73                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | F1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | D5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | TP183                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| A3                | B1                                                                                     | R75                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | E2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | E4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | TP186                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                   |                                                                                        | R76                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | E2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | E4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                   | B1<br>B1<br>B2<br>B2<br>B2<br>B2<br>B2<br>B2<br>B2<br>B2<br>B2<br>B2<br>B2<br>B2<br>B2 | B1       E1         B1       D3         B2       D3         B2       E1         B2       B1         B2       D3         B2       E1         B2       B1         B2       C2         B2       C3         B2       C2         B2       C3         B2       C3         B2       C3         B2       C3         B2       D3         B3       B1         B4       A1         B4       B3         B5       D3         B5       D3         B5       D3         B4       B4         E4       B3         E4       B3         E4       B3         E4       B3         D2       D1         D2       D1         D2       D1      D2       D1      D | B1         E1         P57           B1         D3         P65           B2         D3         P132           B2         D3         P32           B2         C2         Q32           B2         E3         Q39           E2         D4         Q46           F2         D5         Q50           B3         B1         Q67           B4         A1         Q68           B4         A2         Q77           D3         B5         Q105           D3         B5         Q112           E4         B4         Q122           E4         B4         Q143           E4         B3         Q162           E4         B3         Q166           F4         C5         Q167           D2         D2         D2         R4 | B1       E1       P67       C1         B1       C2       P57       C2         B1       D3       P65       C2         B2       D3       P65       C3         B2       E1       P83       F4         B2       B1       P132       C2         B2       D3       P65       C3         B2       E1       P83       F4         B2       D3       P132       C2         B2       C2       Q32       D1         B2       E3       Q39       D2         E2       E3       Q39       D2         F2       E5       O49       D2         F2       D5       Q50       D2         B3       B1       Q67       E1         B4       A1       Q68       E1         B4       A2       Q77       F2         D3       B5       Q105       B3         D3       B5       Q113       B3         D3       C5       Q122       C3         E4       B4       Q127       C4         E4       B3       Q166       E4 | B1         E1         P57         C1         D1           B1         D3         P65         C2         D1           B2         D3         P65         C3         D1           B2         E1         P83         F4         C5           B2         B1         P132         C2         E2           B2         C2         Q32         D1         D2           B2         C2         Q32         D1         D2           B2         E3         Q39         D2         D2           B2         E3         Q39         D2         C2           B2         E3         G39         D2         C2           B2         E3         G39         D2         C2           B2         D3         B5         G60         D2         C2           B3         B1         O67         E1         D4           B4         A1         C68         E1         D4           B4         A2         C77         F2         D4           B3         B5         Q113         B3         A2           D3         B5         Q113         B3 <t< td=""></t<> |



**REV A MAR 1981** 

# Z-AXIS AND FOCUS AMPLIFIER DIAGRAM 13

| A21 ASS           | Y                                       |                   | 1                                        |                                                                                                                                                                |                                                                                                                 | 1                 |                                                                                                                 |                                                                                                                 |
|-------------------|-----------------------------------------|-------------------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION                       | BOARD<br>LOCATION | CIRCUIT<br>NUMBER                        | SCHEM<br>LOCATION                                                                                                                                              | BOARD<br>LOCATION                                                                                               | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION                                                                                               | BOARD                                                                                                           |
| C2                | B1                                      | E1                | P57                                      | A2                                                                                                                                                             | D1                                                                                                              | R79               | F2                                                                                                              | D5                                                                                                              |
| C3<br>C4          | B1                                      | E1                | P57                                      | C1                                                                                                                                                             | D1                                                                                                              | R81               | E2                                                                                                              | E3                                                                                                              |
| C4<br>C6          | B1<br>B1                                | C2<br>D3          | P57<br>P65                               | C2<br>C2                                                                                                                                                       | D1                                                                                                              | R82               | E2                                                                                                              | D4                                                                                                              |
| C7                | B2                                      | D3                | P65                                      | C3                                                                                                                                                             | D1<br>D1                                                                                                        | R83<br>R101       | E2<br>B3                                                                                                        | D4<br>B1                                                                                                        |
| C8                | B2                                      | E1                | P83                                      | F4                                                                                                                                                             | C5                                                                                                              | R102              | B3                                                                                                              | B2                                                                                                              |
| C9                | B2                                      | B1                | P132                                     | C2                                                                                                                                                             | E2                                                                                                              | R103              | B3                                                                                                              | B1                                                                                                              |
| C10               | B2                                      | D3                |                                          |                                                                                                                                                                |                                                                                                                 | R104              | B3                                                                                                              | C2                                                                                                              |
| C11<br>C12        | B2<br>B2                                | C2<br>A3          | Q32<br>Q36                               | D1<br>D2                                                                                                                                                       | D2                                                                                                              | R106              | B3                                                                                                              | C1                                                                                                              |
| C13               | B2                                      | E3                | Q39                                      | D2<br>D2                                                                                                                                                       | D2<br>D2                                                                                                        | R109<br>R110      | B3<br>B3                                                                                                        | A1<br>B1                                                                                                        |
| C76               | E2                                      | D4                | Q46                                      | D2                                                                                                                                                             | D2                                                                                                              | R111              | B3                                                                                                              | A1                                                                                                              |
| C79               | F2                                      | E5                | Q49                                      | D2                                                                                                                                                             | C2                                                                                                              | R113              | 84                                                                                                              | A1                                                                                                              |
| C83               | F2                                      | D5                | Q50                                      | D2                                                                                                                                                             | C2                                                                                                              | R121              | В3                                                                                                              | 81                                                                                                              |
| C103<br>C113      | B3<br>84                                | B1<br>A1          | Q67                                      | E1                                                                                                                                                             | D4                                                                                                              | R122              | B3                                                                                                              | B2                                                                                                              |
| C123              | 84<br>84                                | A1<br>A2          | Q68<br>Q77                               | E1<br>F2                                                                                                                                                       | D4<br>D4                                                                                                        | R123<br>R124      | B4                                                                                                              | A2                                                                                                              |
| C150              | D3                                      | B5                | 083                                      | F2                                                                                                                                                             | D4<br>D5                                                                                                        | R124              | 84<br>C3                                                                                                        | A2<br>B3                                                                                                        |
| C151              | D3                                      | B5                | Q105                                     | B3                                                                                                                                                             | B2                                                                                                              | R126              | C3                                                                                                              | 82                                                                                                              |
| C155              | D3                                      | B5                | Q113                                     | B3                                                                                                                                                             | A2                                                                                                              | R127              | C4                                                                                                              | B2                                                                                                              |
| C156              | D3                                      | C5                | Q122                                     | B3                                                                                                                                                             | B2                                                                                                              | R128              | C4                                                                                                              | A3                                                                                                              |
| C169<br>C171      | E4<br>E4                                | В4<br>С3          | Q127<br>Q132                             | C4<br>C3                                                                                                                                                       | A3                                                                                                              | R129              | C3                                                                                                              | B2                                                                                                              |
| C172              | E4                                      | C3                | Q142                                     | C3                                                                                                                                                             | B3<br>B3                                                                                                        | R132<br>R133      | C3<br>C3                                                                                                        | 82                                                                                                              |
| C179              | E4                                      | B4                | Q143                                     | D4                                                                                                                                                             | A4                                                                                                              | R133              | C3                                                                                                              | B3<br>C3                                                                                                        |
| C180              | E4                                      | B3                | Q162                                     | E3                                                                                                                                                             | A4                                                                                                              | R135              | C3                                                                                                              | C3                                                                                                              |
| C183              | E4                                      | B3                | Q166                                     | E4                                                                                                                                                             | A4                                                                                                              | R136              | C3                                                                                                              | 82                                                                                                              |
| C186              | F4                                      | C5                | Q167<br>Q173                             | E4<br>F4                                                                                                                                                       | A4                                                                                                              | R141              | C4                                                                                                              | B2                                                                                                              |
| CR32              | D1                                      | D1                | Q183                                     | F4<br>F4                                                                                                                                                       | B4<br>B4                                                                                                        | R142<br>R143      | C4<br>D3                                                                                                        | B2                                                                                                              |
| CR35              | D2                                      | D3                | Q184                                     | F4                                                                                                                                                             | B4                                                                                                              | R143              | D3                                                                                                              | B3<br>B5                                                                                                        |
| CR36              | D2                                      | D2                |                                          |                                                                                                                                                                |                                                                                                                 | R155              | D3                                                                                                              | C3                                                                                                              |
| CR37              | D2                                      | D2                | R4                                       | A1                                                                                                                                                             | D3                                                                                                              | R156              | D3                                                                                                              | C3                                                                                                              |
| CR39<br>CR43      | D2<br>D2                                | D1<br>D1          | R8<br>R9                                 | B2<br>B2                                                                                                                                                       | D2                                                                                                              | R161              | E3                                                                                                              | A4                                                                                                              |
| CR46              | D2                                      | DI                | R11                                      | В2<br>В2                                                                                                                                                       | C1<br>D3                                                                                                        | R162<br>R166      | E3<br>D4                                                                                                        | A4<br>B4                                                                                                        |
| CR47              | D2                                      | D1                | R12                                      | B2                                                                                                                                                             | D3                                                                                                              | R167              | E4                                                                                                              | В4<br>А4                                                                                                        |
| CR64              | E1                                      | D3                | R31                                      | D1                                                                                                                                                             | D1                                                                                                              | R168              | E4                                                                                                              | A4                                                                                                              |
| CR65              | E2                                      | D3                | R35                                      | D2                                                                                                                                                             | D3                                                                                                              | R169              | F4                                                                                                              | C3                                                                                                              |
| CR76<br>CR82      | E2<br>E2                                | E5<br>D4          | R36<br>R37                               | D2<br>D2                                                                                                                                                       | D2<br>D1                                                                                                        | R171              | E4                                                                                                              | C3                                                                                                              |
| CR86              | F2                                      | E5                | R42                                      | D2<br>D2                                                                                                                                                       | D1                                                                                                              | R172<br>R173      | E4<br>E4                                                                                                        | C5<br>C3                                                                                                        |
| CR105             | B3                                      | C1                | R43                                      | D2                                                                                                                                                             | D1                                                                                                              | R176              | E4<br>F4                                                                                                        | C3                                                                                                              |
| CR127             | C4                                      | A3                | R44                                      | D2                                                                                                                                                             | C1                                                                                                              | R177              | F4                                                                                                              | C5                                                                                                              |
| CR143             | D4                                      | B3                | R46                                      | D2                                                                                                                                                             | C1                                                                                                              | R179              | E4                                                                                                              | B4                                                                                                              |
| CR152<br>CR153    | D3<br>D3                                | B4<br>B5          | R61<br>R62                               | E1                                                                                                                                                             | D3                                                                                                              | R180              | E4                                                                                                              | 83                                                                                                              |
| CR173             | E4                                      | C4                | R63                                      | E1<br>E2                                                                                                                                                       | D3<br>D4                                                                                                        | R183              | E4                                                                                                              | С3                                                                                                              |
| CR177             | E4                                      | C4                | R64                                      | E2                                                                                                                                                             | D3                                                                                                              | TP32              | E1                                                                                                              | D3                                                                                                              |
| CR184             | F4                                      | B4                | R65                                      | E2                                                                                                                                                             | D3                                                                                                              | TP83              | F2                                                                                                              | D5                                                                                                              |
| 10-7              | D1                                      |                   | R67                                      | E1                                                                                                                                                             | D3                                                                                                              | TP103             | B3                                                                                                              | B2                                                                                                              |
| J37<br>J78        | D1<br>A3                                | C1<br>A1          | R70<br>R71                               | E1<br>F1                                                                                                                                                       | D5                                                                                                              | TP106             | B3                                                                                                              | B1                                                                                                              |
| J91               | A3<br>A4                                | D3                | R71<br>R72                               | F1                                                                                                                                                             | D5<br>D5                                                                                                        | TP122<br>TP143    | B3                                                                                                              | B2                                                                                                              |
| J106              | C3                                      | C1                | R73                                      | F1                                                                                                                                                             | D5                                                                                                              | TP143<br>TP183    | D3<br>F4                                                                                                        | В4<br>С3                                                                                                        |
| J110              | A3                                      | B1                | R75                                      | E2                                                                                                                                                             | E4                                                                                                              | TP186             | F4                                                                                                              | C5                                                                                                              |
| 000               |                                         | 50                | R76                                      | E2                                                                                                                                                             | E4                                                                                                              |                   |                                                                                                                 |                                                                                                                 |
| P20               | C1                                      | E2                | R77                                      | F2                                                                                                                                                             | E4                                                                                                              | U105              | B3                                                                                                              | B1                                                                                                              |
|                   |                                         |                   |                                          |                                                                                                                                                                |                                                                                                                 |                   |                                                                                                                 |                                                                                                                 |
|                   |                                         |                   |                                          |                                                                                                                                                                | 1997) Male and Control (1997) All the Control of States of States of States of States of States of States of St |                   | (*************************************                                                                          | 9000.1 - 9000 9012 C / 9000 au Linna (Linna)                                                                    |
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|                   |                                         |                   |                                          |                                                                                                                                                                |                                                                                                                 |                   |                                                                                                                 |                                                                                                                 |

#### **VOLTAGE AND WAVEFORM CONDITIONS**

The voltages and waveforms shown were obtained with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B); READOUT INTENSITY (OFF).

**Voltage Conditions.** The voltages were taken with a digital multimeter with a  $10M\Omega$  input impedance (Tektronix DM 501 Digital Multimeter installed in a TM 501 Power Module or Tektronix 7D13 Digital Multimeter used with a readout-equipped 7000-Series Oscilloscope).

Waveform Conditions. The waveforms shown below were obtained using a test oscilloscope system with 10 M $\Omega$  input impedance, at least 60 MHz bandwidth and 10X probe (Tektronix 7603 Oscilloscope, 7B92 Time Base, 7A13 Differential Comparator and P6063A Probe).

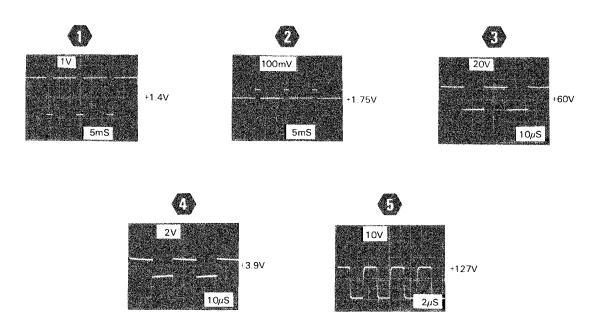
Waveform 1 conditions: 7B80 Time Base with controls set as follows: TIME/DIV (1 ms); TRIGGERING (P-P AUTO, AC, INT) was installed in the B HORIZ compartment of the 7854. 7854 conditions: A and B INTENSITY midrange.

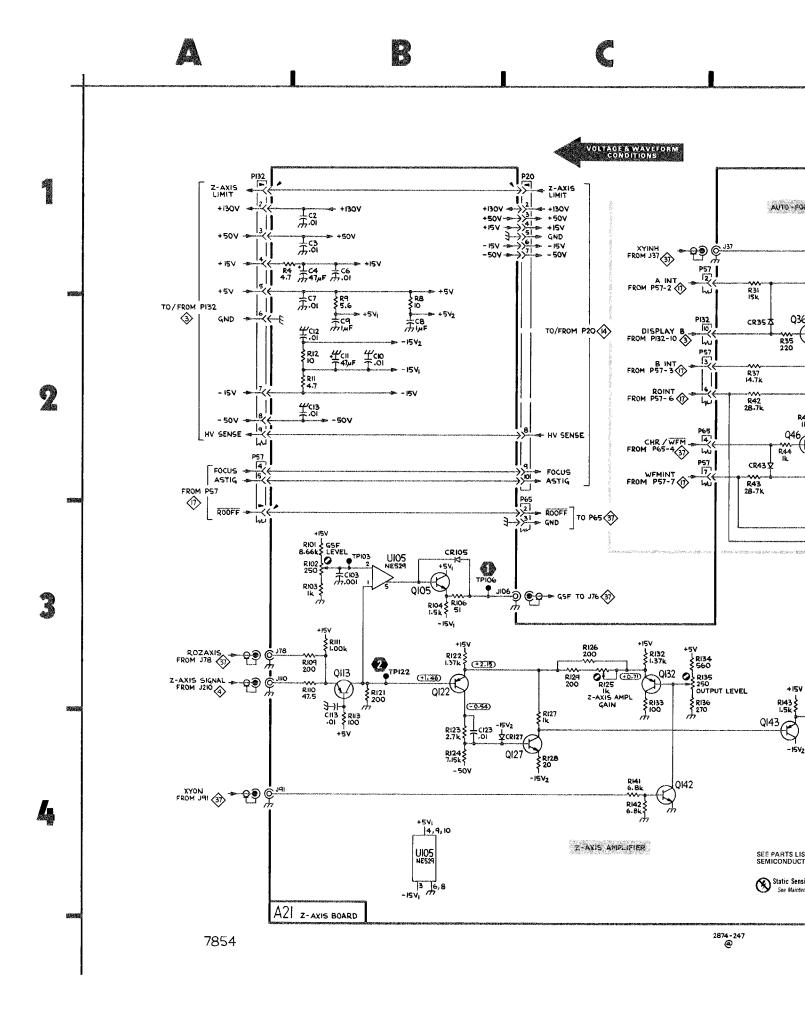
Waveform 2 conditions: Same as 1 above except B INTENSITY fully CCW.

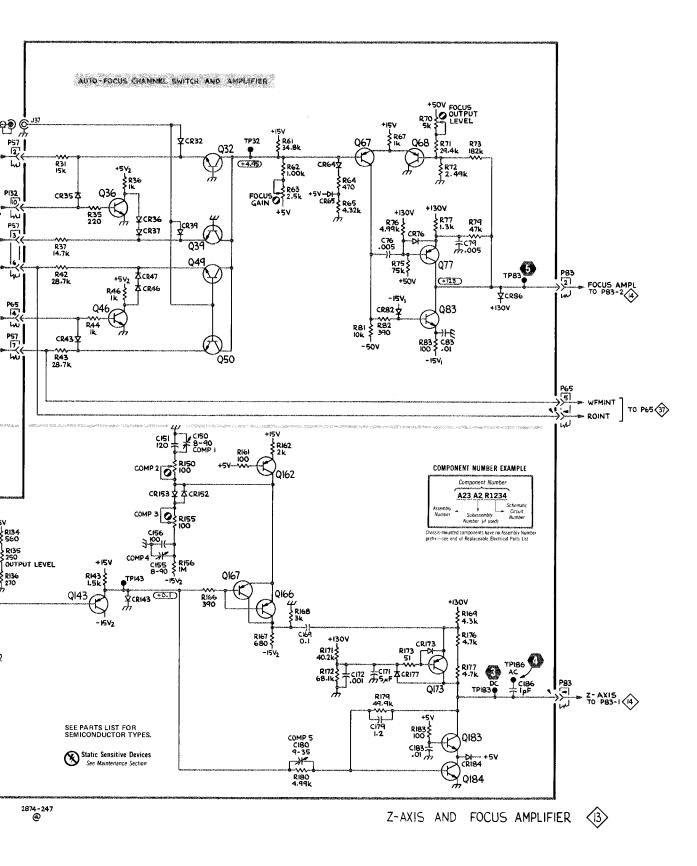
Waveform 3 conditions: Same as 1 above except 7B80 Time Base set for 2  $\mu$ s/div.

Waveform 4 conditions: Same as 1 above except 7B80 Time Base set for 2  $\mu$ s/div. A Calibration Fixture (Tektronix 067-0587-01 with controls set as follows: REP RATE (100 KHz); STEP RESP (+) was installed in the LEFT VERT compartment of the 7854.

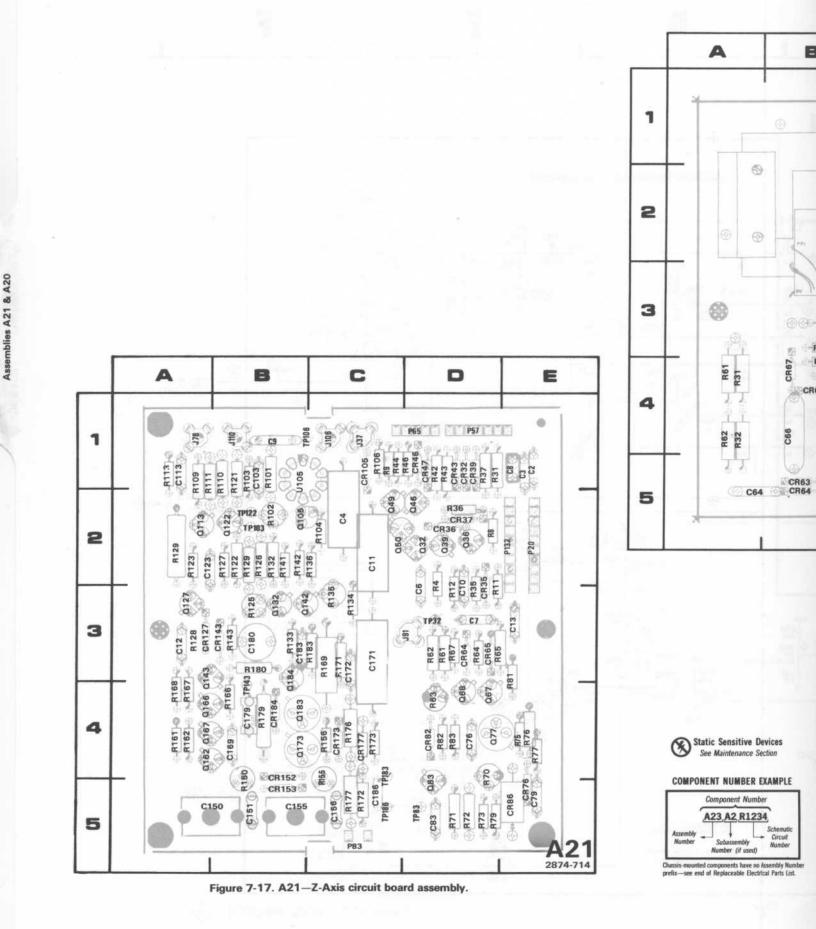
Waveform 5 conditions: Same as 1 above except 7854 in CHOP mode, A INTENSITY (CCW) 7B80 Time Base set for 1  $\mu$ s/div.







D



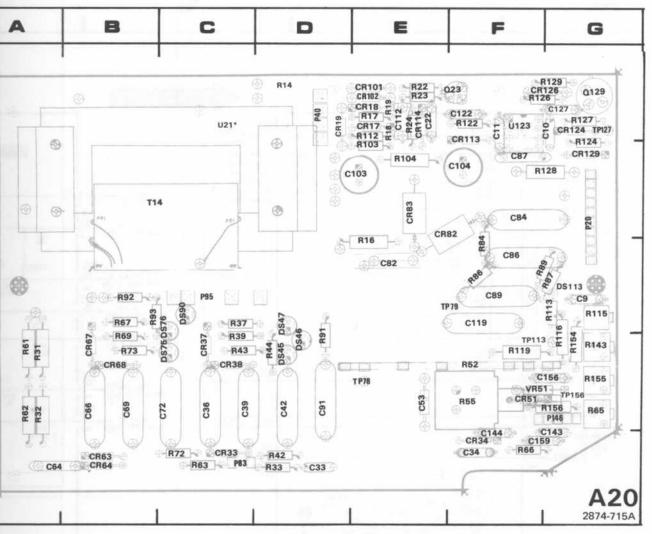
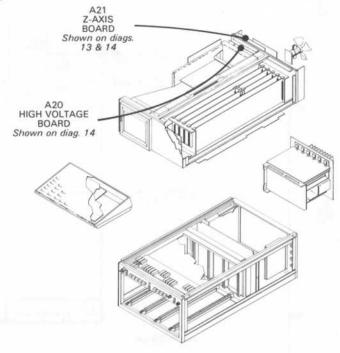
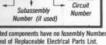


Figure 7-18. A20-High Voltage circuit board assembly.



tatic Sensitive Devices See Maintenance Section

NENT NUMBER EXAMPLE

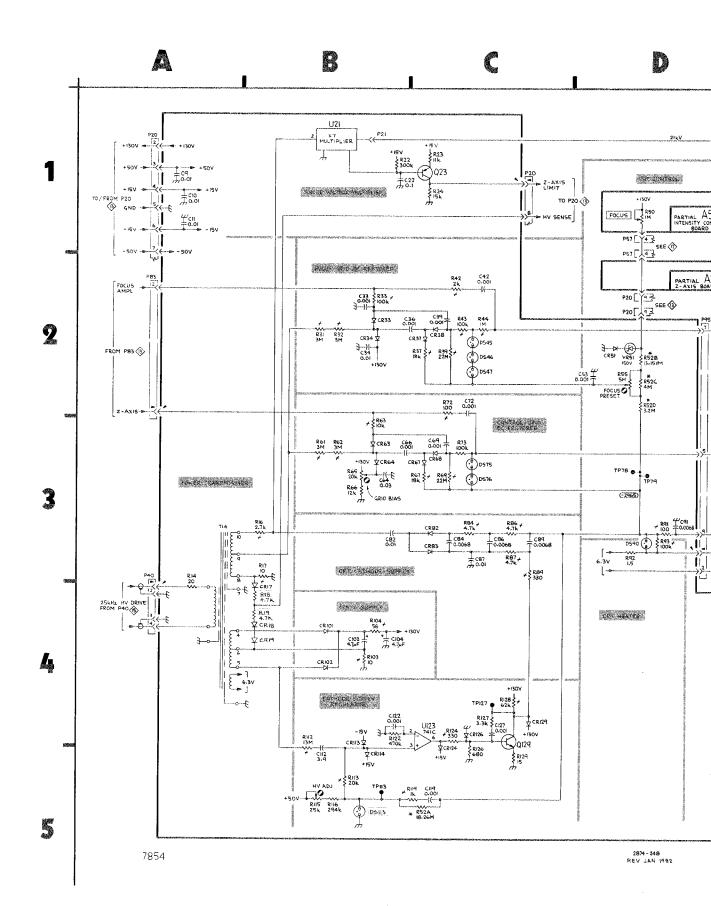


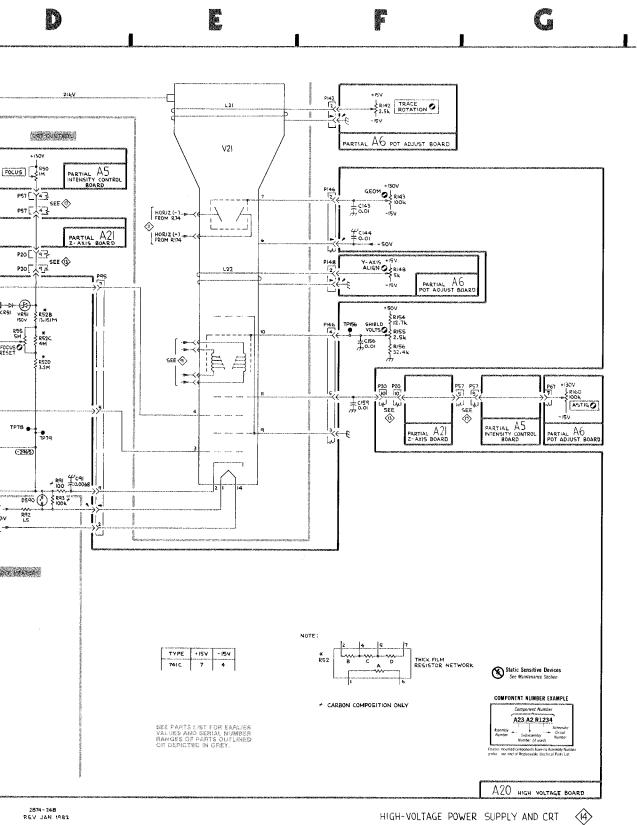
**REV JAN 1982** 

# HIGH-VOLTAGE POWER SUPPLY AND CRT DIAGRAM 14

| CIRCUIT             | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER    | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD    |
|---------------------|-------------------|-------------------|----------------------|-------------------|-------------------|-------------------|-------------------|----------|
| P57<br>P57          | D1<br>G3          | D1<br>D1          | R50                  | D1                | D2                |                   |                   | ×        |
| Partial A5 A        | SSY also sho      | wn on diagram     | ns 2 and 17.         |                   |                   |                   |                   |          |
| PARTIAL             | A6 ASSY           |                   |                      |                   |                   |                   |                   |          |
| CIRCUIT<br>NUMBER   | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER    | SCHEM<br>LOCATION | BOARD             | CIRCUIT<br>NUMBER | SCHEM             | BOARD    |
| P67<br>P142<br>P148 | G3<br>F1<br>F2    | C1<br>A1<br>A1    | R142<br>R148<br>R160 | F1<br>F2<br>G3    | A1<br>A1<br>B1    |                   |                   |          |
| Partial A6 A        | SSY also sho      | wn on diagram     | 17.                  |                   |                   |                   |                   |          |
| A20 ASS             | Y                 |                   |                      |                   |                   |                   |                   |          |
| CIRCUIT             | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER    | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD    |
| C9                  | A1                | G3                | CR102                | В4                | E1                | R62               | B3                | A4       |
| C10                 | A1                | G1                | CR113                | B4                | F1                | R63               | B3                | C5       |
| C11<br>C22          | A1<br>B1          | F1<br>E1          | CR114                | B5                | E1                | R65               | B3                | G4       |
| C33                 | B2                | C5                | CR124<br>CR126       | C5<br>C4          | G1<br>G1          | R66<br>R67        | B3<br>C3          | F5<br>B3 |
| C34                 | B2                | F5                | CR120                | C4                | G2                | R69               | C3                | B3<br>B4 |
| C36                 | B2                | C4                | DS45                 | C2                | D4                | R72               | C2                | C5       |
| C39                 | C2                | C4                | DS46                 | C2                | D4                | R73               | C3                | B4       |
| C42                 | C2                | D4                | DS47                 | C2                | D3                | R84               | C3                | F3       |
| C53                 | D2                | E4                | DS75                 | C3                | C4                | R86               | C3                | F3       |
| C64                 | B3                | A5                | DS76                 | C3                | C3                | R87               | C3                | G3       |
| C66                 | B3                | B4                | DS90                 | D3                | C3                | R89               | C3                | F3       |
| C69                 | C3                | B4                | DS113*               | B5                | G3                | R91               | D3                | D4       |
| C72                 | C2                | C4                | P20                  | A1                | G2                | R92               | D3                | 83       |
| C82<br>C84          | B3<br>C3          | E3<br>F2          | P20                  | C1                | G2                | R93               | D3                | B3       |
| C86                 | C3                | F3                | P20                  | F3                | G2                | R103<br>R104      | 84<br>84          | E2<br>E2 |
| C87                 | C3                | F2                | P40                  | A3                | D1                | R112              | B4                | E1       |
| C89                 | C3                | F3                | P83                  | A2<br>D2          | C5                | R113              | 85                | G3       |
| C91                 | D3                | D4                | P95<br>P146          | F1                | C3<br>G4          | R115              | 85                | G3       |
| C103                | B4                | E2                | P146                 | F2                | G4<br>G4          | R116              | B5                | G4       |
| C104                | B4                | F2                | 1000                 |                   |                   | R119              | C5                | F4       |
| C112                | B5                | E1                | 023                  | C1                | F1                | R122              | B4                | F1       |
| C119                | C5                | F3                | Q129<br>R14          | C4<br>A3          | G1<br>D1          | R124              | C4                | G2       |
| C122<br>C127        | 84<br>C4          | F1<br>G1          | R16                  | B3                | E3                | R126              | C5                | F1       |
| C143                | F1                | G5                | R17                  | 83                | E1                | R127<br>R128      | C4<br>C4          | G1       |
| C144                | F2                | F5                | R18*                 | B4                | E1                | R129              | C5                | G2<br>G1 |
| C156                | F2                | G4                | R19*                 | B4                | E1                | R143              | F1                | G4       |
| C159                | F3                | F5                | R22                  | B1                | E1                | R154              | F2                | G4       |
| 0017                |                   |                   | R23                  | C1                | E1                | R155              | F2                | G4       |
| CR17<br>CR18        | B4<br>B4          | E1<br>E1          | R24<br>R31           | C1<br>B2          | E1                | R156              | F2                | G4       |
| CR19                | B4<br>B4          | D1                | R32                  | B2<br>B2          | A4<br>A4          | T14               | A3                | B2       |
| CR33                | B2                | C5                | R33                  | B2                | C5                |                   | 10                | 02       |
| CR34                | B2                | F5                | R37                  | C2                | C3                | TP78              | D3                | E4       |
| CR37                | C2                | C4                | R39                  | C2                | C4                | TP79              | D3                | F3       |
| CR38                | C2                | C4                | R42                  | C2                | C5                | TP113             | B5                | F4       |
| CR51                | D2<br>B2          | F4                | R43                  | C2                | C4                | TP127             | C4                | G1       |
| CR63<br>CR64        | B3<br>B3          | 85<br>85          | R44<br>R52A          | C2<br>C5          | D4<br>F4          | TP156             | F2                | G4       |
| CR67                | C3                | B4                | R52B                 | D2                | F4                | U21               | B1                | C1*      |
| CR68                | C3                | B4                | R52C                 | D2                | F4                | U123              | C4                | F1       |
| CR82                | C3                | E2                | R52D                 | D2                | F4                |                   | 17525             |          |
| CR83<br>CR101       | C3<br>B4          | E2<br>E1          | R55<br>R61           | D2<br>B3          | F4<br>A4          | VR51              | D2                | F4       |
| CHASSIS             | MOUNTED           | PARTS             |                      |                   |                   |                   |                   |          |
| CIRCUIT<br>NUMBER   | SCHEM<br>LOCATION | BOARD             | CIRCUIT<br>NUMBER    | SCHEM<br>LOCATION | BOARD             | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD    |
| L21                 | E1                | CHASSIS           | V21                  | E1                | CHASSIS           |                   |                   |          |

\*See Parts List for serial number ranges.





High Voltage Power Supply and Crt

Reverse Side

A23 & A12

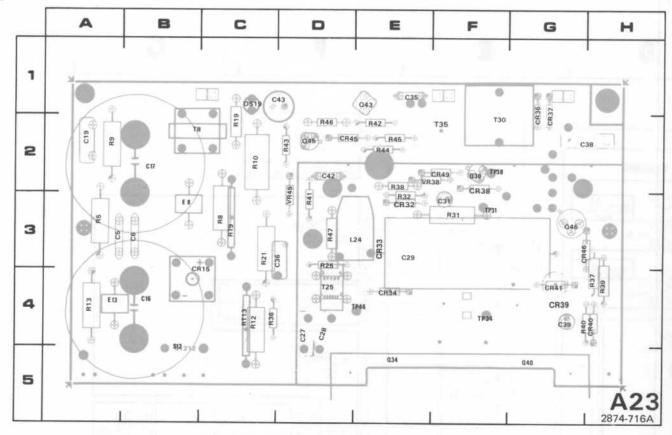


Figure 7-19. A23-Inverter circuit board assembly.

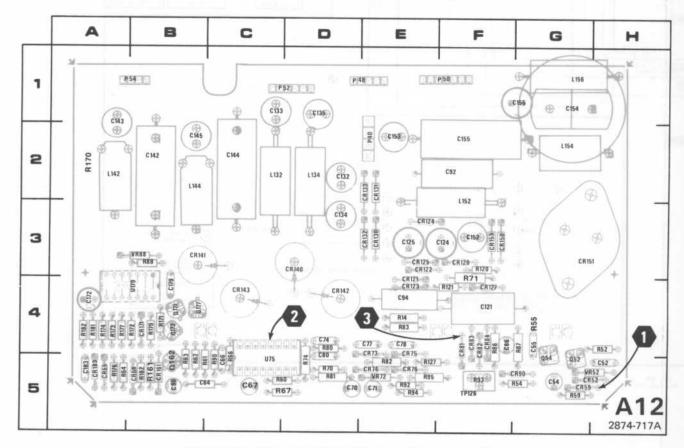
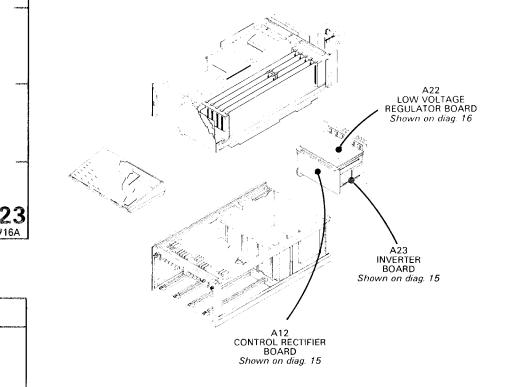


Figure 7-20. A12-Control Rectifier circuit board assembly.

| A12 ASS                                                                                                                               | Y                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CIRCUIT                                                                                                                               | SCHEM                                                                                                                                                                                          | BOARD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CIRCUIT                                                                                                                                                                                                                                  |
| NUMBER                                                                                                                                | LOCATION                                                                                                                                                                                       | LOCATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | NUMBER                                                                                                                                                                                                                                   |
| C52                                                                                                                                   | В3                                                                                                                                                                                             | Н5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | C154                                                                                                                                                                                                                                     |
| C54                                                                                                                                   | C3                                                                                                                                                                                             | G5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | C155                                                                                                                                                                                                                                     |
| C55                                                                                                                                   | C3                                                                                                                                                                                             | G4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | C156                                                                                                                                                                                                                                     |
| C64                                                                                                                                   | C3<br>B4                                                                                                                                                                                       | B5<br>C5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | C172<br>C179                                                                                                                                                                                                                             |
| C66<br>C67                                                                                                                            | 84<br>B4                                                                                                                                                                                       | C5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | C183                                                                                                                                                                                                                                     |
| C70                                                                                                                                   | C3                                                                                                                                                                                             | D5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0100                                                                                                                                                                                                                                     |
| C71                                                                                                                                   | C3                                                                                                                                                                                             | E5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CR52                                                                                                                                                                                                                                     |
| C74                                                                                                                                   | C4                                                                                                                                                                                             | D4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CR59                                                                                                                                                                                                                                     |
| C77                                                                                                                                   | D3                                                                                                                                                                                             | E4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CR65                                                                                                                                                                                                                                     |
| C78                                                                                                                                   | D3                                                                                                                                                                                             | E4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CR66<br>CR73                                                                                                                                                                                                                             |
| C80<br>C86                                                                                                                            | C4<br>D4                                                                                                                                                                                       | D4<br>F <b>4</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CR73<br>CR74                                                                                                                                                                                                                             |
| C90                                                                                                                                   | D4                                                                                                                                                                                             | B5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CR75                                                                                                                                                                                                                                     |
| C92                                                                                                                                   | D4                                                                                                                                                                                             | F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CR76                                                                                                                                                                                                                                     |
| C94                                                                                                                                   | D4                                                                                                                                                                                             | E4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CR81                                                                                                                                                                                                                                     |
| C121                                                                                                                                  | F1                                                                                                                                                                                             | F4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CR82                                                                                                                                                                                                                                     |
| C124                                                                                                                                  | E1                                                                                                                                                                                             | E3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CR83                                                                                                                                                                                                                                     |
| C125                                                                                                                                  | E2<br>E2                                                                                                                                                                                       | E3<br>D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CR84<br>CR90                                                                                                                                                                                                                             |
| C132<br>C133                                                                                                                          | E2<br>F2                                                                                                                                                                                       | D2<br>C1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CR90<br>CR120                                                                                                                                                                                                                            |
| C133<br>C134                                                                                                                          | E2                                                                                                                                                                                             | D3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CR120                                                                                                                                                                                                                                    |
| C135                                                                                                                                  | F2                                                                                                                                                                                             | D1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CR122                                                                                                                                                                                                                                    |
| C142                                                                                                                                  | E2                                                                                                                                                                                             | B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CR123                                                                                                                                                                                                                                    |
| C143                                                                                                                                  | F2                                                                                                                                                                                             | A1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CR124                                                                                                                                                                                                                                    |
| C144                                                                                                                                  | E2                                                                                                                                                                                             | C2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CR125                                                                                                                                                                                                                                    |
| C145                                                                                                                                  | F2                                                                                                                                                                                             | B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CR127                                                                                                                                                                                                                                    |
| C152<br>C153                                                                                                                          | E3<br>F3                                                                                                                                                                                       | F3<br>E2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CR130<br>CR131                                                                                                                                                                                                                           |
| PARTIAL                                                                                                                               | A22 ASS                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                          |
| CIRCUIT<br>NUMBER                                                                                                                     | SCHEM<br>LOCATION                                                                                                                                                                              | BOARD<br>LOCATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CIRCUIT<br>NUMBER                                                                                                                                                                                                                        |
|                                                                                                                                       | E 4                                                                                                                                                                                            | F5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | P54                                                                                                                                                                                                                                      |
| C8                                                                                                                                    | E4                                                                                                                                                                                             | FD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | P54                                                                                                                                                                                                                                      |
|                                                                                                                                       |                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | P64                                                                                                                                                                                                                                      |
| CR7                                                                                                                                   | E4                                                                                                                                                                                             | F5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | P64<br>P72                                                                                                                                                                                                                               |
| CR7<br>CR8                                                                                                                            | E4<br>E4                                                                                                                                                                                       | F5<br>F5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                          |
| CR8<br>Partial A22                                                                                                                    | E4<br>ASSY also s                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | P72<br>P82<br>gram 16.                                                                                                                                                                                                                   |
| CR8<br>Partial A22                                                                                                                    | E4<br>ASSY also s                                                                                                                                                                              | F5<br>shown on dia                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | P72<br>P82<br>gram 16.                                                                                                                                                                                                                   |
| CR8<br>Partial A22                                                                                                                    | E4<br>ASSY also s                                                                                                                                                                              | F5<br>shown on dia                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | P72<br>P82<br>gram 16.                                                                                                                                                                                                                   |
| CR8<br>Partial A22<br>PARTIAL<br>CIRCUIT<br>NUMBER                                                                                    | E4<br>ASSY also s<br>A23 ASS<br>SCHEM                                                                                                                                                          | F5<br>shown on dia<br>Y<br>BOARD<br>LOCATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | P72<br>P82<br>gram 16.<br>CIRCUIT<br>NUMBER<br>CR32                                                                                                                                                                                      |
| CR8<br>Partial A22<br>PARTIAL<br>CIRCUIT<br>NUMBER<br>C5<br>C6                                                                        | E4<br>ASSY also s<br>A23 ASS'<br>SCHEM<br>LOCATION<br>A2<br>A2<br>A2                                                                                                                           | F5<br>shown on dia<br>BOARD<br>LOCATION<br>A3<br>B3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | P72<br>P82<br>gram 16.<br>CIRCUIT<br>NUMBER<br>CR32<br>CR33                                                                                                                                                                              |
| CR8<br>Partial A22<br>PARTIAL<br>CIRCUIT<br>NUMBER<br>C5<br>C6<br>C16                                                                 | E4<br>ASSY also s<br>A23 ASS<br>SCHEM<br>LOCATION<br>A2<br>A2<br>B1                                                                                                                            | F5<br>shown on dia<br>Y<br>BOARD<br>LOCATION<br>A3<br>B3<br>B4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | P72<br>P82<br>CIRCUIT<br>NUMBER<br>CR32<br>CR33<br>CR34                                                                                                                                                                                  |
| CR8<br>Partial A22<br>PARTIAL<br>CIRCUIT<br>NUMBER<br>C5<br>C6<br>C16<br>C16<br>C17                                                   | E4<br>ASSY also S<br>A23 ASS<br>SCHEM<br>LOCATION<br>A2<br>A2<br>B1<br>B1<br>B1                                                                                                                | F5<br>shown on dia<br>BOARD<br>LOCATION<br>A3<br>B3<br>B4<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | P72<br>P82<br>CIRCUIT<br>NUMBER<br>CR32<br>CR33<br>CR34<br>CR36                                                                                                                                                                          |
| CR8<br>Partial A22<br>PARTIAL<br>CIRCUIT<br>NUMBER<br>C5<br>C6<br>C16<br>C16<br>C17<br>C19                                            | E4<br>ASSY also s<br>A23 ASS<br>SCHEM<br>LOCATION<br>A2<br>A2<br>B1<br>B1<br>B1                                                                                                                | F5<br>shown on dia<br>BOARD<br>LOCATION<br>A3<br>B3<br>B4<br>B2<br>A2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | P72<br>P82<br>gram 16.<br>CIRCUIT<br>NUMBER<br>CR32<br>CR33*<br>CR34<br>CR36<br>CR37                                                                                                                                                     |
| CR8<br>Partial A22<br>PARTIAL<br>CIRCUIT<br>NUMBER<br>C5<br>C6<br>C16<br>C16<br>C17                                                   | E4<br>ASSY also S<br>A23 ASS<br>SCHEM<br>LOCATION<br>A2<br>A2<br>B1<br>B1<br>B1                                                                                                                | F5<br>shown on dia<br>BOARD<br>LOCATION<br>A3<br>B3<br>B4<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | P72<br>P82<br>CIRCUIT<br>NUMBER<br>CR32<br>CR33<br>CR34<br>CR36                                                                                                                                                                          |
| CR8<br>Partial A22<br>PARTIAL<br>CIRCUIT<br>NUMBER<br>C5<br>C6<br>C16<br>C16<br>C17<br>C19<br>C27                                     | E4<br>ASSY also s<br>A23 ASSY<br>SCHEM<br>LOCATION<br>A2<br>A2<br>B1<br>B1<br>B1<br>B1<br>C1                                                                                                   | F5<br>shown on dia<br>BOARD<br>LOCATION<br>A3<br>B3<br>B4<br>B2<br>A2<br>D4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | P72<br>P82<br>gram 16.<br>CIRCUIT<br>NUMBER<br>CR32<br>CR33<br>CR34<br>CR36<br>CR37<br>CR38                                                                                                                                              |
| CR8<br>Partial A22<br>PARTIAL<br>CIRCUIT<br>NUMBER<br>C5<br>C6<br>C16<br>C17<br>C19<br>C27<br>C28<br>C29<br>C31                       | E4<br>ASSY also s<br>A23 ASS<br>SCHEM<br>LOCATION<br>A2<br>A2<br>B1<br>B1<br>B1<br>C1<br>C1<br>C1<br>C1<br>C1                                                                                  | F5<br>shown on dia<br>BOARD<br>LOCATION<br>A3<br>B3<br>B4<br>B2<br>A2<br>D4<br>D4<br>E3<br>F3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | P72<br>P82<br>gram 16.<br>CIRCUIT<br>NUMBER<br>CR32<br>CR33*<br>CR34<br>CR36<br>CR37<br>CR38<br>CR39*<br>CR39<br>CR40<br>CR41                                                                                                            |
| CR8<br>Partial A22<br>PARTIAL<br>CIRCUIT<br>NUMBER<br>C5<br>C6<br>C16<br>C17<br>C19<br>C27<br>C28<br>C29<br>C31<br>C35                | E4<br>ASSY also s<br>A23 ASSY<br>SCHEM<br>LOCATION<br>A2<br>A2<br>B1<br>B1<br>B1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>D2                                                                     | F5<br>shown on dia<br>BOARD<br>LOCATION<br>A3<br>B3<br>B4<br>B2<br>A2<br>D4<br>D4<br>D4<br>E3<br>F3<br>E1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | P72<br>P82<br>CIRCUIT<br>NUMBER<br>CR32<br>CR33<br>CR34<br>CR36<br>CR37<br>CR38<br>CR39<br>CR39<br>CR39<br>CR39<br>CR39<br>CR39<br>CR39<br>CR39                                                                                          |
| CR8<br>Partial A22<br>PARTIAL<br>CIRCUIT<br>NUMBER<br>C5<br>C6<br>C16<br>C17<br>C19<br>C27<br>C28<br>C29<br>C31<br>C35<br>C36         | E4<br>ASSY also s<br>A23 ASS<br>SCHEM<br>LOCATION<br>A2<br>A2<br>B1<br>B1<br>B1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>D2<br>D2                                                    | F5<br>shown on dia<br>BOARD<br>LOCATION<br>A3<br>B3<br>B4<br>B2<br>A2<br>D4<br>D4<br>E3<br>F3<br>E1<br>D3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | P72<br>P82<br>gram 16.<br>CIRCUIT<br>NUMBER<br>CR32<br>CR33<br>CR33<br>CR34<br>CR36<br>CR37<br>CR38<br>CR39<br>CR40<br>CR41<br>CR45<br>CR46                                                                                              |
| CR8 Partial A22 PARTIAL CIRCUIT NUMBER C5 C6 C16 C17 C19 C27 C28 C29 C31 C35 C36 C38                                                  | E4<br>ASSY also s<br>A23 ASS<br>SCHEM<br>LOCATION<br>A2<br>A2<br>B1<br>B1<br>B1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1                                  | F5<br>shown on dia<br>BOARD<br>LOCATION<br>A3<br>B3<br>B4<br>B2<br>A2<br>D4<br>B2<br>A2<br>D4<br>E3<br>F3<br>E1<br>D3<br>H2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | P72<br>P82<br>CIRCUIT<br>NUMBER<br>CR32<br>CR33<br>CR33<br>CR34<br>CR36<br>CR37<br>CR38<br>CR39<br>CR40<br>CR41<br>CR45<br>CR46<br>CR49                                                                                                  |
| CR8<br>Partial A22<br>PARTIAL<br>CIRCUIT<br>NUMBER<br>C5<br>C6<br>C16<br>C17<br>C19<br>C27<br>C28<br>C29<br>C31<br>C35<br>C36         | E4<br>ASSY also s<br>A23 ASS<br>SCHEM<br>LOCATION<br>A2<br>A2<br>B1<br>B1<br>B1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>D2<br>D2                                                    | F5<br>shown on dia<br>BOARD<br>LOCATION<br>A3<br>B3<br>B4<br>B2<br>A2<br>D4<br>D4<br>E3<br>F3<br>E1<br>D3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | P72<br>P82<br>CIRCUIT<br>NUMBER<br>CR32<br>CR33<br>CR33<br>CR34<br>CR36<br>CR37<br>CR36<br>CR37<br>CR38<br>CR39<br>CR40<br>CR41<br>CR45<br>CR46<br>CR49<br>DS19                                                                          |
| CR8 Partial A22 PARTIAL CIRCUIT NUMBER C5 C6 C16 C17 C19 C27 C28 C29 C31 C35 C36 C38 C39                                              | E4<br>ASSY also s<br>A23 ASS<br>SCHEM<br>LOCATION<br>A2<br>A2<br>B1<br>B1<br>C1<br>C1<br>C1<br>C1<br>C1<br>D2<br>D2<br>C2<br>C2<br>C2                                                          | F5<br>shown on dia<br>BOARD<br>LOCATION<br>A3<br>B3<br>B4<br>B2<br>A2<br>D4<br>D4<br>D4<br>E3<br>F3<br>E1<br>D3<br>H2<br>G4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | P72<br>P82<br>CIRCUIT<br>NUMBER<br>CR32<br>CR33<br>CR34<br>CR36<br>CR37<br>CR38<br>CR37<br>CR38<br>CR39<br>CR40<br>CR41<br>CR45<br>CR45<br>CR45<br>CR49<br>DS19<br>E8                                                                    |
| CR8 Partial A22 PARTIAL CIRCUIT NUMBER C5 C6 C16 C17 C19 C27 C28 C29 C31 C35 C36 C38 C39 C42 C43 CR15                                 | E4<br>ASSY also s<br>A23 ASSY<br>SCHEM<br>LOCATION<br>A2<br>A2<br>B1<br>B1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C2<br>C2<br>C2<br>C2<br>C2<br>B1                                 | F5<br>shown on dia<br>BOARD<br>LOCATION<br>A3<br>B3<br>B4<br>B2<br>A2<br>D4<br>D4<br>D4<br>E3<br>F3<br>E1<br>D3<br>H2<br>G4<br>D2<br>D1<br>C4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | P72<br>P82<br>CIRCUIT<br>NUMBER<br>CR32<br>CR33<br>CR34<br>CR36<br>CR37<br>CR38<br>CR39<br>CR36<br>CR37<br>CR38<br>CR39<br>CR40<br>CR41<br>CR45<br>CR46<br>CR49<br>DS19<br>E8<br>E13<br>L24                                              |
| CR8 Partial A22 PARTIAL CIRCUIT NUMBER C5 C6 C16 C17 C19 C27 C28 C29 C31 C35 C36 C38 C39 C42 C43 CR15                                 | E4<br>ASSY also s<br>A23 ASSY<br>SCHEM<br>LOCATION<br>A2<br>A2<br>B1<br>B1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C2<br>C2<br>C2<br>C2<br>C2<br>B1                                 | F5<br>shown on dia<br>BOARD<br>LOCATION<br>A3<br>B3<br>B4<br>B2<br>A2<br>D4<br>D4<br>E3<br>F3<br>E1<br>D3<br>H2<br>G4<br>D2<br>D1<br>C4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | P72<br>P82<br>CIRCUIT<br>NUMBER<br>CR32<br>CR33<br>CR34<br>CR36<br>CR37<br>CR38<br>CR39<br>CR36<br>CR37<br>CR38<br>CR39<br>CR40<br>CR41<br>CR45<br>CR46<br>CR49<br>DS19<br>E8<br>E13<br>L24                                              |
| CR8 Partial A22 PARTIAL CIRCUIT NUMBER C5 C6 C16 C17 C19 C27 C28 C29 C31 C35 C36 C38 C39 C42 C43 CR15 CR15 CHASSIS                    | E4<br>ASSY also s<br>A23 ASS'<br>SCHEM<br>LOCATION<br>A2<br>A2<br>B1<br>B1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C                                                          | F5<br>shown on dia<br>BOARD<br>LOCATION<br>A3<br>B3<br>B4<br>B2<br>A2<br>D4<br>A2<br>D4<br>E3<br>F3<br>E1<br>D3<br>F3<br>E1<br>D3<br>H2<br>G4<br>D2<br>D1<br>C4<br>C4<br>D2<br>D1<br>C4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | P72<br>P82<br>CIRCUIT<br>NUMBER<br>CR32<br>CR33<br>CR34<br>CR36<br>CR37<br>CR38<br>CR37<br>CR38<br>CR39<br>CR40<br>CR41<br>CR45<br>CR45<br>CR49<br>DS19<br>E8<br>E13<br>L24                                                              |
| CR8  Partial A22  PARTIAL  CIRCUIT NUMBER  C5 C6 C16 C17 C19 C27 C28 C29 C31 C35 C36 C38 C39 C42 C43 CR15                             | E4<br>ASSY also s<br>A23 ASS<br>SCHEM<br>LOCATION<br>A2<br>A2<br>B1<br>B1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C2<br>C2<br>C2<br>C2<br>C2<br>B1                                  | F5<br>shown on dia<br>BOARD<br>LOCATION<br>A3<br>B3<br>B4<br>B2<br>A2<br>D4<br>D4<br>E3<br>F3<br>E1<br>D3<br>H2<br>G4<br>D2<br>D1<br>C4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | P72<br>P82<br>CIRCUIT<br>NUMBER<br>CR32<br>CR33<br>CR34<br>CR36<br>CR37<br>CR38<br>CR39<br>CR36<br>CR37<br>CR38<br>CR39<br>CR40<br>CR41<br>CR45<br>CR46<br>CR49<br>DS19<br>E8<br>E13<br>L24                                              |
| CR8  Partial A22  PARTIAL  CIRCUIT NUMBER  C5 C6 C16 C17 C19 C27 C28 C29 C31 C35 C36 C38 C39 C42 C43 CR15  CHASSIS  CIRCUIT NUMBER    | E4<br>ASSY also s<br>A23 ASSY<br>SCHEM<br>LOCATION<br>A2<br>A2<br>B1<br>B1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C2<br>C2<br>C2<br>C2<br>C2<br>B1<br>MOUNTED<br>SCHEM<br>LOCATION | F5<br>shown on dia<br>BOARD<br>LOCATION<br>A3<br>B3<br>B4<br>B2<br>A2<br>D4<br>D4<br>D4<br>E3<br>F3<br>E1<br>D3<br>H2<br>G4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D1<br>C4<br>D2<br>D2<br>D1<br>D2<br>D1<br>D2<br>D1<br>D2<br>D1<br>D2<br>D1<br>D2<br>D1<br>D2<br>D1<br>D2<br>D1<br>D2<br>D1<br>D2<br>D1<br>D2<br>D2<br>D1<br>D2<br>D2<br>D2<br>D2<br>D2<br>D2<br>D2<br>D2<br>D2<br>D2 | P72<br>P82<br>CIRCUIT<br>NUMBER<br>CR32<br>CR33<br>CR33<br>CR33<br>CR34<br>CR36<br>CR37<br>CR38<br>CR39<br>CR40<br>CR41<br>CR45<br>CR46<br>CR49<br>DS19<br>E8<br>E13<br>L24<br>CIRCUIT<br>NUMBER                                         |
| CR8  Partial A22  PARTIAL  CIRCUIT NUMBER  C5 C6 C16 C17 C19 C27 C28 C29 C31 C35 C36 C38 C39 C42 C43 CR15 CR15 CHASSIS CIRCUIT NUMBER | E4<br>ASSY also s<br>A23 ASS<br>SCHEM<br>LOCATION<br>A2<br>A2<br>B1<br>B1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C                                                           | F5<br>shown on dia<br>BOARD<br>LOCATION<br>A3<br>B3<br>B4<br>B2<br>A2<br>D4<br>E3<br>F3<br>E1<br>D3<br>H2<br>G4<br>D2<br>D1<br>C4<br>C4<br>C4<br>C4<br>C4<br>C4<br>C4<br>C4<br>C4<br>C4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | P72<br>P82<br>CIRCUIT<br>NUMBER<br>CR32<br>CR33<br>CR33<br>CR34<br>CR36<br>CR37<br>CR36<br>CR37<br>CR36<br>CR37<br>CR36<br>CR37<br>CR36<br>CR37<br>CR40<br>CR41<br>CR45<br>CR46<br>CR49<br>DS19<br>E8<br>E13<br>L24<br>CIRCUIT<br>NUMBER |



\*See Parts List for serial number ranges.

Static Sensitive Devices See Maintenance Section

**12** 

COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

## CONVERTER / RECTIFIER DIAGRAM 15

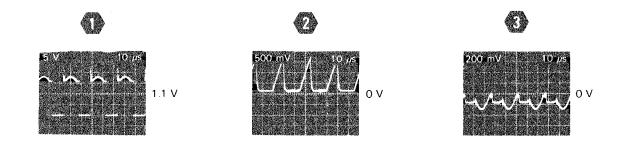
| A12 ASSY                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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| CIRCUIT<br>NUMBER L                                                                                                                                                                                                                | SCHEM<br>LOCATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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                                 | SCHEM<br>LOCATION                                                                                                                                                          | BOARD<br>LOCATION                                                                                                    | CIRCUIT<br>NUMBER                                                                                                                                                                                                        | SCHEM<br>LOCATION                                                                                                                | BOARD<br>LOCATION                                                                                                                                                                                                                                                                                                                   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| C52<br>C54<br>C55<br>C64<br>C66<br>C67<br>C70<br>C71<br>C74<br>C77<br>C78<br>C80<br>C80<br>C80<br>C86<br>C90<br>C92<br>C94<br>C121<br>C124<br>C125<br>C132<br>C133<br>C134<br>C135<br>C142<br>C142<br>C144<br>C145<br>C152<br>C153 | <ul> <li>83</li> <li>C3</li> <li>C3</li> <li>C4</li> <li>D4</li> <li>D4</li> <li>D4</li> <li>D4</li> <li>D4</li> <li>D4</li> <li>F1</li> <li>E1</li> <li>E2</li> <li>F2</li> <li>E3</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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CR132<br>CR133<br>CR140<br>CR141<br>CR142<br>CR143<br>CR150<br>CR151<br>CR153<br>CR161<br>CR171<br>CR183<br>L132<br>L134<br>L134<br>L142<br>L144<br>L152<br>L154<br>L156<br>P40<br>P48<br>P50<br>P52<br>P54<br>O52<br>Q54 | E2<br>E2<br>E2<br>E2<br>E2<br>E3<br>E3<br>E3<br>E3<br>E4<br>F3<br>F2<br>F2<br>F2<br>F2<br>F2<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3 | E3<br>E2<br>D3<br>B3<br>D4<br>C4<br>F3<br>G3<br>F3<br>B5<br>B4<br>A5<br>C2<br>D2<br>A2<br>B2<br>F2<br>G1<br>E2<br>C1<br>F1<br>C1<br>A1<br>G5<br>G5 | 0162<br>0171<br>0173<br>0177<br>R52<br>R54<br>R55<br>R59<br>R60<br>R61<br>R62<br>R63<br>R64<br>R66<br>R67<br>R70<br>R71<br>R74<br>R80<br>R71<br>R74<br>R80<br>R81<br>R82<br>R83<br>R84<br>R86<br>R87<br>R88<br>R87<br>R88<br>R87<br>R88<br>R87<br>R88<br>R87<br>R88<br>R87<br>R88<br>R87<br>R88<br>R87<br>R88<br>R87<br>R88<br>R87<br>R88<br>R87<br>R88<br>R87<br>R87 | 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| PARTIAL A                                                                                                                                                                                                                          | 22 ASSY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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| CIRCUIT<br>NUMBER L                                                                                                                                                                                                                | SCHEM<br>LOCATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| C8<br>CR7<br>CR8                                                                                                                                                                                                                   | E4<br>E4<br>E4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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                                 | E4<br>E4                                                                                                                                                                   | E6<br>F5                                                                                                             | Френ (1999) Малена (1994)<br>                                                                                                                                                                                            | villannenen vennend om vormen                                                                                                    | NEW CONFERENCE OF STREET, STREE                                                                                                                                                                                                                                                                                                     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| Partial A22 A                                                                                                                                                                                                                      | SSY also si                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| PARTIAL A                                                                                                                                                                                                                          | A23 ASSY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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                                 | n y fan Twinnen yw jangar yn de yn ar de ar fan                                                                                        | *****                                                                                                                |                                                                                                                                                                                                                          | an ann an thair ann an tha                                                                                                       | PORT of the VERY WAR AND A COMPANY OF                                                                                                                                                                                                                                                                                                                                   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| CIRCUIT<br>NUMBER L                                                                                                                                                                                                                | SCHEM<br>LOCATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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                                                                                                                                    | CIRCUIT<br>NUMBER                                                                                                                                                                                                         | SCHEM<br>LOCATION                                                                                                                                                          | BOARD<br>LOCATION                                                                                                                                  | CIRCUIT<br>NUMBER                                                                                                                                                                                                                                                                                                                                                     | SCHEM<br>LOCATION                                                                                                                                                          | an a                                                                             | CIRCUIT<br>NUMBER                                                                                                                                                                                                        | SCHEM<br>LOCATION                                                                                                                | The market state of the second state of the se |
| C5<br>C6<br>C16<br>C17<br>C19<br>C27<br>C28<br>C29<br>C31<br>C35<br>C36<br>C36<br>C38<br>C39<br>C42<br>C43<br>CR15                                                                                                                 | A2<br>A2<br>B1<br>B1<br>C1<br>C1<br>C1<br>C1<br>C1<br>D2<br>D2<br>C2<br>C2<br>C2<br>C2<br>C2<br>C2<br>B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | A3<br>B3<br>B4<br>B2<br>A2<br>D4<br>D4<br>E3<br>F3<br>E1<br>D3<br>H2<br>G4<br>D2<br>D1<br>C4                                                                               | CR32<br>CR33<br>CR34<br>CR36<br>CR37<br>CR38<br>CR39<br>CR40<br>CR41<br>CR45<br>CR46<br>CR45<br>CR46<br>CR49<br>DS19<br>E8<br>E13<br>L24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | C1<br>C1<br>C1<br>B2<br>B2<br>D1<br>C1<br>C2<br>D2<br>D1<br>C2<br>D1<br>B1<br>B1<br>A1<br>C1                                                                                                       | D3<br>E3<br>E4<br>G1<br>G1<br>F3<br>G4<br>H4<br>G4<br>D2<br>G3<br>F1<br>C1<br>B3<br>A4<br>E3                                                                                                                                                                                                                                                                                                                                                 | Q30<br>Q34<br>Q40<br>Q43<br>Q45<br>Q46<br>R5<br>R8<br>R9<br>R10<br>R12<br>R13<br>R19<br>R21<br>R25<br>R31                                                                                                                 | C2<br>C1<br>C1<br>D2<br>D1<br>C2<br>B2<br>B2<br>B2<br>B2<br>B2<br>A1<br>A1<br>B1<br>B1<br>C1                                                                               | F2<br>E5<br>G5<br>E1<br>D2<br>G3<br>A3<br>C3<br>A2<br>C2<br>C4<br>A4<br>C2<br>C4<br>A4<br>C2<br>C3<br>D3<br>F3                                     | R32<br>R36<br>R37<br>R38<br>R39<br>R40<br>R41<br>R42<br>R43<br>R44<br>R43<br>R44<br>R45<br>R46<br>R47<br>R19<br>RT13                                                                                                                                                                                                                                                  | C1<br>D2<br>C1<br>C2<br>C2<br>D2<br>D2<br>D2<br>D1<br>D1<br>D1<br>D1<br>B2<br>A1                                                                                           | E3<br>C4<br>H4<br>E2<br>H4<br>G4<br>D3<br>E2<br>D2<br>E2<br>E2<br>E2<br>D2<br>D3<br>C3<br>C4                         | S12<br>T8<br>T25<br>T30<br>T35<br>TP31<br>TP34<br>TP38<br>TP46<br>VR38<br>VR45                                                                                                                                           | A1<br>B2<br>B1<br>C1<br>D2<br>C1<br>D1<br>C1<br>C2<br>C2<br>D2                                                                   | B5<br>B2<br>D4<br>F1<br>E2<br>F3<br>F4<br>F2<br>E4<br>F1<br>D3                                                                                                                                                                                                                                                                      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| CHASSIS N                                                                                                                                                                                                                          | MOUNTED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PARTS                                                                                                                                                                      | ***                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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                                                                                                                                    |                                                                                                                                                                                                                           | 88) M. CH. 1873) M. A. B. M. (AMAR S. M. C. M. (AMAR S. M                                                            | an na shekara ka shekara ka sa sa sa sa sa sa sa                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                       | an na an a                                                                                                                                   |                                                                                                                      |                                                                                                                                                                                                                          | ******                                                                                                                           | ann an Iolaich a chlaich Guir all ann an Iolaich                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CIRCUIT<br>NUMBER L                                                                                                                                                                                                                | 149-1693 (12-16) (12-16) (12-16)<br>149-1693 (12-16) (12-16) (12-16) (12-16)<br>149-1693 (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) (12-16) 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                                                                                                                                                                                                            |                                                                                                                                                                                                                           | SCHEM<br>LOCATION                                                                                                                                                          |                                                                                                                                                    | CIRCUIT<br>NUMBER<br>S10                                                                                                                                                                                                                                                                                                                                              | SCHEM<br>LOCATION<br>A3                                                                                                                                                    | BOARD<br>LOCATION<br>CHASSIS                                                                                         |                                                                                                                                                                                                                          | nanga mangangkanan nangangkangkang nangangkangkangkangkang nangangkangkangkangkangkangkangkangkangk                              | anayoo waxaa ahaa ahaayaa ahayoo a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| C37<br>F10                                                                                                                                                                                                                         | D1<br>A3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CHASSIS<br>CHASSIS                                                                                                                                                         | FL10<br>L37                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | A3<br>D1                                                                                                                                                                                           | CHASSIS<br>CHASSIS                                                                                                                                                                                                                                                                                                                                                                                                                           | P10<br>P11<br>P83                                                                                                                                                                                                         | A4<br>A3<br>F5                                                                                                                                                             | CHASSIS<br>CHASSIS<br>CHASSIS                                                                                                                      | 510<br>572<br>T110                                                                                                                                                                                                                                                                                                                                                    | E4                                                                                                                                                                         | CHASSIS                                                                                                              |                                                                                                                                                                                                                          |                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                     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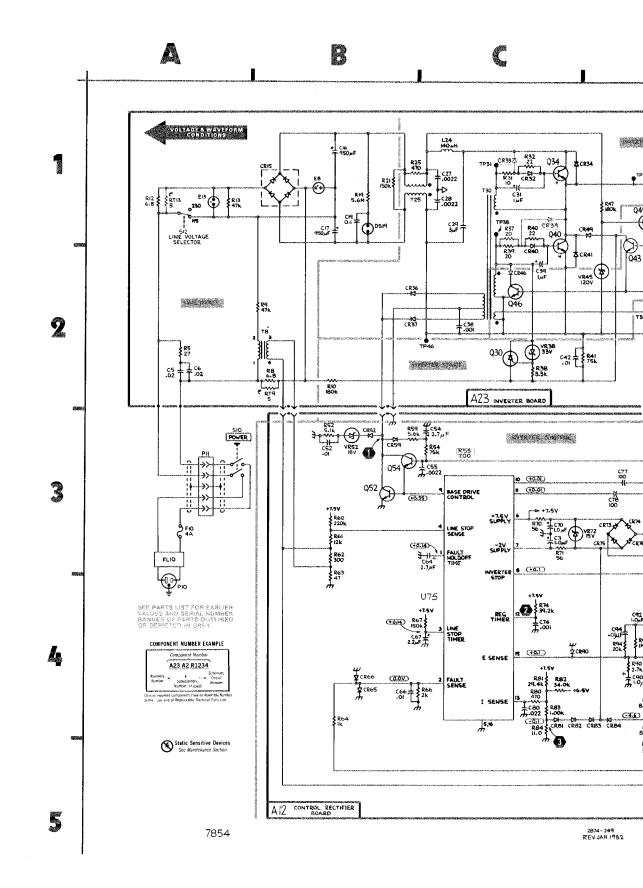
## **VOLTAGE AND WAVEFORM CONDITIONS**

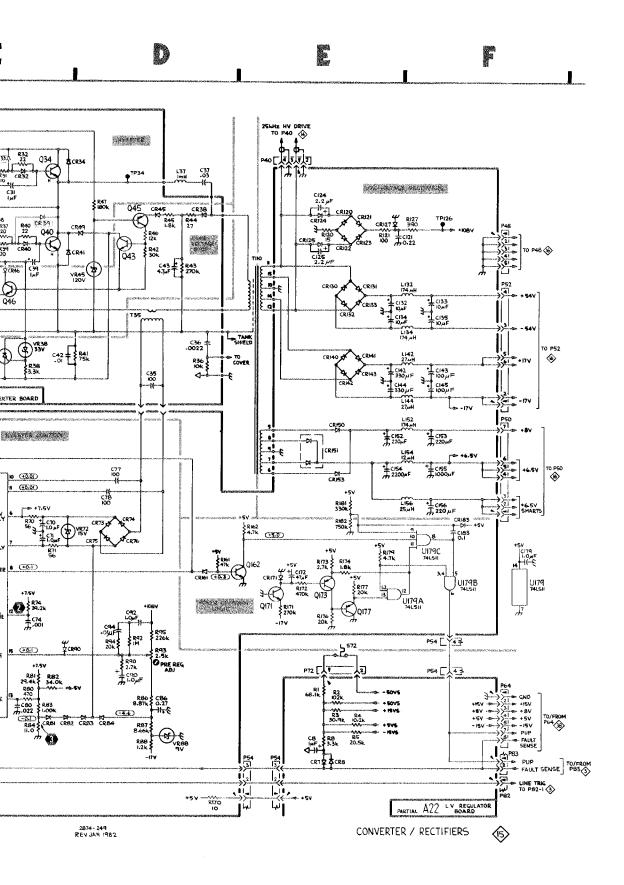
The voltages shown were obtained with the 7854 front panel variable controls at midrange except INTENSITY controls fully counterclockwise; VERTICAL MODE (LEFT); TRIGGER SOURCE (VERT MODE); HORIZONTAL MODE (B). No plug-in units were installed.

Voltage Conditions. The voltages shown on the diagram were obtained using a digital multimeter with a 10 M $\Omega$  input impedance. (Tektronix DM501 Digital Multimeter.)

Waveform Conditions. The waveforms shown below were obtained using a test oscilloscope system with 1 M $\Omega$  input impedance and at least 60 MHz bandwidth. (Tektronix 7603 Oscilloscope, 7B53A Time Base, and 7A13 Differential Comparator equipped with a 10X probe.)







Rectifiers

A22 & A16 🐺

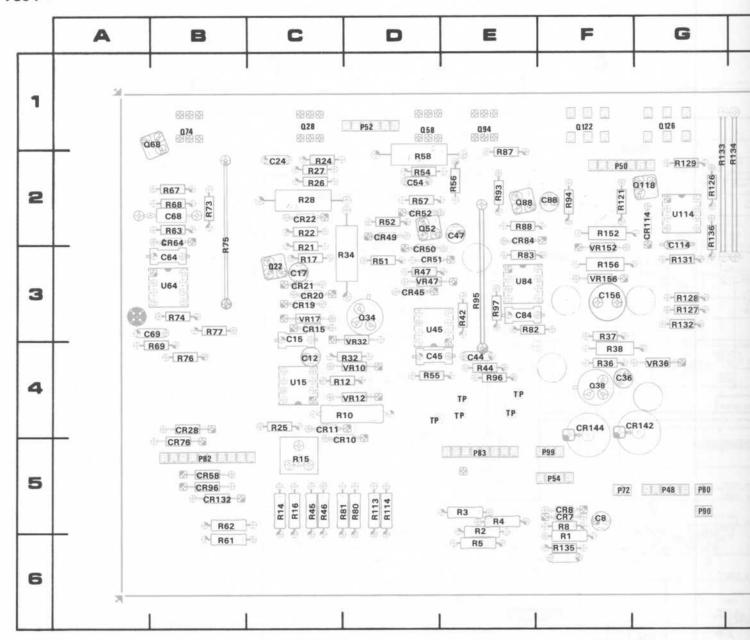
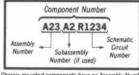


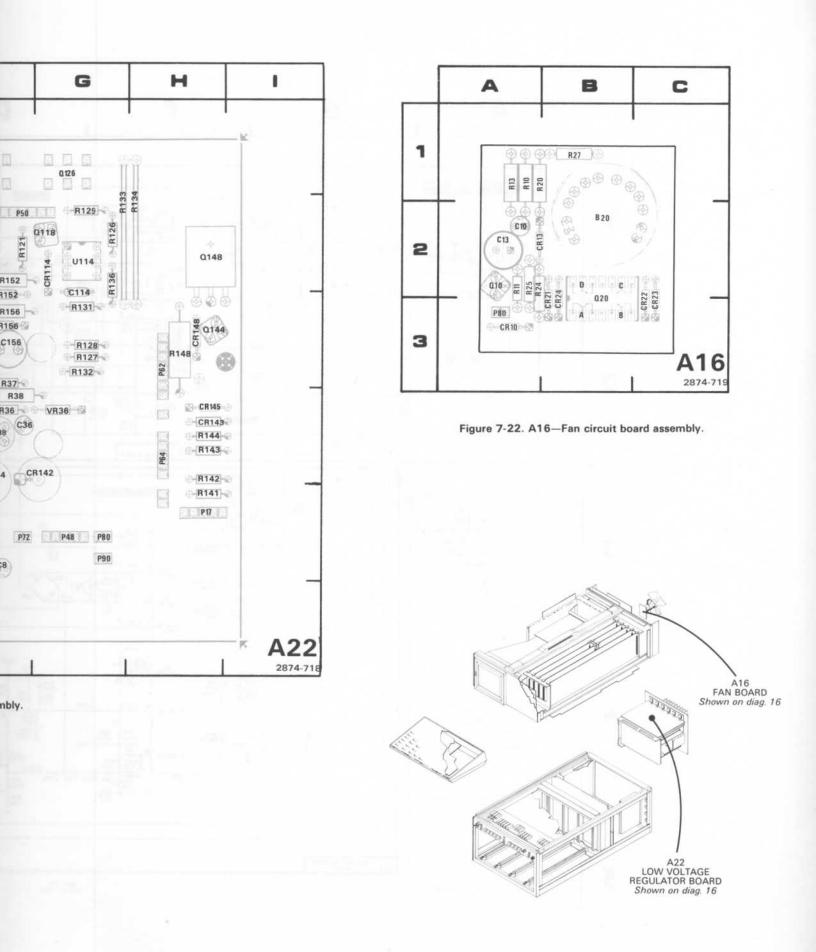
Figure 7-21. A22-Low Voltage circuit board assembly.

#### COMPONENT NUMBER EXAMPLE



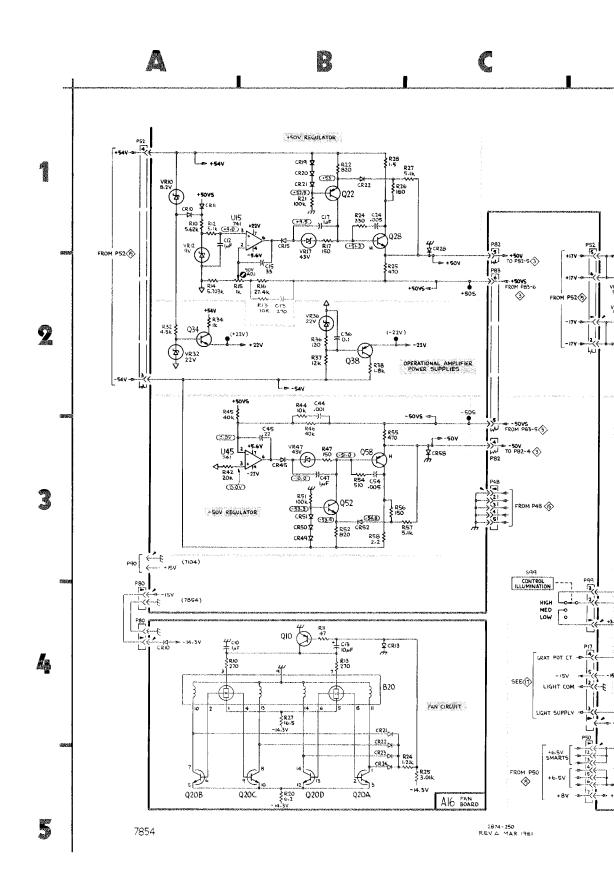
Chassis-mounted components have no Assembly Number prefix--see end of Replaceable Electrical Parts List.

Static Sensitive Devices See Maintenance Section

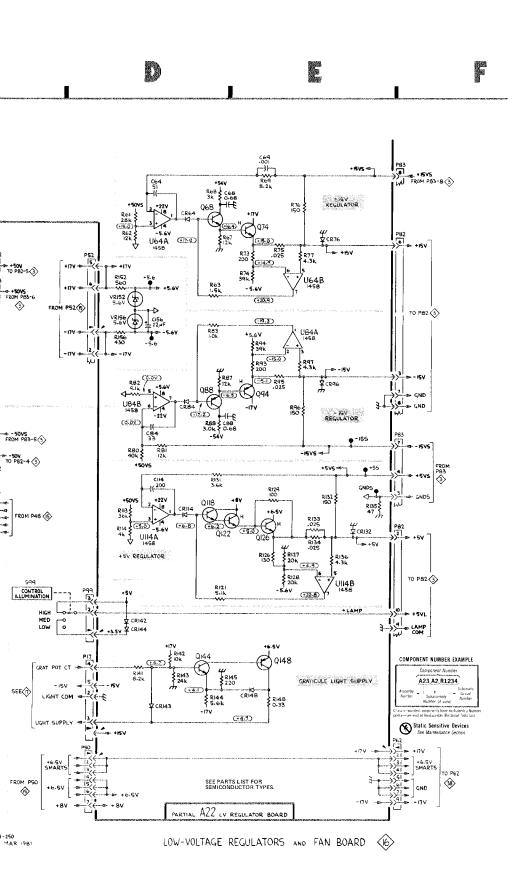


| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOAR     |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------|
| B20               | B4                | B2                | CR21<br>CR22      | B4                | B3                | Q20B              | A5                | В3                | R20               | B5                | A1       |
| C10               | A4                | A2                | CR22<br>CR23      | B4<br>B5          | C3<br>C3          | 020C<br>020D      | B5<br>B5          | B3                | R24               | C5                | A3       |
| C13               | B4                | A2                | CR23              | 85                | B3                | 0200              | BP                | B3                | R25<br>R27        | C5<br>84          | A2<br>B1 |
| 0.0               | 2.1               |                   | OTILT             | 20                | 55                | R10               | A4                | A1                | 827               | 64                | BI       |
| CR10              | A4                | A3                | Q10               | B4                | A2                | R11               | B4                | A2                |                   |                   |          |
| CR13              | В4                | A2                | Q20A              | B5                | B3                | R13               | B4                | A1                |                   |                   |          |
| ARTIAL            | A22 ASSY          | 1                 |                   |                   |                   |                   |                   |                   |                   |                   |          |
| CIRCUIT           | SCHEM             | BOARD             | CIRCUIT           | SCHEM             | BOARD             | CIRCUIT           | SCHEM             | BOARD             | CIRCUIT           | SCHEM             | BOAR     |
| NUMBER            | LOCATION          | LOCATION          | NUMBER            | LOCATION          | LOCATION          | NUMBER            | LOCATION          | LOCATION          | NUMBER            | LOCATION          | LOCATI   |
| C12               | A1                | C4                | P17               | D4                | H5                | R25               | B2                | C4                | R97               | E2                | E3       |
| C15<br>C17        | B2<br>B1          | C3                | P48               | C3                | G5                | R26               | B1                | C2                | R113              | D3                | D5       |
| C17               | B1                | C3<br>C2          | P50<br>P52        | D5<br>A1          | F2                | R27               | B1                | C2                | R114              | D3                | D5       |
| C36               | B2                | F4                | P52               | D2                | D1<br>D1          | R28<br>R32        | B1                | C2                | R121              | D3                | F2       |
| C44               | B2                | E4                | P62               | E5                | НЗ                | R32               | A2<br>A2          | D4                | R126              | E3                | G2       |
| C45               | B3                | D4                | P80               | A4                | G5                | R36               | B2                | D3<br>F4          | R127<br>R128      | E3<br>E3          | G3<br>G3 |
| C47               | 83                | E2                | P82               | C1                | 85                | R37               | B2<br>B2          | F4<br>F3          | R128              | E3                | G3<br>G2 |
| C54               | B3                | D2                | P82               | C3                | 85                | R38               | B2                | F4                | R125              | D3                | G2<br>G3 |
| C64               | D1                | 83                | P82               | E2                | 85                | B42               | A3                | E3                | R132              | E3                | G3       |
| C68               | D1                | B2                | P82               | E3                | 85                | R44               | B2                | E4                | R133              | E3                | G2       |
| C69               | E1                | 83                | P83               | C2                | E5                | R45               | A2                | C5                | R134              | E3                | H2       |
| C84               | D3                | E3                | P83               | E1                | E5                | R46               | B3                | C5                | R135              | E3                | F6       |
| C88               | D2                | F2                | P83               | E3                | E5                | R47               | B3                | D3                | R136              | E3                | G2       |
| C114              | D3                | G3                | P90               | A3                | G5                | R51               | B3                | D3                | R141              | D4                | H5       |
| C156              | D2                | F3                | P99               | D4                | F5                | R52               | B3                | D2                | R142              | D4                | H4       |
|                   |                   |                   |                   |                   |                   | R54               | 83                | D2                | R143              | D4                | H4       |
| CR10              | A1                | D5                | Q22               | B1                | C3                | R55               | B3                | D4                | R144              | D4                | H4       |
| CR11              | A1                | C4                | 028               | B1                | C1                | R56               | B3                | E2                | R145              | D4                | H4       |
| CR15              | B1                | C3                | Q34               | A2                | D3                | R57               | 83                | D2                | R148              | E4                | H3       |
| CR19<br>CR20      | B1                | C3<br>C3          | Q38               | B2                | F4                | R58               | B3                | D2                | R152              | D2                | F2       |
| CR20<br>CR21      | B1<br>B1          | C3                | Q52               | B3                | D2                | R61               | D1                | B6                | R156              | D2                | F3       |
| CR22              | B1                | C2                | Q58<br>Q68        | B3<br>D1          | D1                | R62               | D1                | B5                |                   |                   |          |
| CR28              | C1                | B4                | 074               | E1                | B1                | R63               | D2                | 82                | U15               | A1                | C4       |
| CR45              | B3                | D3                | Q88               | D2                | B1<br>E2          | R67<br>R68        | D1<br>D1          | B2                | U45               | A3                | D3       |
| CR49              | B3                | D2                | 094               | E2                | E1                | R69               | E1                | B2<br>B4          | U64A              | D1                | A3       |
| CR50              | B3                | D3                | 0118              | D3                | G2                | R73               | E1                | B4<br>B2          | U64B<br>U84A      | E2<br>E2          | A3<br>E3 |
| CR51              | B3                | D2                | 0122              | D3                | F1                | R74               | E2                | 83                | U84A<br>U84B      | D2                | E3<br>E3 |
| CR52              | B3                | D2                | Q126              | E3                | G1                | R75               | E1                | B3                | U114A             | D2<br>D3          | G2       |
| CR58              | C3                | 85                | 0144              | D4                | H3                | R76               | E1                | 84                | U114B             | E3                | G2       |
| CR64              | D1                | B2                | Q148              | E4                | H2                | R77               | E1                | B3                |                   |                   | OF       |
| CR76              | E1                | B5                |                   |                   |                   | R80               | D3                | D5                | VR10              | A1                | D4       |
| CR84              | D2                | E2                | R10               | A1                | D4                | R81               | D3                | D5                | VR12              | A1                | D4       |
| CR96              | E2                | B5                | R12               | A1                | D4                | R82               | D2                | E3                | VR17              | B1                | C3       |
| CR114             | D3                | G2                | R14               | A2                | C5                | R83               | D2                | E3                | VR32              | A2                | D4       |
| CR132             | E3                | B5                | R15               | A2                | C5                | R87               | D2                | E2                | VR36              | B2                | G4       |
| CR142             | D4                | G4                | R16               | B2                | C5                | R88               | D2                | E2                | VR47              | B3                | D3       |
| CR143             | D4                | H4                | R17               | B1                | C3                | R93               | E2                | E2                | VR152             | D2                | F3       |
| CR144             | D4                | F4                | R21               | B1                | C3                | R94               | E2                | F2                | VR156             | D2                | F3       |
| CR148             | E4                | H3                | R22               | B1                | C2                | R95               | E2                | E3                |                   |                   |          |
|                   |                   |                   | R24               | B1                | C2                | R96               | E2                | E4                |                   |                   |          |

# LOW-VOLTAGE REGULATOR AND FAN BOARD DIAGRAM 16



Low Voltage Regulators and Fan Board



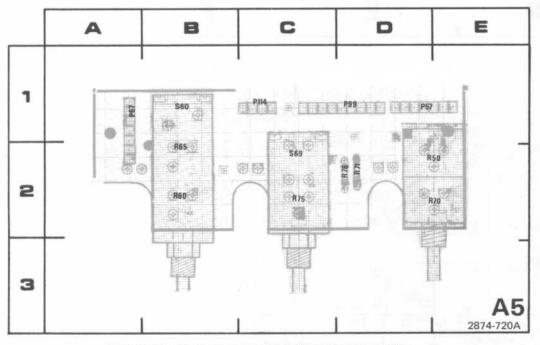
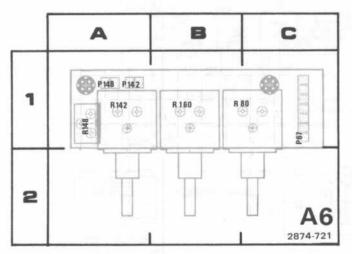
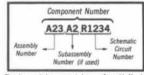


Figure 7-23. A5-Intensity Control circuit board assembly.





### COMPONENT NUMBER EXAMPLE



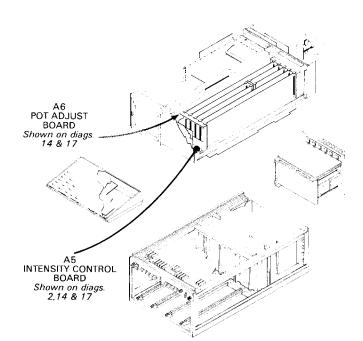
Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

Static Sensitive Devices See Maintenance Section

REV J

## FRONT-PANEL CONTROLS DIAGRAM 17

| PARTIAL                                                                                                                  | A5 ASSY                                                                                            | CONTRACT PROPERTY of A statements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| CIRCUIT                                                                                                                  | SCHEM                                                                                              | BOARD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| NUMBER                                                                                                                   | LOCATION                                                                                           | LOCATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
|                                                                                                                          |                                                                                                    | and an                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| P57                                                                                                                      | F2                                                                                                 | D1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| P67                                                                                                                      | D4                                                                                                 | A1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| P99                                                                                                                      | C5                                                                                                 | D1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| P99                                                                                                                      | E3                                                                                                 | D1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| R50                                                                                                                      | F5                                                                                                 | D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| R60                                                                                                                      | C2                                                                                                 | B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| R65                                                                                                                      | C3                                                                                                 | В2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| R70                                                                                                                      | C3                                                                                                 | D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| R71                                                                                                                      | D3                                                                                                 | D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| 875                                                                                                                      | C4                                                                                                 | C2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| R76                                                                                                                      | D4                                                                                                 | D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| S60                                                                                                                      | D2                                                                                                 | B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| S69                                                                                                                      | D3                                                                                                 | C2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| **************************************                                                                                   | A6 ASSY                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|                                                                                                                          |                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|                                                                                                                          | SCHEM                                                                                              | BOARD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| CIRCUIT<br>NUMBER                                                                                                        | SCHEM<br>LOCATION                                                                                  | BOARD<br>LOCATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| CIRCUIT<br>NUMBER<br>P67                                                                                                 | SCHEM<br>LOCATION<br>D4                                                                            | BOARD<br>LOCATION<br>C1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| P67<br>P67                                                                                                               | D4<br>E4                                                                                           | C1<br>C1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| P67                                                                                                                      | D4                                                                                                 | C1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| P67<br>P67                                                                                                               | D4<br>E4                                                                                           | C1<br>C1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| P67<br>P67<br>P142                                                                                                       | D4<br>E4<br>E5                                                                                     | C1<br>C1<br>A1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| P67<br>P67<br>P142<br>R80                                                                                                | D4<br>E4<br>E5<br>E4                                                                               | C1<br>C1<br>A1<br>B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| P67<br>P67<br>P142<br>R80<br>R142<br>R160<br>Partial A6 A                                                                | D4<br>E4<br>E5<br>E4<br>E5<br>E5<br>SSY also sho                                                   | C1<br>C1<br>A1<br>B1<br>A1<br>B1<br>wn on diagra                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| P67<br>P67<br>P142<br>R80<br>R142<br>R160<br>Partial A6 A                                                                | D4<br>E4<br>E5<br>E4<br>E5<br>E5                                                                   | C1<br>C1<br>A1<br>B1<br>A1<br>B1<br>wn on diagra                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| P67<br>P67<br>P142<br>R80<br>R142<br>R160<br>Partial A6 A<br>CHASSIS                                                     | D4<br>E4<br>E5<br>E5<br>SSY also sho<br>MOUNTEL<br>SCHEM<br>LOCATION                               | C1<br>C1<br>A1<br>B1<br>A1<br>B1<br>wn on diagra                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| P67<br>P67<br>P142<br>R80<br>R142<br>R160<br>Partial A6 A<br>CHASSIS<br>CIRCUIT                                          | D4<br>E4<br>E5<br>E5<br>E5<br>SSY also sho<br>MOUNTEE                                              | C1<br>C1<br>A1<br>B1<br>A1<br>B1<br>Wrn on diagra                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| P67<br>P67<br>P142<br>R80<br>R142<br>R160<br>Partial A6 A<br>CHASSIS<br>CIRCUIT<br>NUMBER                                | D4<br>E4<br>E5<br>E5<br>SSY also sho<br>MOUNTED<br>SCHEM<br>LOCATION                               | C1<br>C1<br>A1<br>B1<br>A1<br>B1<br>What is in the second seco |  |
| P67<br>P67<br>P142<br>R80<br>R142<br>R160<br>Partial A6 A<br>CHASSIS<br>CIRCUIT<br>NUMBER<br>DS42                        | D4<br>E4<br>E5<br>E5<br>SSY also sho<br>MOUNTEE<br>SCHEM<br>LOCATION<br>E1                         | C1<br>C1<br>A1<br>B1<br>A1<br>B1<br>When on diagras                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| P67<br>P67<br>P142<br>R80<br>R142<br>R160<br>Partial A6 A<br>CHASSIS<br>CIRCUIT<br>NUMBER<br>DS42<br>DS43                | D4<br>E4<br>E5<br>E5<br>SSY also sho<br>MOUNTED<br>SCHEM<br>LOCATION<br>E1<br>E1                   | C1<br>C1<br>A1<br>B1<br>A1<br>B1<br>What is in the second seco |  |
| P67<br>P67<br>P142<br>R80<br>R142<br>R160<br>Partial A6 A<br>CHASSIS<br>CIRCUIT<br>NUMBER<br>DS42<br>DS43<br>DS44        | D4<br>E4<br>E5<br>E5<br>SSY also sho<br>MOUNTEE<br>SCHEM<br>LOCATION<br>E1<br>E1<br>E1<br>E1       | C1<br>C1<br>A1<br>B1<br>A1<br>B1<br>What is in the second seco |  |
| P67<br>P67<br>P142<br>R80<br>R142<br>R160<br>Partial A6 A<br>CHASSIS<br>CIRCUIT<br>NUMBER<br>DS42<br>DS43<br>DS44<br>P17 | D4<br>E4<br>E5<br>E5<br>SSY also sho<br>MOUNTED<br>SCHEM<br>LOCATION<br>E1<br>E1<br>E1<br>E1<br>D1 | C1<br>C1<br>A1<br>B1<br>A1<br>B1<br>OPARTS<br>BOARD<br>LOCATION<br>CHASSIS<br>CHASSIS<br>CHASSIS<br>CHASSIS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| P67<br>P67<br>P142<br>R80<br>R142<br>R160<br>Partial A6 A<br>CHASSIS<br>CIRCUIT<br>NUMBER<br>DS42<br>DS43<br>DS44<br>P17 | D4<br>E4<br>E5<br>E5<br>SSY also sho<br>MOUNTED<br>SCHEM<br>LOCATION<br>E1<br>E1<br>E1<br>E1<br>D1 | C1<br>C1<br>A1<br>B1<br>A1<br>B1<br>OPARTS<br>BOARD<br>LOCATION<br>CHASSIS<br>CHASSIS<br>CHASSIS<br>CHASSIS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |



#### VOLTAGE CONDITIONS

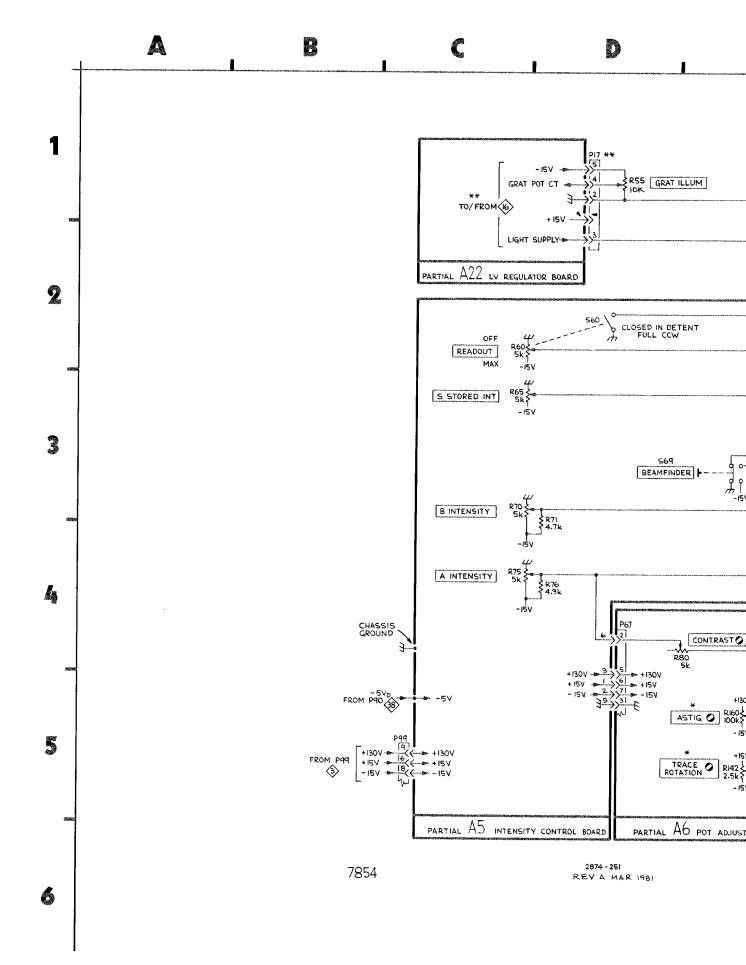
The voltages shown were taken with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B); READOUT INTENSITY (OFF). No plug-in units were installed.

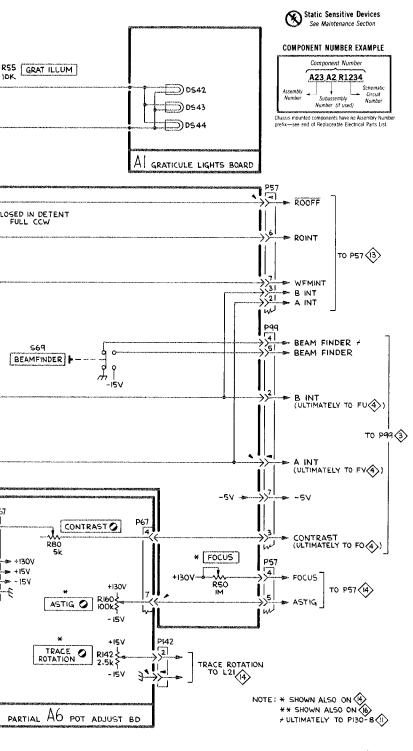
Voltage Conditions. The voltages on the diagram were taken using a digital multimeter with a 10 M $\Omega$  input impedance (Tektronix DM 501 Digital Multimeter installed in a TM 501 Power Module or a Tektronix 7D13 Digital Multimeter used with a readout-equipped 7000-Series Oscilloscope).



Digitally signed by http://www.aa4df.com

Signature Not Verified





FRONT-PANEL CONTROLS

G

R 1981

Control

Reverse Side

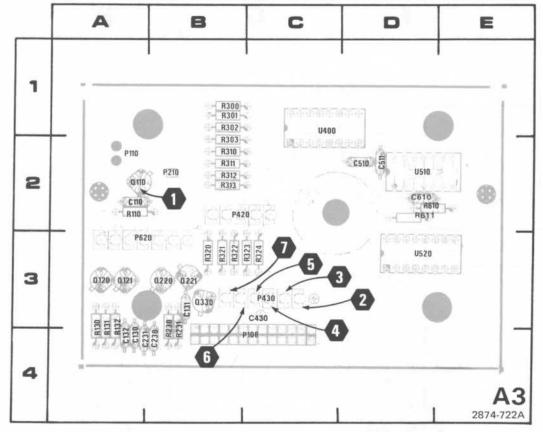
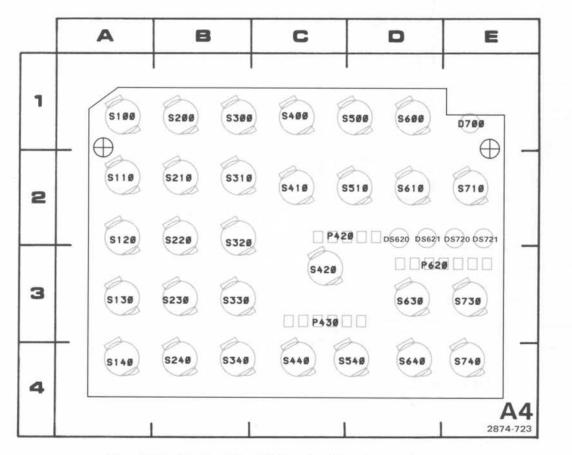


Figure 7-25. A3—Front Panel Keyboard Electronics circuit board assembly.







Chassis-mounted components have no Assem prefix —see end of Replaceable Electrical P

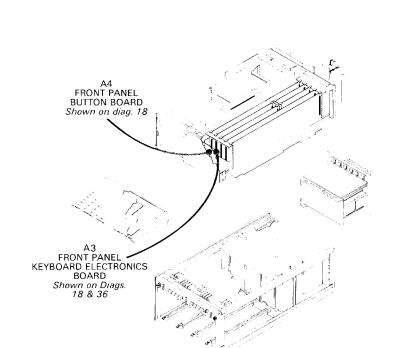
## FRONT-PANEL KEYBOARD DIAGRAM 18

| PARTIAL               | A3 ASSY  |          |         |          |            |
|-----------------------|----------|----------|---------|----------|------------|
| CIRCUIT               | SCHEM    | BOARD    | CIRCUIT | SCHEM    | BOARD      |
| NUMBER                |          |          | NUMBER  |          | LOCATION   |
| NONDER                | LOCATION | LOCATION | NONDEN  | LOCATION | LOCATION   |
| C110                  | 83       | A2       | 0330    | В2       | B3         |
| C130                  | A2       | A4       |         |          |            |
| C131                  | A2       | B3       | R110    | A3       | A2         |
| C132                  | A2       | A4       | R130    | C2       | A4         |
| C230                  | A2       | B4       | R131    | C2       | A4         |
| C231                  | A2       | A4       | R132    | 82       | A4         |
| C430*                 | A2       | C3       | R230    | B2       | B4         |
| C510                  | A3       | D2       | R231    | B2       | B4         |
| C511                  | G2       | D2       | R300    | F1       | B1         |
| C610                  | B3       | D2       | R301    | F1       | B1         |
| L\$520                | B3       | D2       | R302    | F2       | B1         |
| 1.3520                | БЭ       | 02       | R303    | F2       | B2         |
| P108                  | A2       | C4       | R310    | F3       | B2         |
| P108                  | C3       | C4       | R311    | F3       | B2         |
| P108                  | ₹4       | C4       | R312    | F2       | <b>B</b> 2 |
| P108                  | G2       | C4       | R313    | F2       | B2         |
| P210                  | A3       | 82       | R320    | B2       | B3         |
| P420                  | F2       | B2       | R321    | B2       | B3         |
| P430                  | D3       | C3       | R322    | B2       | 83         |
| P620                  | B1       | A3       | R323    | C2       | C3         |
| P620                  | B2       | A3       | R324    | C2       | C3         |
| P620                  | F1       | A3       | R610    | G2       | D2         |
|                       |          |          | R611    | G2       | E2         |
| Q110                  | В3       | A2       |         |          |            |
| Q120                  | C2       | A3       | U400    | F1       | C1         |
| Q121                  | C2       | A3       | U510C   | G2       | D2         |
| 0220                  | B2       | B3       | U51-0D  | G2       | D2         |
| Q221                  | B2       | 83       | U520    | С3       | D3         |
| CONTRACTORY STOCKARDS |          |          | L       |          |            |

Partial A3 ASSY also shown on diagram 36.

| A4 | ASSY |
|----|------|
|----|------|

| A4 A331           |                   |                   |                   |                   |                   |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION |
| DS620<br>DS621    | B1<br>B1          | D2<br>D2          | \$320<br>\$330    | D2<br>E2          | B2<br>B3          |
| DS700             | C1<br>B1          | D1<br>E2          | \$340             | E2                | 84                |
| DS720<br>DS721    | C1                | E2<br>E2          | \$400<br>\$410    | E2<br>E1          | C1<br>C2          |
| S100              | D3                | A1                | S420<br>S440      | C2<br>E1          | C3<br>C4          |
| S110<br>S120      | D2<br>D2          | A2<br>A2          | S500<br>S510      | E2<br>E1          | D1<br>D2          |
| S130              | E2                | A3                | S540              | E1                | D4                |
| S140<br>S200      | E2<br>D3          | A4<br>B1          | S600<br>S610      | E3<br>C3          | D1<br>D2          |
| S210<br>S220      | D2<br>D2          | B2<br>B2          | S630<br>S640      | C1<br>C2          | D3<br>D4          |
| \$230             | E2<br>E2          | B3<br>B4          | \$710             | E3                | E2                |
| \$240<br>\$300    | E3                | B1                | \$730<br>\$740    | C1<br>C2          | E3<br>E4          |
| S310              | D2                | B2                |                   |                   |                   |



\*See Parts List for serial number ranges.

Static Sensitive Devices See Maintenance Section

## COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

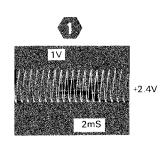
**REV JAN 1982** 

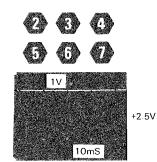
### VOLTAGE AND WAVEFORM CONDITIONS

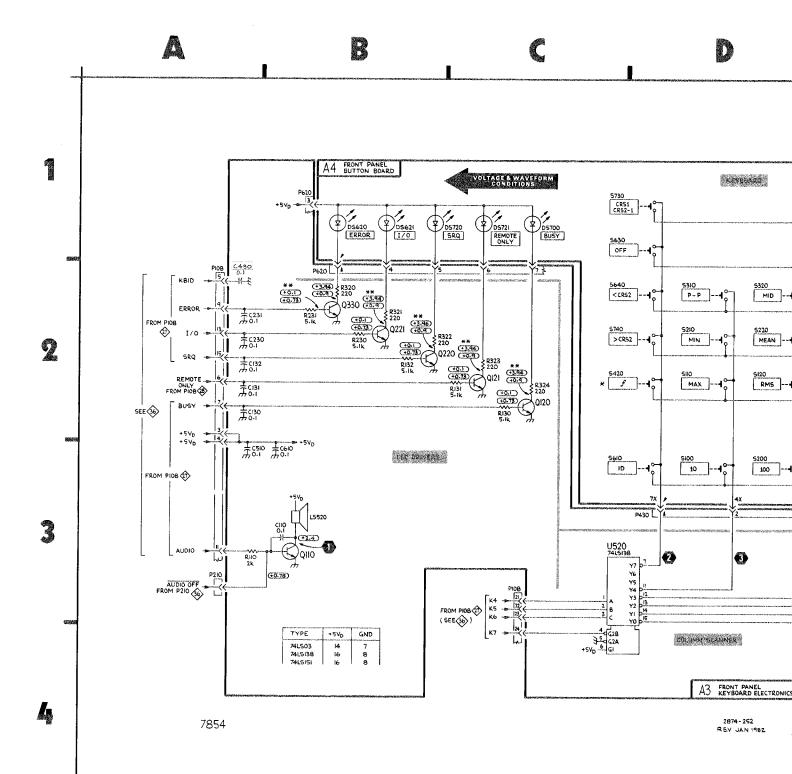
The voltages and waveforms shown were obtained with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B); READOUT INTENSITY (OFF).

**Voltage Conditions.** The voltages were taken with a digital multimeter with a 10 M $\Omega$  input impedance (Tektronix DM 501 Digital Multimeter installed in a TM 501 Power Module or Tektronix 7D13 Digital Multimeter used with a readout-equipped 7000-Series Oscilloscope).

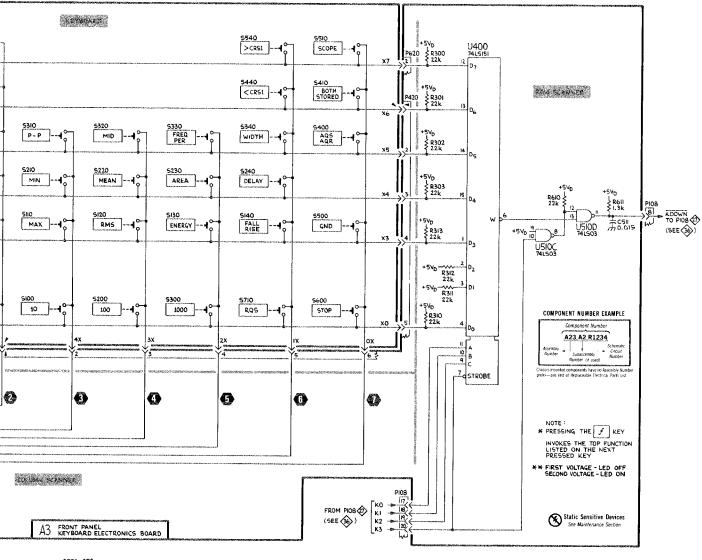
Waveform Conditions. The waveforms shown below were obtained using a test oscilloscope system with 10 M $\Omega$  input impedance, at least 60 MHz bandwidth and 10X probe (Tektronix 7603 Oscilloscope, 7B92 Time Base, 7A13 Differential Comparator and P6063A Probe).











FRONT-PANEL KEYBOARD

Front Panel Keyboard

Reverse Side

2874-252 REV JAN 1982

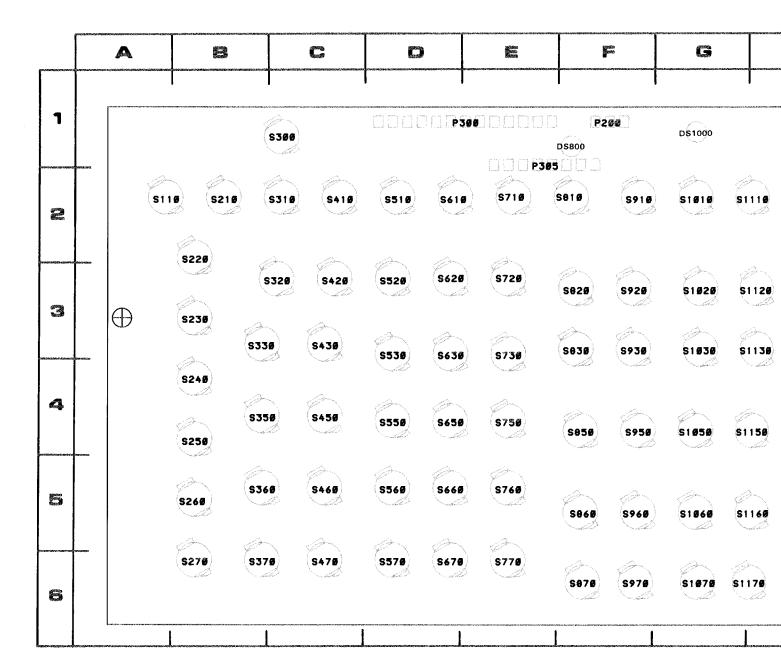
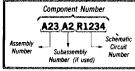


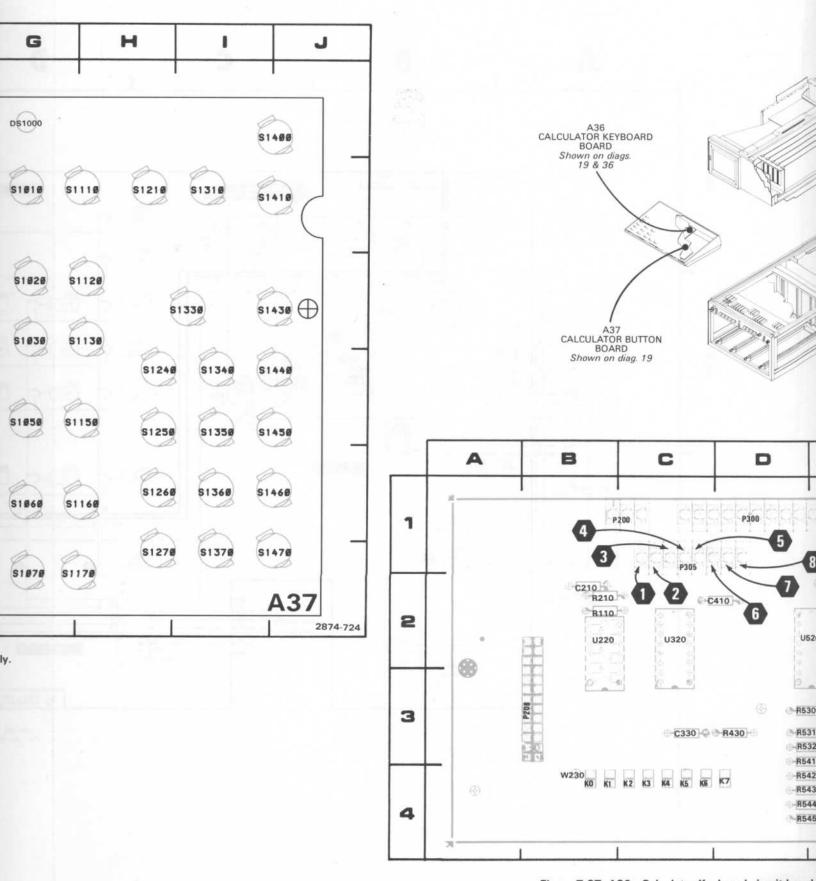
Figure 7-28. A37-Calculator Button circuit board assembly.



COMPONENT NUMBER EXAMPLE

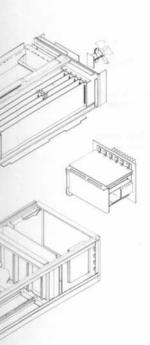


Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.



REV A MAR 1981

Figure 7-27. A36—Calculator Keyboard circuit board

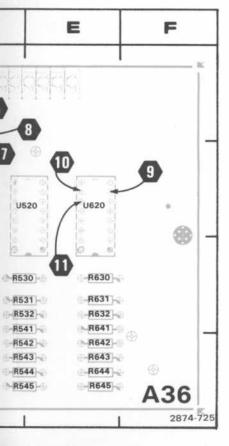




| CIRCUIT | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD |
|---------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------|
| C210    | B3                | B2                | R531              | G2                | E3                | R644              | G2                | E4    |
| C330    | B3                | C3                | R532              | G2                | E3                | R645              | G2                | E4    |
| C410    | B3                | D2                | R541              | G2                | E3                |                   |                   |       |
|         |                   |                   | R542              | G1                | E4                | U220A             | G2                | B2    |
| P200    | C2                | C1                | R543              | G1                | E4                | U220B             | H1                | B2    |
| P208    | B2                | 83                | R544              | G1                | E4                | U220D             | 83                | B2    |
| P300    | G1                | D1                | R545              | G1                | E4                | U220E             | B2                | B2    |
| P305    | D4                | C1                | R630              | G3                | E3                | U220F             | 84                | B2    |
|         |                   |                   | R631              | G3                | E3                | U320              | D4                | C2    |
| R110    | C3                | B2                | R632              | G3                | E3                | U520              | G1                | E2    |
| R210    | C2                | B2                | R641              | G3                | E3                | U620              | G4                | E2    |
| R430    | G2                | D3                | R642              | G3                | E4                |                   |                   |       |
| R530    | G1                | E3                | R643              | G3                | E4                | W230              | B4                | B4    |

Partial A36 ASSY also shown on diagram 36.

| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| DS800             | C2                | F1                | S530              | E3                | D3                | S1030             | E2                | G3                |
| DS1000            | C3                | G1                | S550              | E3                | D4                | S1050             | E2                | G4                |
|                   |                   |                   | S560              | E3                | D5                | S1060             | D2                | G5                |
| P200              | C2                | F1                | S570              | F3                | D6                | S1070             | D3                | G6                |
| P300              | G1                | E1                | S610              | D2                | D2                | S1110             | F3                | H2                |
| P305              | D4                | E2                | S620              | E3                | D3                | S1120             | E2                | H3                |
|                   |                   |                   | S630              | E3                | D3                | S1130             | E2                | H3                |
| S110              | D3                | A2                | S650              | E3                | D4                | S1150             | E2                | H4                |
| S210              | D3                | B2                | S660              | E3                | D5                | S1160             | D2                | H5                |
| S220              | E3                | B2                | S670              | F3                | D6                | S1170             | D3                | H6                |
| S230              | F3                | B3                | S710              | D2                | E2                | S1210             | F2                | H2                |
| S240              | E3                | B4                | S720              | E2                | E3                | S1240             | E1                | H4                |
| \$250             | D1                | 84                | S730              | E3                | E3                | S1250             | E1                | H4                |
| S260              | D1                | 85                | S750              | E3                | E4                | S1260             | F1                | H5                |
| S270              | E1                | B6                | S760              | E3                | E5                | S1270             | F1                | H6                |
| S300              | F1                | C1                | S770              | F3                | E6                | \$1310            | F2                | 12                |
| \$310             | D3                | C2                | S810              | F3                | F2                | S1330             | D3                | 13                |
| S320              | E3                | C3                | S820              | E2                | F3                | S1340             | E1                | 14                |
| S330              | E1                | B3                | S830              | E2                | F3                | S1350             | E1                | 14                |
| S350              | E1                | 84                | S850              | E2                | F4                | \$1360            | F1                | 15                |
| S360              | F1                | 85                | S860              | E2                | F5                | S1370             | F1                | 06                |
| S370              | F1                | B6                | S870              | F2                | F6                | S1400             | D1                | J1                |
| S410              | D3                | C2                | S910              | F3                | F2                | S1410             | D1                | J2                |
| S420              | E3                | C3                | S920              | E2                | F3                | S1430             | D1                | J3                |
| S430              | E3                | C3                | 5930              | E1                | F3                | S1440             | E1                | 14                |
| S450              | E3                | C4                | S950              | E2                | F4                | S1450             | E1                | J4                |
| S460              | E3                | C5                | S960              | E2                | F5                | S1460             | F1                | J5                |
| S470              | F3                | C6                | \$970             | F2                | F6                | S1470             | F1                | J6                |
| S510              | D3                | D2                | S1010             | F3                | G2                | 10000             |                   | 100100            |
| S520              | E3                | D3                | S1020             | E2                | G3                |                   |                   |                   |



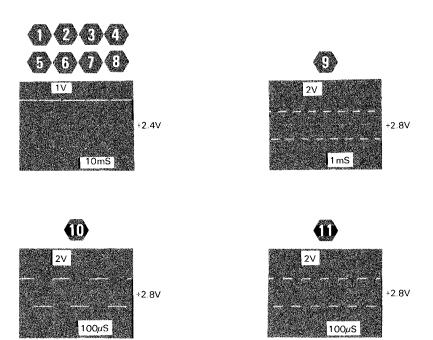
board assembly.

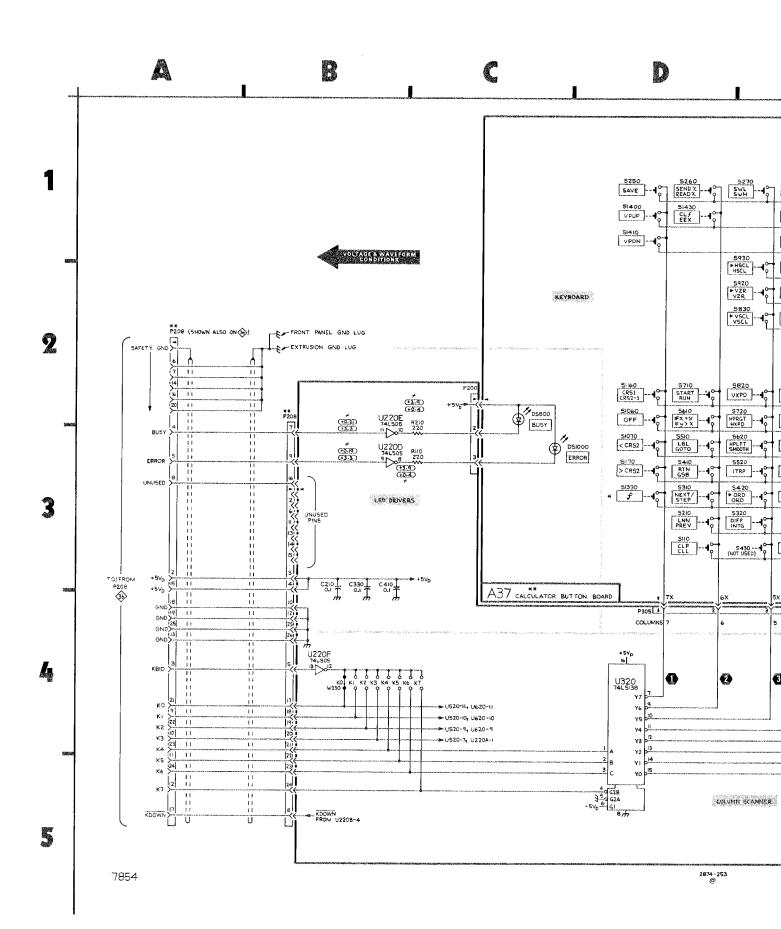
#### **VOLTAGE AND WAVEFORM CONDITIONS**

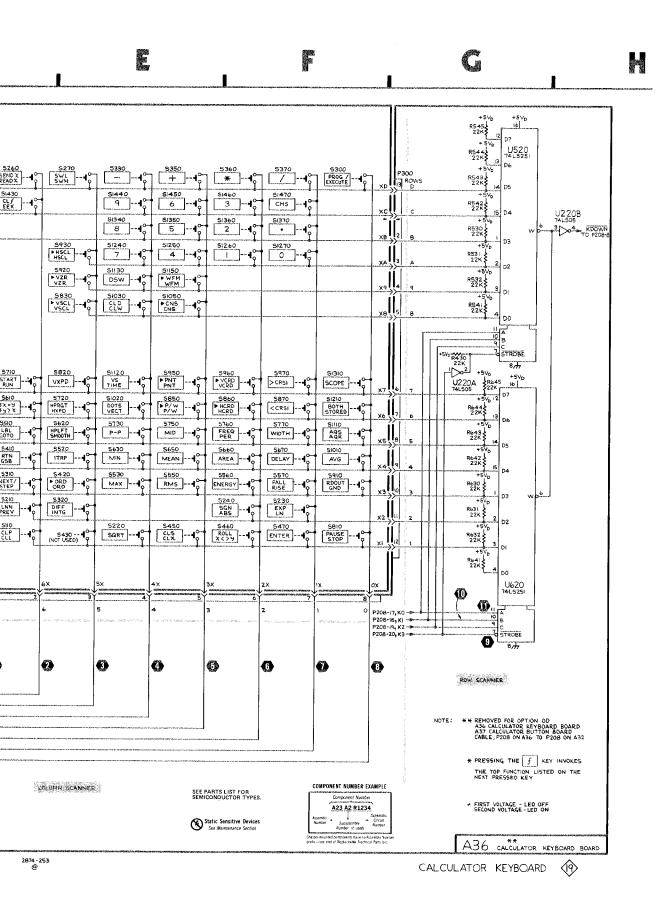
The voltages and waveforms shown were obtained with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B); READOUT INTENSITY (OFF).

Voltage Conditions. The voltages were taken with a digital multimeter with a 10 M $\Omega$  input impedance (Tektronix DM 501 Digital Multimeter installed in a TM 501 Power Module or Tektronix 7D13 Digital Multimeter used with a readout-equipped 7000-Series Oscilloscope.

Waveform Conditions. The waveforms shown below were obtained using a test oscilloscope system with 10 M $\Omega$  input impedance, at least 60 MHz bandwidth and 10X probe (Tektronix 7603 Oscilloscope, 7B92 Time Base, 7A13 Differential Comparator and P6063A Probe).







Calculator Keyboard

Reverse Side A25 7854

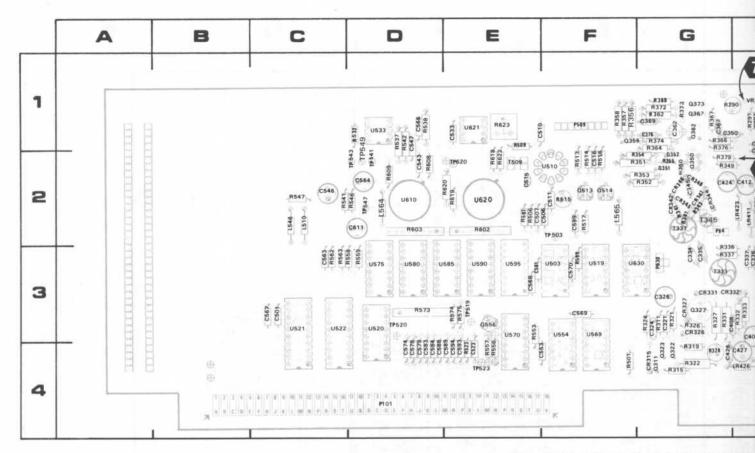


Figure 7-29. A25-Digitizer circuit board assem

Static Sensitive Devices See Maintenance Section

COMPONENT NUMBER EXAMPLE

|                    | Component Numbe                 | r                              |
|--------------------|---------------------------------|--------------------------------|
|                    | A23 A2 R1234                    | <u>1</u>                       |
| Assembly<br>Number | Subassembly<br>Number (if used) | Schematic<br>Circuit<br>Number |

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

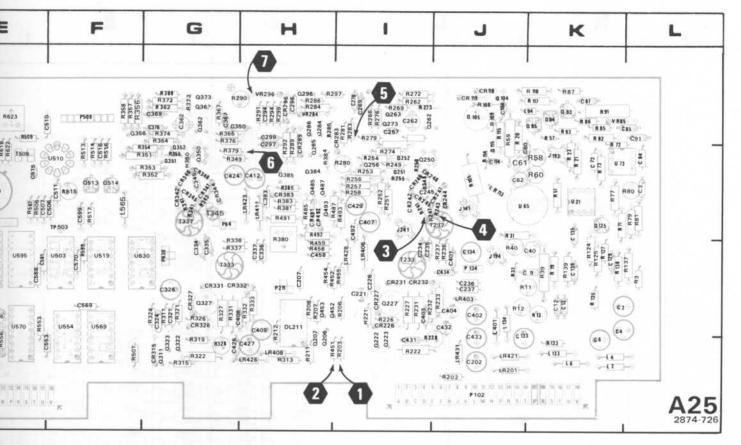
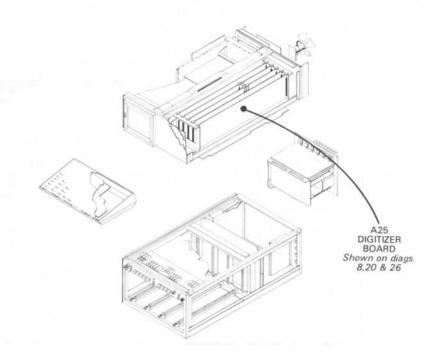


Figure 7-29. A25-Digitizer circuit board assembly.



# VERTICAL AND HORIZONTAL SAMPLER DIAGRAM 20

| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD    | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARI    |
|-------------------|-------------------|-------------------|-------------------|-------------------|----------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------|
| C202              | A1                | J4                | C434              | В5                | J3       | Q206              | A1                | H4                | R233              | C1                | J3                | R333              | C3                | Н3       |
| C207              | B1                | H3                | C458              | G5                | H3       | Q207              | B1                | H4                | R236              | D1                | J3                | R336              | D3                | G3       |
| C221              | B1                | 13                | C492              | G5                | 12       | Q222              | B1                | 14                | R237              | D1                | J3                | R337              | D3                | G3       |
| C226              | C1                | 13                |                   |                   |          | Q223              | C1                | 14                | R240              | E1                | *                 | R340              | E3                | *        |
| C234              | D1                | 13                | CR226             | C1                | 13       | Q227              | C1                | 13                | R241              | D1                | 12                | R341              | D3                | G2       |
| C235              | D1                | 13                | CR227             | C1                | 13       | Q250A             | E1                | 12                | R243              | D2                | J2                | R343              | D3                | G2       |
| C236              | D1                | J3                | CR231             | C1                | 13       | Q250B             | F1                | 12                | R244              | E2                | *                 | R344              | E3                | *        |
| C237              | D1                | J3                | CR232             | C1                | 13       | Q251              | E2                | 12                | R245              | D1                | •                 | R345              | D3                | ,        |
| C240              | E1                | *                 | CR242             | E1                | 12       | Q252              | E2                | 12                | R246              | D1                | •                 | R347              | D3                | G2       |
| C244              | E2                | *                 | CR244             | E2                | J2       | Q256              | F2                | 12                | R247              | D1                | 12                | R349              | E3                | G2       |
| C245              | E1                | 12                | CR245             | E3                | 12       | 0262A             | F2                | 11                | R248              | E1                | 12                | R350              | E3                | G2<br>F2 |
| C246              | D1                |                   | CR245             | E1                | 12       | Q262B             | F2                | 11                | R249              | E1                | 12                | R351<br>R352      | E4<br>E4          | F∠<br>G2 |
| C249              | E1                |                   | CR245             | E3                | 12       | Q263              | F2                | 11                | R251<br>R252      | E2<br>E2          | 12<br>12          | R352              | E4                | G2       |
| C250              | E1<br>E2          | 11                | CR246<br>CR247    | E1<br>E1          | 12<br>J2 | Q273<br>Q284      | F2<br>F2          | 11<br>H1          | R252<br>R253      | E2<br>E2          | 12                | R353              | E4                | F2       |
| C262<br>C264      | E2<br>E2          |                   | CR247<br>CR248    | E1                | J2<br>12 | 0284<br>0285A     | F2<br>F2          | H1<br>H2          | R253<br>R254      | E2                | 12                | R354<br>R355      | E4                | G2       |
| C264<br>C267      | E2<br>F2          | 11                | CR248<br>CR283    | F2                | 12       | 0285A<br>0285B    | G2                | H2<br>H2          | R254<br>R255      | E2                | 12                | R356              | E4                | F1       |
| C267<br>C269      | F2<br>F2          | 11                | CR283<br>CR289    | G2                | H2       | Q285B             | G2<br>G2          | H2<br>H1          | R255              | F2                | 12                | R357              | F4                | F1       |
| C209              | F2                | 11                | CR296             | G2                | H1       | Q296              | H1                | H1                | R257              | F2                | 12                | R358              | F4                | F1       |
| C294              | G2                | H1                | CR315             | B3                | G4       | Q230              | B3                | G4                | R258              | F2                | 12                | R362              | F3                | G1       |
| C294              | G2<br>G2          | H1                | CR326             | C3                | G3       | 0322              | B3                | G3                | R262              | F1                | 11                | R364              | F3                | G1       |
| C297              | H1                | H1                | CR327             | C3                | G3       | 0323              | C3                | G4                | R264              | F2                | •                 | R366              | F3                | G1       |
| C299              | H1                | H1                | CR331             | C3                | G3       | 0327              | C3                | G3                | R266              | F1                | (1                | R367              | F4                | G1       |
| C321              | B3                | G3                | CR332             | C3                | G3       | 0350A             | E3                | G1                | R267              | F2                | •                 | R369              | F3                | G1       |
| C324              | B5                | G3                | CR342             | E3                | G2       | Q350B             | F3                | G1                | R269              | F2                | 11                | R372              | F4                | G1       |
| C326              | C3                | G3                | CR344             | E3                | G2       | Q351              | E4                | G2                | R272              | F2                | 11                | R373              | F4                | G1       |
| C334              | D3                | G3                | CR345             | E3                | G2       | Q352              | E4                | G2                | R273              | F2                | 11                | R374              | F4                | G1       |
| C335              | D3                | G3                | CR346             | E3                | G2       | Q356              | F4                | F1                | R274              | F2                | 12                | R376              | F4                | G1       |
| C336              | D3                | G3                | CR347             | E3                | G2       | Q362A             | F3                | G1                | R276              | F2                | 11                | R379              | F4                | G2       |
| C337              | D3                | Н3                | CR348             | E3                | G2       | Q362B             | F4                | G1                | R279              | F2                | 11                | R380              | F4                | нз       |
| C340              | E3                | •                 | CR383             | F4                | H2       | Q363              | F3                | G1                | R280              | F2                | 12                | R381              | F4                | H2       |
| C344              | E3                | •                 | CR491             | G5                | H2       | Q373              | F4                | G1                | R281              | F2                | 11                | R383              | F4                | H2       |
| C345              | E3                | G2                | CR492             | G5                | H2       | Q384              | F4                | H2                | R283              | F2                | 11                | R384              | G4                | H2       |
| C349              | E3                | •                 |                   |                   |          | Q385A             | F4                | H2                | R284              | G2                | H1                | R385              | F4                | H2       |
| C350              | E3                | G1                | DL211             | B2                | H3       | Q385B             | G4                | H2                | R285              | F2                | H1                | R451              | F4                | H4       |
| C362              | F4                | G1                |                   |                   |          | Q452              | F4                | H3                | R286              | G2                | H1                | R452              | G4                | H3       |
| C367              | F4                | G1                | L401              | C4                | J3       | Q453              | G4                | H3                | R289              | G2                | H2                | R454              | G4                | H3       |
| C369              | F4                | G1                |                   |                   |          | Q485              | G4                | H2                | R290              | G2                | G1                | R455              | G4                | 13       |
| C376              | F4                | G1                | LR201             | A1                | J4       | Q487              | G4                | H2                | R291              | G2                | H1                | R458              | G5                | H3       |
| C383              | F4                | H2                | LR403             | C4                | J3       | Q493              | G5                | H2                | R292              | G2                | H2                | R459              | G5                | H3<br>H2 |
| C401              | C4                | J3                | LR406             | C4                | 13       | 0.202             |                   | 14                | R294<br>R297      | G2<br>G2          | F2<br>H1          | R485<br>R487      | G4<br>F4          | HZ<br>H2 |
| C402              | C4<br>C4          | 13<br>13          | LR408<br>LR411    | C4<br>C5          | H4<br>H2 | R202<br>R203      | A1<br>A1          | J4<br>14          | R297<br>R299      | GZ<br>H1          | H1                | R487<br>R491      | F4<br>G5          | HZ<br>H2 |
| C403<br>C404      | C4<br>C4          | 13<br>J3          | LR411<br>LR421    | C5<br>A4          | HZ<br>J4 | R203<br>R206      | A1<br>B1          | 14<br>13          | R299<br>R311      | B3                | G3                | R491<br>R492      | G5<br>G5          | H2<br>H3 |
| C404<br>C407      | C4                | 12                | LR421<br>LR423    | A4<br>A4          | J4<br>H2 | R206<br>R207      | B1                | H3                | R313              | B3                | H4                | R492              | G5<br>G5          | 12       |
| C407              | C4<br>C4          | G3                | LR425             | A4<br>A4          | H4       | R207              | B1                | H3                | R315              | B4                | G4                |                   | 20                | ••-      |
| C408              | C4<br>C4          | H3                | LR428             | A4<br>A5          | 13       | R211              | 82                | H3<br>H4          | R319              | B3                | G4                | T233              | C1                | 13       |
| C403              | C5                | H2                | LR431             | A5                | ,3<br>J4 | R212              | B2                | H3                | R321              | B3                | G3                | T237              | D1                | 12       |
| C424              | A4                | G2                | L                 |                   | 0.       | R221              | B1                | 13                | R322              | B3                | G4                | T333              | C3                | G3       |
| C426              | A4                | G4                | P64               | A3                | G2       | R222              | B1                | 14                | R324              | B5                | G3                | T337              | D3                | G2       |
| C427              | B4                | H4                | P102              | A1                | J4       | R226              | C1                | 13                | R326              | C3                | G3                | T345              | A3                | G2       |
| C429              | A4                | 12                | P102              | A4                | J4       | R227              | C1                | 13                | R327              | C3                | G3                |                   |                   |          |
| C431              | A5                | 14                | P102              | H5                | J4       | R228              | C1                | 14                | R328              | C3                | G4                | VR284             | G2                | H1       |
| C432              | В5                | J3                | P211              | B3                | H3       | R231              | C1                | 13                | R331              | C3                | G3                | VR296             | H1                | H1       |
| C433              | A5                | J4                |                   |                   |          | R232              | C1                | 13                | R332              | C3                | нз                |                   |                   |          |

\* Mounted on back of board

#### **VOLTAGE AND WAVEFORM CONDITIONS**

The voltages and waveforms shown were taken with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B); READOUT INTENSITY (MIDRANGE).

Voltage Conditions. The voltages on the diagram were taken using a digital multimeter with a 10 M $\Omega$  input impedance (Tektronix DM 501 Digital Multimeter installed in a TM 501 Power Module or Tektronix 7D13 Digital Multimeter used with a readout-equipped 7000-Series Oscilloscope.

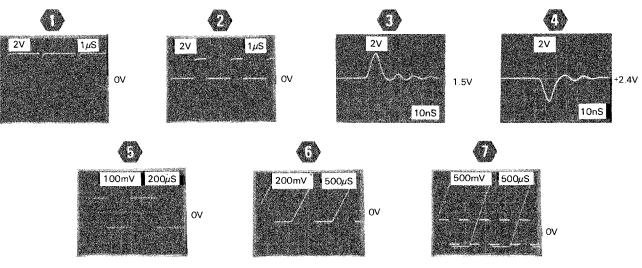
A 7A26 Dual Trace Amplifier with coupling switch set to Gnd was installed in the LEFT VERT compartment of the 7854.

Waveform Conditions. The waveforms shown below were obtained using a test oscilloscope system with 10 M $\Omega$  input impedance, at least 60 MHz bandwidth and 10X probe (Tektronix 7603 Oscilloscope, 7B92 Time Base, 7A13 Differential Comparator and P6063A Probe).

A Tektronix 7A26 Dual Trace Amplifier with controls set as follows: VOLTS/DIV (0.1 V); DISPLAY MODE (CH1) was installed in the LEFT/VERT compartment of the 7854.

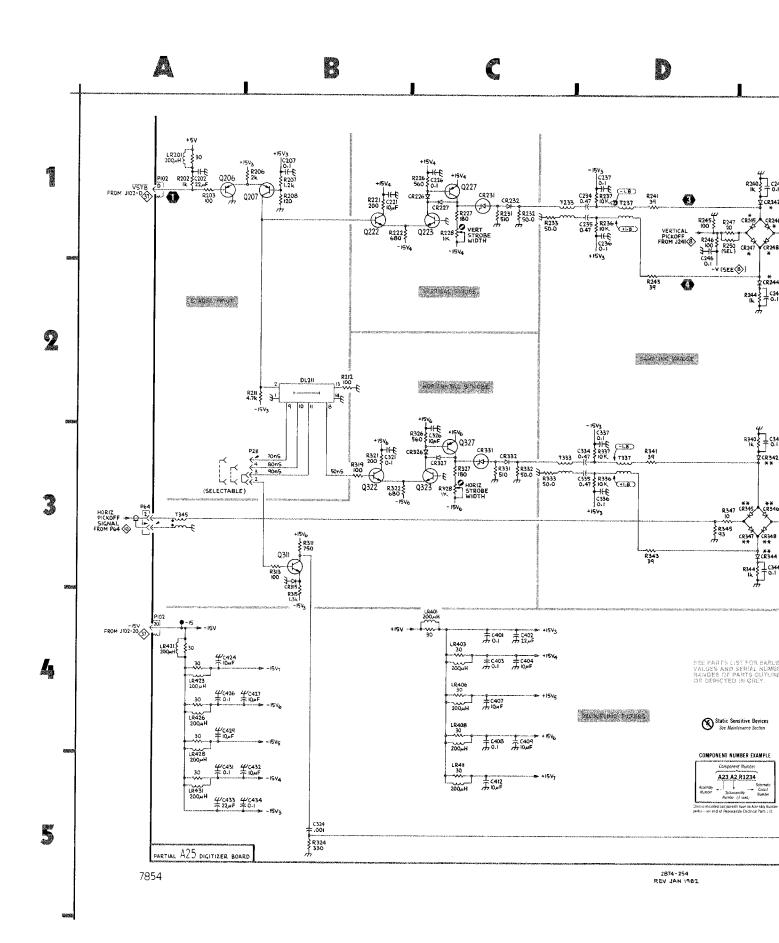
The 0.4 V CALIBRATOR signal was applied to the channel 1 bnc input connector.

A Time Base (Tektronix 7B15) with controls set as follows: TRIGGERING (NORM, AC, INT); TIME/DIV (1 ms) was installed in the B HORIZ compartment of the 7854.



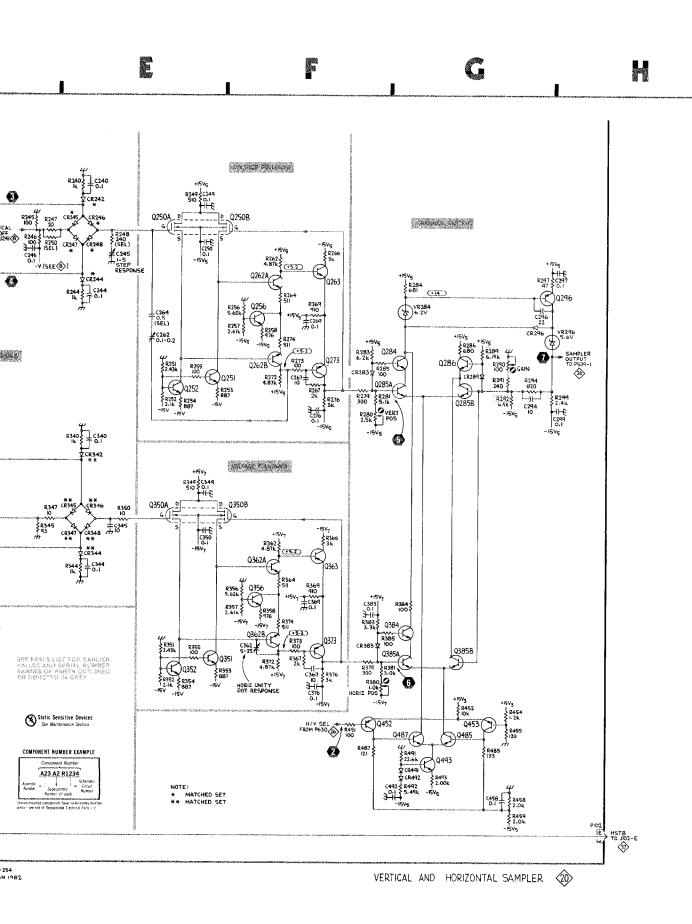
## Selectable Electrical Parts Table For Diagram 20.

| Component Number | Reason For Selection                                                                                                           | Component Value           |
|------------------|--------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| A25R248          | Affects the first 3 ns of high-frequency transient response. Increasing the resistance lowers the front corner and vice-versa. | 220Ω<br>240Ω<br>270Ω      |
| A25R250          | Affects first 1 ns of high-frequency transient response. Decreasing the resistance raises the front corner and vice-versa.     | 91Ω<br>36Ω<br>18Ω<br>8.2Ω |
| A25C264          | Affects Unity Dot response. Increasing the capacitance lowers the first 3.5 $\mu$ s of the vertical transient response.        | 0.5pF<br>1.0pF<br>1.5pF   |



Vertical and Horiz Sampler

Reverse Side



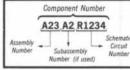
7854



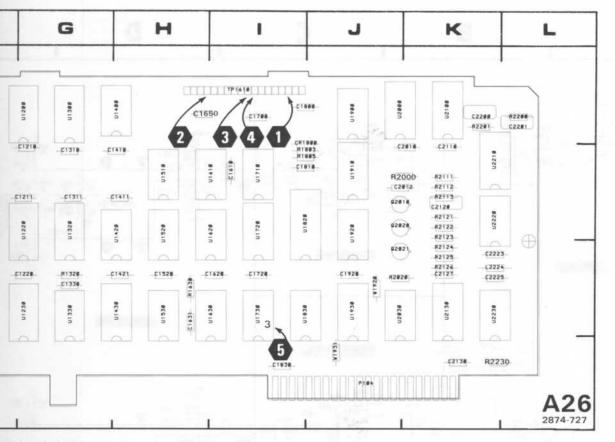
Figure 7-30. A26-Control Logic circuit board ass



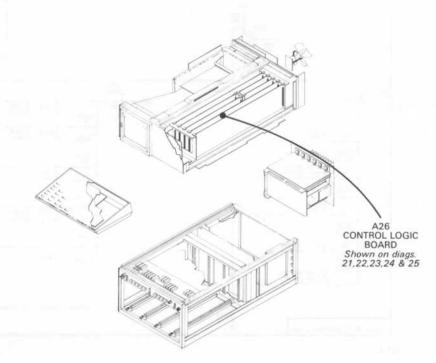
## COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see and of Replaceable Electrical Parts List.



trol Logic circuit board assembly.



## DIGITIZER CONTROL LOGIC DIAGRAM 21

| PARTIAL A26 ASSY  |                   |                   |                            |                   |                                                            |  |  |  |  |  |  |
|-------------------|-------------------|-------------------|----------------------------|-------------------|------------------------------------------------------------|--|--|--|--|--|--|
| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER          | SCHEM<br>LOCATION | BOARD<br>LOCATION                                          |  |  |  |  |  |  |
| C120              | A4                | A2                | P104                       | F1                | J4                                                         |  |  |  |  |  |  |
| C130              | A4                | A3                | P104                       | G1                | J4                                                         |  |  |  |  |  |  |
| C230              | A4                | B3                | P104                       | G5                | J4                                                         |  |  |  |  |  |  |
| C320              | A4                | 82                |                            |                   |                                                            |  |  |  |  |  |  |
| C330              | A4                | B4                | R1320                      | E2                | G3                                                         |  |  |  |  |  |  |
| C410              | A4                | C2                |                            |                   |                                                            |  |  |  |  |  |  |
| C430              | A4                | C3                | TP1610                     | B5                | 11                                                         |  |  |  |  |  |  |
| C610              | A4                | D2                | TP1610                     | D3                | 11                                                         |  |  |  |  |  |  |
| C611              | A4                | D2                | TP1610                     | E3                | 11                                                         |  |  |  |  |  |  |
| C620              | A4                | D3                | TP1610                     | G2                | 11                                                         |  |  |  |  |  |  |
| C720              | A4                | D3                | TP1610                     | G1                | 11                                                         |  |  |  |  |  |  |
| C820              | A4                | E3                | TP1610                     | G2                | 11                                                         |  |  |  |  |  |  |
| C920              | A4                | E3                | TP1610                     | G1                | 11                                                         |  |  |  |  |  |  |
| C1010             | A4                | F2                | TP1610                     | G2                | 11                                                         |  |  |  |  |  |  |
| C1020             | A4                | E3                |                            |                   |                                                            |  |  |  |  |  |  |
| C1030             | A4                | F4                | U830                       | E3                | E3                                                         |  |  |  |  |  |  |
| C1120             | A4                | F3                | U930                       | E2                | E3                                                         |  |  |  |  |  |  |
| C1210             | A4                | G2                | U1030                      | C4                | F3                                                         |  |  |  |  |  |  |
| C1211             | A4                | G2                | U1130                      | C3                | F3                                                         |  |  |  |  |  |  |
| C1220             | A4                | G3                | U1220                      | B2                | G2                                                         |  |  |  |  |  |  |
| C1310             | A4                | G2                | U1230                      | C1                | G3                                                         |  |  |  |  |  |  |
| C1311             | A4                | G2                | U1320                      | C2                | G2                                                         |  |  |  |  |  |  |
| C1330             | E2                | G3                | U1330B                     | E2                | G3                                                         |  |  |  |  |  |  |
| C1410             | A4                | G2                | U1330C                     | E2                | G3                                                         |  |  |  |  |  |  |
| C1411             | A4                | H1                | U1420A                     | E2                | H1                                                         |  |  |  |  |  |  |
| C1421             | A4                | нз                | U1420B                     | C1                | H1                                                         |  |  |  |  |  |  |
| C1520             | A4                | нз                | U1430A                     | F2                | H3                                                         |  |  |  |  |  |  |
| C1600             | A4                | 13                | U1430E                     | F3                | нз                                                         |  |  |  |  |  |  |
| C1620             | A4                | 13                | U1430F                     | F3                | H3                                                         |  |  |  |  |  |  |
| C1700             | A4                | 11                | U1510A                     | C 1               | H1                                                         |  |  |  |  |  |  |
| C1720             | A4                | 13                | U1510B                     | C3                | H1                                                         |  |  |  |  |  |  |
| C1810             | A4                | 12                | U1520A                     | B4                | H1                                                         |  |  |  |  |  |  |
| C1830             | A4                | 14                | U1520B                     | E2                | H1                                                         |  |  |  |  |  |  |
| C1920             | A4                | J3                | U1530C                     | D3                | НЗ                                                         |  |  |  |  |  |  |
| C2010             | A4                | K2                | U1530D                     | B3                | H3                                                         |  |  |  |  |  |  |
| C2012             | A4                | J2                | U1620B                     | F1                | 12                                                         |  |  |  |  |  |  |
| C2110             | A4                | K2                | U1620D                     | D3                | 12                                                         |  |  |  |  |  |  |
| C2130             | A4                | K4                | U1630D                     | D2                | 13                                                         |  |  |  |  |  |  |
| C2225             | A4                | К3                | U1730A                     | G2                | 13                                                         |  |  |  |  |  |  |
| C2230             | A4                | K4                | U1730B                     | F2                | 13                                                         |  |  |  |  |  |  |
|                   |                   |                   | U1930                      | F1                | J3                                                         |  |  |  |  |  |  |
| P103              | A1                | D4                |                            | <b>C</b> 1        |                                                            |  |  |  |  |  |  |
| P103              | G2                | D4                | W1931                      | F1                | J4                                                         |  |  |  |  |  |  |
| P104              | A4                | J4                |                            |                   |                                                            |  |  |  |  |  |  |
| Partial A26 >     | 4SSY also sh      | own on diagra     | <b>L</b><br>ams 22, 23, 24 | 1 and 25.         | Partial A26 ASSY also shown on diagrams 22, 23, 24 and 25. |  |  |  |  |  |  |

### WAVEFORM CONDITIONS

The waveforms shown were taken with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B); READOUT INTENSITY (MIDRANGE).

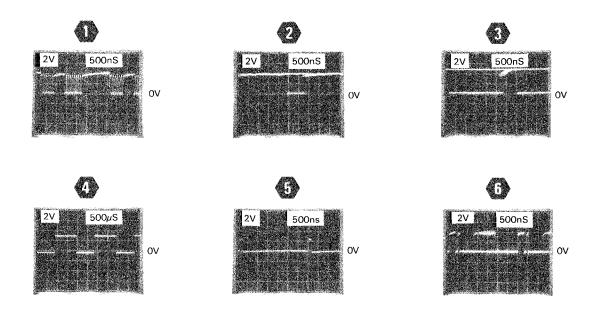
Waveform Conditions. The waveforms shown below were obtained using a test oscilloscope system with 10 M $\Omega$  input impedance, at least 60 MHz bandwidth and 10X probe (Tektronix 7603 Oscilloscope, 7B92 Time Base, 7A13 Differential Comparator and P6063A Probe).

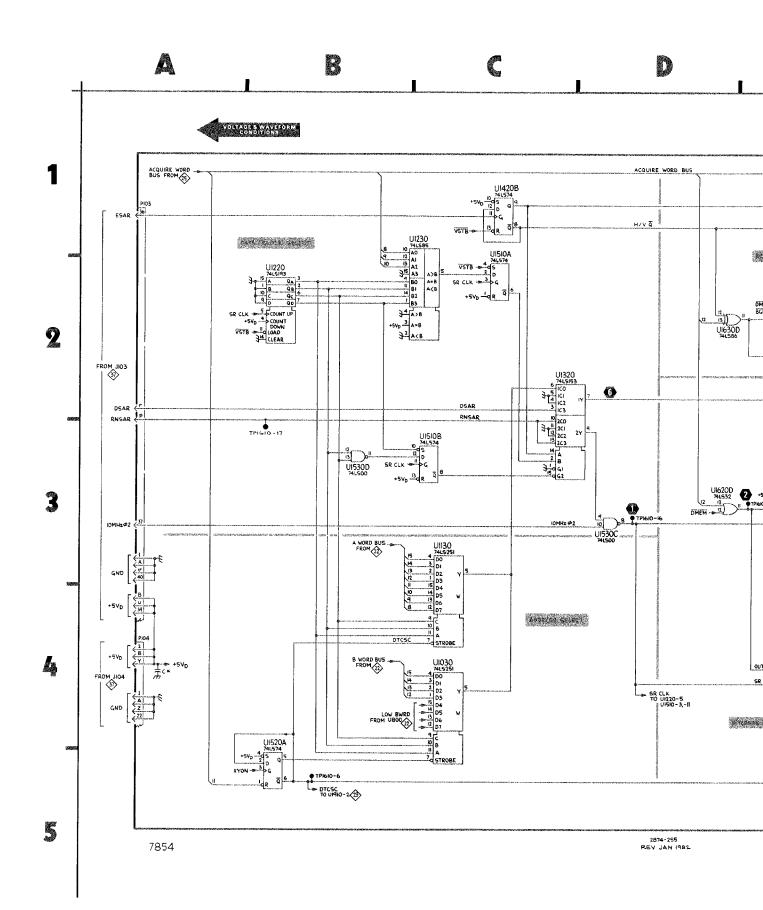
A Tektronix 7A26 Dual Trace Amplifier with controls set as follows: VOLTS/DIV (0.1 V); DISPLAY MODE (CH1); was installed in the LEFT VERT compartment of the 7854.

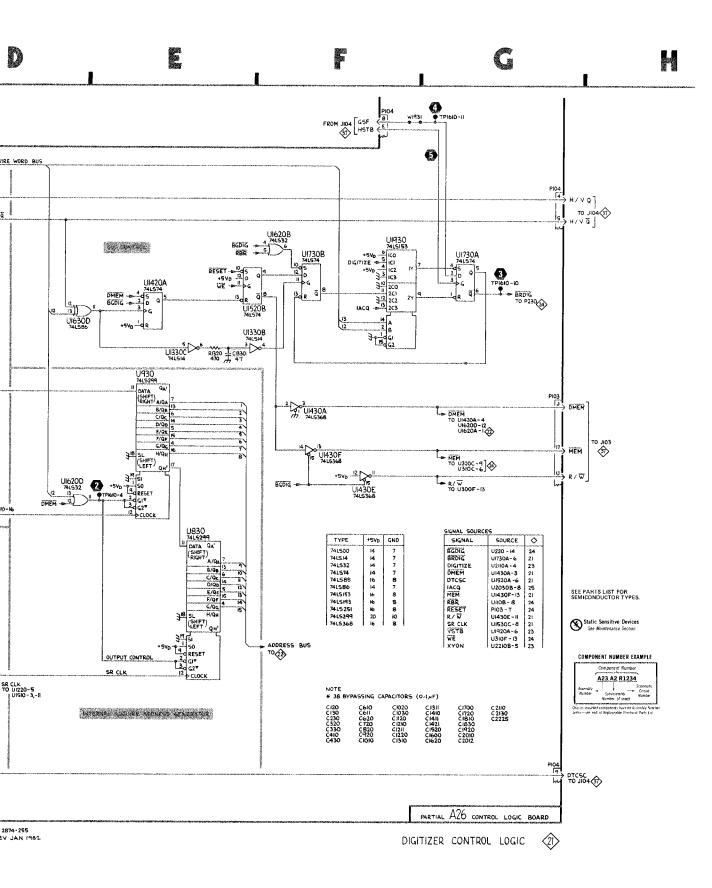
The 0.4 V CALIBRATOR signal was applied to the channel 1 bnc connector.

A Tektronix 7B15 Time Base with controls set as follows: TRIGGERING (NORM, AC, INT); TIME/DIV (1 ms); was installed in the B HORIZ compartment of the 7854.

Waveform 4 conditions: 7B15 TIME/DIV (500 µs).









Reverse Side

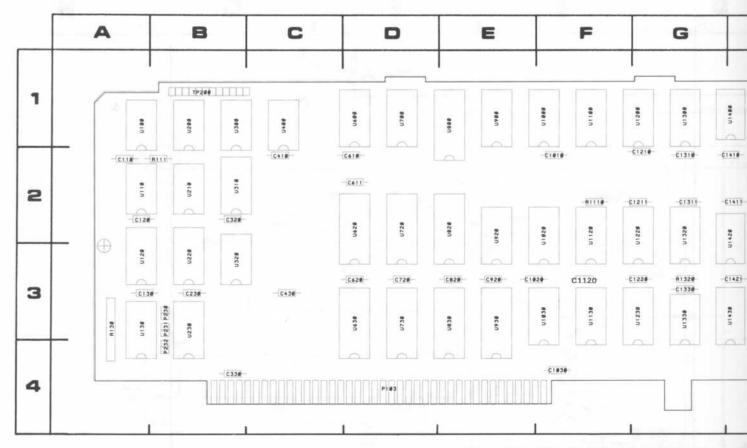


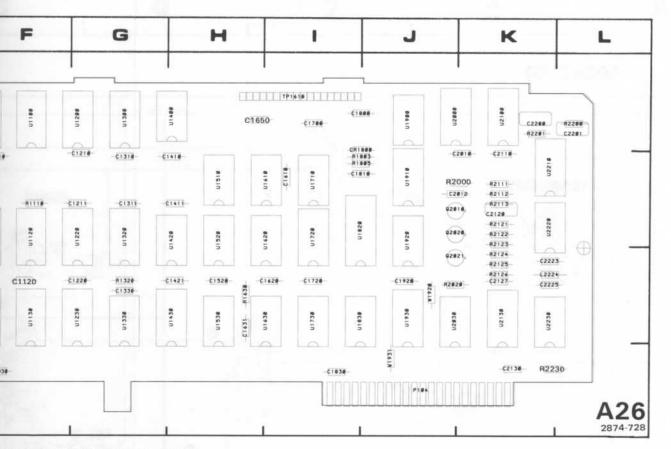
Figure 7-31. A26-Control Logic circuit board assemb

Static Sensitive Devices See Maintenance Section

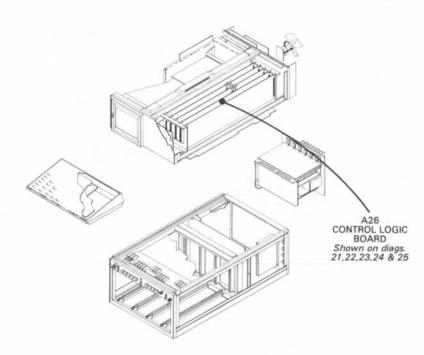
COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix-see end of Replaceable Electrical Parts List. 1 1 1 1 A 1



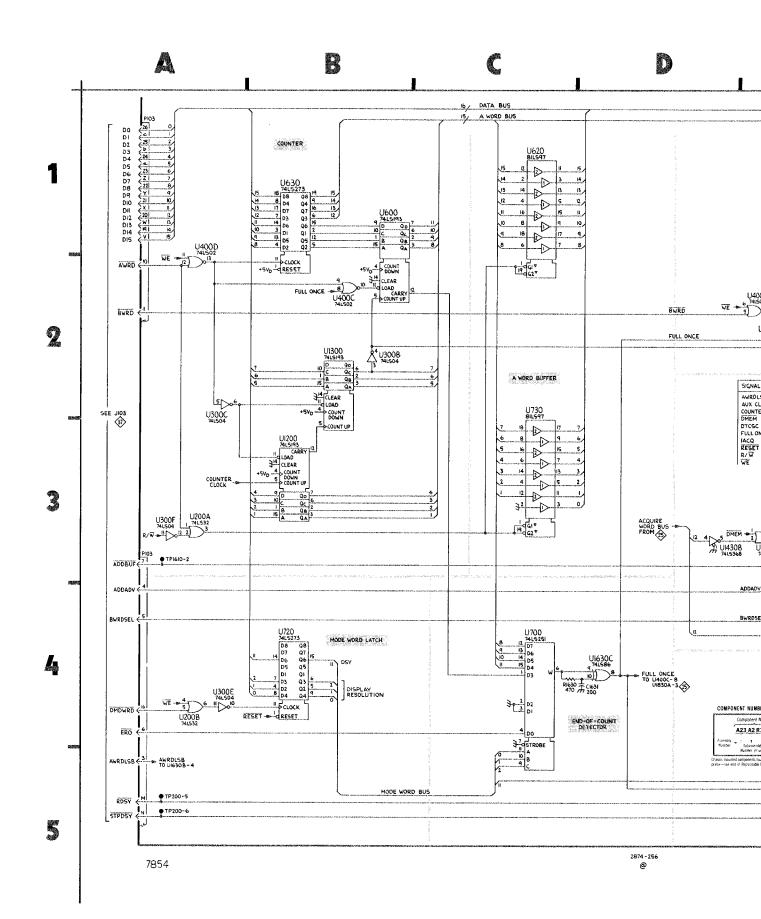
-Control Logic circuit board assembly.

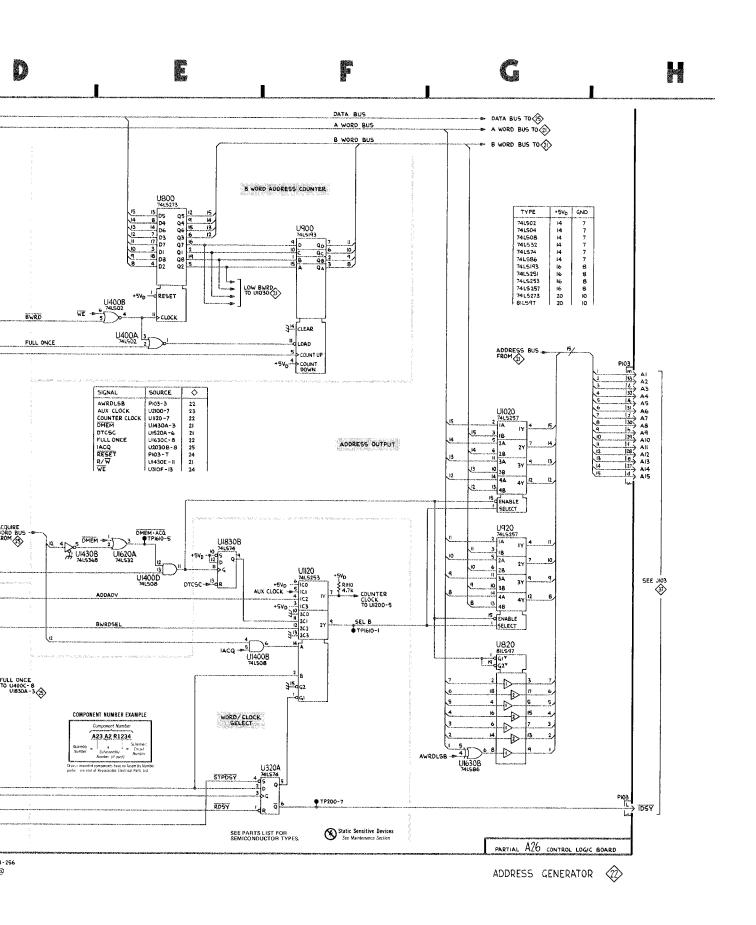


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# ADDRESS GENERATOR DIAGRAM 22

| TATION AND SOMETICS | an a |          |                                                                                                                 |
|---------------------|------------------------------------------|----------|-----------------------------------------------------------------------------------------------------------------|
| PARTIAL             | A26 ASSY                                 |          | Na 1 wanted bit has been been been a band data been wanted a second water of second water of second second seco |
| CIRCUIT             | SCHEM                                    | BOARD    |                                                                                                                 |
| NUMBER              | LOCATION                                 |          |                                                                                                                 |
| C1631               | D4                                       |          |                                                                                                                 |
| 01031               | 04                                       | H3       |                                                                                                                 |
| P103                | A1                                       | D4       |                                                                                                                 |
| P103                | A3                                       | D4       |                                                                                                                 |
| P103                | H2                                       | D4       |                                                                                                                 |
| P103                | H5                                       | D4       |                                                                                                                 |
| B1110               | F3                                       | F2       |                                                                                                                 |
| R1630               | C4                                       | H3       |                                                                                                                 |
| TP200               |                                          |          |                                                                                                                 |
| TP200               | A5<br>F5                                 | B1<br>B1 |                                                                                                                 |
| TP1610              | F5<br>A3                                 | 11       |                                                                                                                 |
| TP1610              | АЗ<br>F4                                 | 11       |                                                                                                                 |
|                     |                                          |          |                                                                                                                 |
| U200A               | A3                                       | B1       |                                                                                                                 |
| U200B               | A4                                       | B 1      |                                                                                                                 |
| U300B               | B2                                       | B1       |                                                                                                                 |
| U300C               | A2                                       | B1       |                                                                                                                 |
| U300E               | A4                                       | B1       |                                                                                                                 |
| U300F               | A3                                       | B1       |                                                                                                                 |
| U320A               | F5                                       | B3       |                                                                                                                 |
| U400A               | E2                                       | C1       |                                                                                                                 |
| U400B               | E2                                       | C1       |                                                                                                                 |
| U400C               | B2                                       | C1       |                                                                                                                 |
| U400D               | A2                                       | C1       |                                                                                                                 |
| U600                | B1                                       | D1       |                                                                                                                 |
| U620<br>U630        | C1                                       | D2       |                                                                                                                 |
| U700                | B1<br>C4                                 | D3       |                                                                                                                 |
| U720                | 64<br>B4                                 | D1<br>D2 |                                                                                                                 |
| U730                | C3                                       | D2<br>D3 |                                                                                                                 |
| U800                | E1                                       | E1       |                                                                                                                 |
| U820                | G4                                       | E2       |                                                                                                                 |
| U900                | F1                                       | E1       |                                                                                                                 |
| U920                | G3                                       | E2       |                                                                                                                 |
| U1020               | G3                                       | F2       |                                                                                                                 |
| U1120               | F4                                       | F2       |                                                                                                                 |
| U1200               | B3                                       | G1       |                                                                                                                 |
| U1300               | B2                                       | G1       |                                                                                                                 |
| U1400B              | E4                                       | H1       |                                                                                                                 |
| U1400D              | E3                                       | H1       |                                                                                                                 |
| U1430B              | D3                                       | Н3       |                                                                                                                 |
| U1620A              | E3                                       | 12       |                                                                                                                 |
| U1630B              | G5                                       | 13       |                                                                                                                 |
| U1630C              | D4                                       | 13       |                                                                                                                 |
| U1720               | В4                                       | 12       |                                                                                                                 |
| U1830B              | E3                                       | 13       |                                                                                                                 |
|                     |                                          |          | ams 21, 23, 24 and 25.                                                                                          |





Address F Generator

Reverse Side

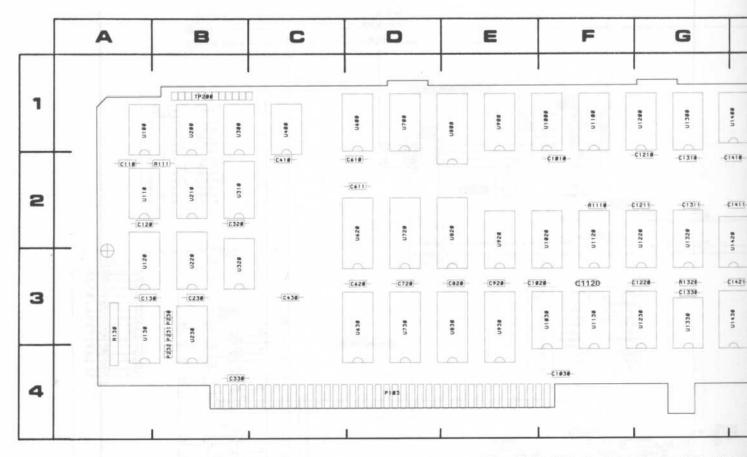


Figure 7-32. A26-Control Logic circuit board asse

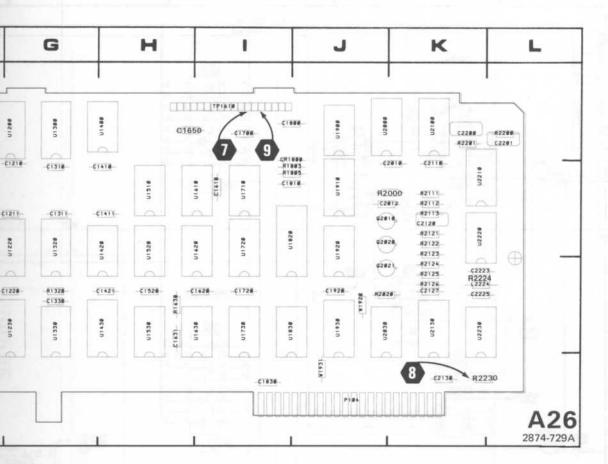
Static Sensitive Devices See Maintenance Section

Assembly A26

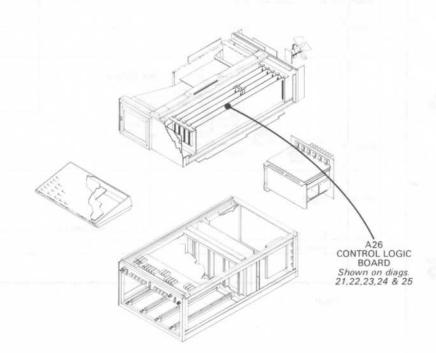
### COMPONENT NUMBER EXAMPLE

|                    | Component Numb                  | er                             |
|--------------------|---------------------------------|--------------------------------|
|                    | A23 A2 R123                     |                                |
| Assembly<br>Number | Subassembly<br>Number (it used) | Schematic<br>Circuit<br>Number |

Chassis-mounted components have no Assembly Number prefix-see end of Replaceable Electrical Parts List.



ogic circuit board assembly.



## **DIGITIZER CLOCK DIAGRAM 23**

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| CIRCUIT<br>NUMBER |          | BOARD<br>LOCATION | AND A REPORT OF A MARK A MARK AND AND A MARK |
|-------------------|----------|-------------------|----------------------------------------------|
| C1800             | C3       |                   | BALLING CONTRACTOR OF LAS                    |
| C2120             | F3       | К2                |                                              |
| C2127             | F3       | КЗ                |                                              |
| C2200             | C1       | K1                |                                              |
| C2201             | C3       | L1                |                                              |
| C2223             | A3       | К3                |                                              |
| CR1800            | C3       | 12                |                                              |
| L2224             | A3       | КЗ                |                                              |
| P103              | G2       | D4                |                                              |
| P104              | A1       | J4                |                                              |
| P104              | A3       | J4                |                                              |
| P104              | G3       | J4                |                                              |
| Q2010             | F3       | J2                |                                              |
| 02020             | F3       | J2                |                                              |
| 02021             | F3       | J3                |                                              |
| R1803             | C3       | 12                |                                              |
| R1805             | C3       | 12                |                                              |
| R2000             | A1       | J2                |                                              |
| R2111             | F3       | К2                |                                              |
| R2112             | F2       | K2                |                                              |
| R2113             | F3       | К2                |                                              |
| R2121             | F3       | K2                |                                              |
| R2122<br>R2123    | F3<br>F3 | K2<br>K2          |                                              |
| R2123             | F3<br>F2 | K3                |                                              |
| R2124             | F3       | K3                |                                              |
| R2126             | F3       | КЗ                |                                              |
| R2200             | C3       | L1                |                                              |
| R2201             | C1       | K1                |                                              |
| R2224             | A3       | КЗ                |                                              |
| R2230             | C3       | K4                |                                              |
| TP1610            | A1       | 11                |                                              |
| TP1610            | F3       | 11                |                                              |
| TP1610            | G2       | 11                |                                              |
| U1900A            | D1       | J1                |                                              |
| U1900B            | G2       | J1                |                                              |
| U1900C            | D2       | J1                |                                              |
| U1900D            | C3       | J1                |                                              |
| U1910A            | C1<br>D3 | J2                |                                              |
| U1910B            |          | J2                |                                              |
| U1920A<br>U1920B  | E2<br>E3 | J2<br>J2          |                                              |
| U1920B            | E3<br>A1 | J2<br>J1          |                                              |
| U2030A            | E2       | 13                |                                              |
| U2100             | B1       | К1                |                                              |
| U2130             | E1       | КЗ                |                                              |
| U2210A            | C2       | K2                |                                              |
| U2210B            | C3       | К2                |                                              |
| U2230             | B2       | КЗ                |                                              |
| W1920             | C2       | 13                |                                              |

\*See Parts List for serial number ranges.

### WAVEFORM CONDITIONS

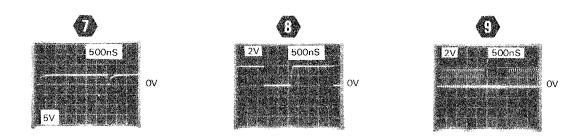
The waveforms shown were taken with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B); READOUT INTENSITY (MIDRANGE).

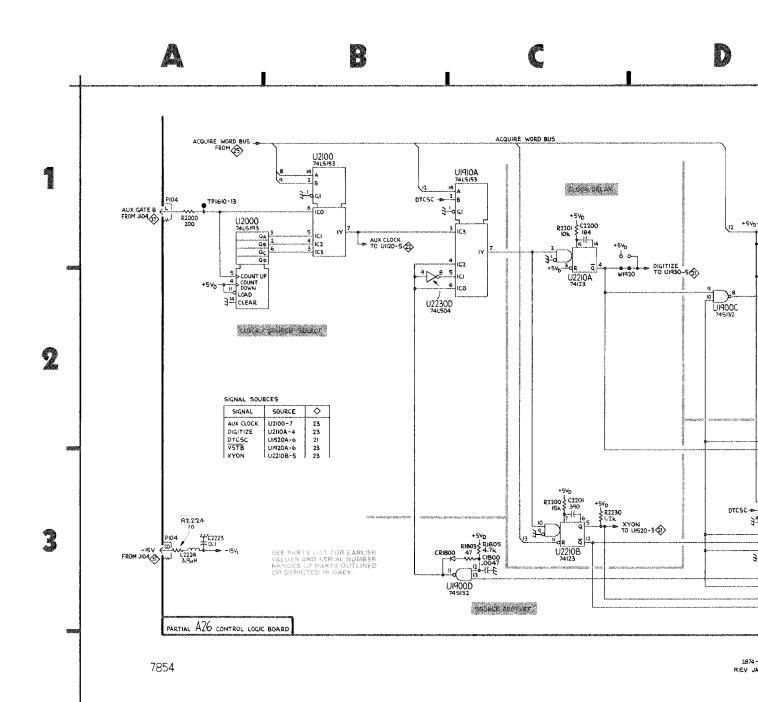
Waveform Conditions. The waveforms shown below were obtained using a test oscilloscope system with 10 M $\Omega$  input impedance, at least 60 MHz bandwidth and 10X probe (Tektronix 7603 Oscilloscope, 7B92 Time Base, 7A13 Differential Comparator and P6063A Probe).

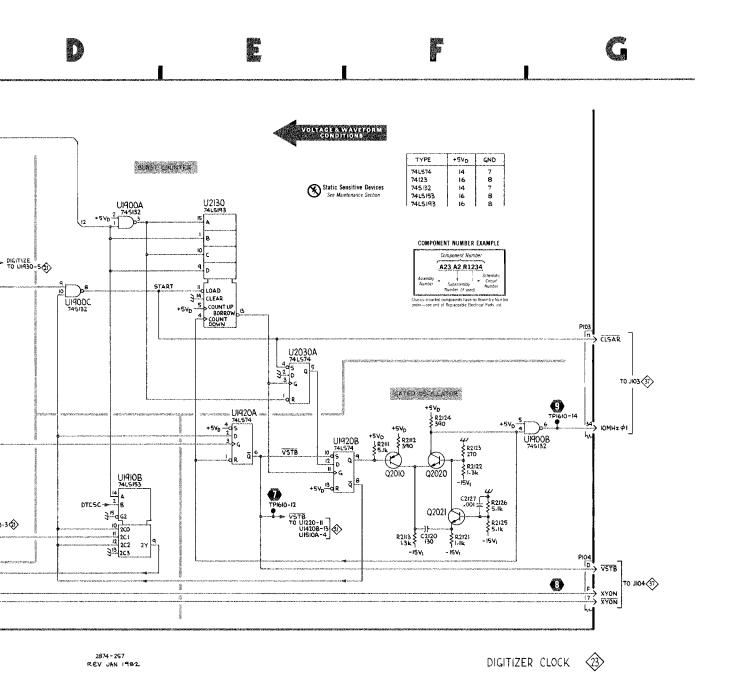
A Tektronix 7A26 Dual Trace Amplifier with controls set as follows: VOLTS/DIV (0.1 V); DISPLAY MODE (CH1); was installed in the LEFT VERT compartment of the 7854.

The 0.4 V CALIBRATOR signal was applied to the channel 1 bnc connector.

A Tektronix 7B15 Time Base with controls set as follows: TRIGGERING (NORM, AC, INT); TIME/DIV (1 ms); was installed in the B HORIZ compartment of the 7854.







23 Digitizer Clock

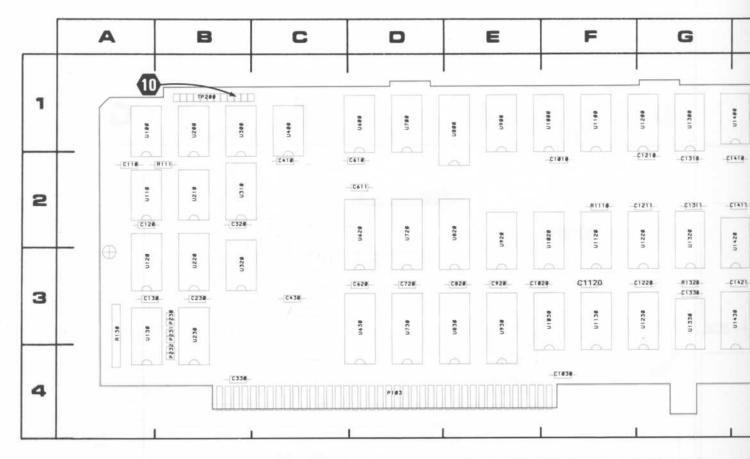
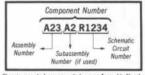


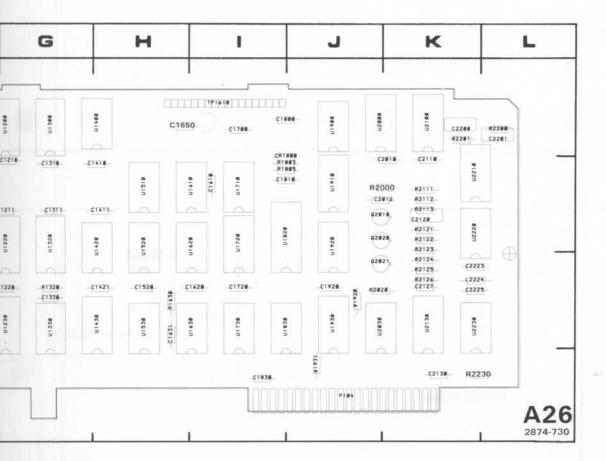
Figure 7-33. A26-Control Logic circuit board assemble

Static Sensitive Devices See Maintenance Section

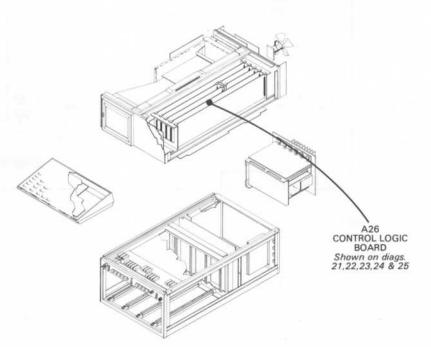
COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.



circuit board assembly.



REV A MAR 1981

# DMA CONTROL DIAGRAM 24

| 2       | A26 ASSY |          |                                                                |
|---------|----------|----------|----------------------------------------------------------------|
| CIRCUIT | SCHEM    | BOARD    |                                                                |
| NUMBER  | LOCATION | LOCATION |                                                                |
| C110    | D4       | A2       | an mang nan na si sa sa ka |
| P103    | A1       | D4       |                                                                |
| P103    | H1       | D4       |                                                                |
| P230    | B1       | B3       |                                                                |
| P231    | B1       | В3       |                                                                |
| P232    | B2       | B4       |                                                                |
| R111    | D4       | В2       |                                                                |
| R130A   | B1       | A3       |                                                                |
| R130B   | B1       | A3       |                                                                |
| R130C   | C1       | A3       |                                                                |
| R130D   | C2       | A3       |                                                                |
| R130E   | B2       | A3       |                                                                |
| R130F   | C2       | A3       |                                                                |
|         |          |          |                                                                |
| TP200   | A1       | B1       |                                                                |
| TP200   | A2       | B1       |                                                                |
| 1P200   | A4       | B1       |                                                                |
| TP200   | В3       | B1       |                                                                |
| TP200   | G5       | B1       |                                                                |
| TP200   | G4       | B1       |                                                                |
| TP200   | G2       | B 1      |                                                                |
| TP200   | G1       | B1       |                                                                |
| U100A   | C4       | A1       |                                                                |
| U100B   | E3       | A1       |                                                                |
| U100C   | E4       | A1       |                                                                |
| U110A   | F4       | A2       |                                                                |
| U110B   | D5       | A2       |                                                                |
| U120    | D1       | A3       |                                                                |
| U130    | C1       | A3       |                                                                |
| U200C   | B3       | B1       |                                                                |
| U210B   | B3       | B2       |                                                                |
| U220    | G1       | B3       |                                                                |
| U230    | F1       | B3       |                                                                |
| U300A   | D2       | B1       |                                                                |
| U300D   | E4       | B1       |                                                                |
| U310A   | D4       | B2       |                                                                |
| U310B   | B4       | B2       |                                                                |
| U310C   | B4       | B2       |                                                                |
| U310F   | F4       | B2       |                                                                |
| U320B   | C4       | B3       |                                                                |
|         |          | _        | rams 21, 22, 23 and 25.                                        |

### WAVEFORM CONDITIONS

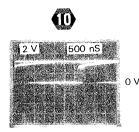
The waveforms shown were taken with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B); READOUT INTENSITY (MIDRANGE).

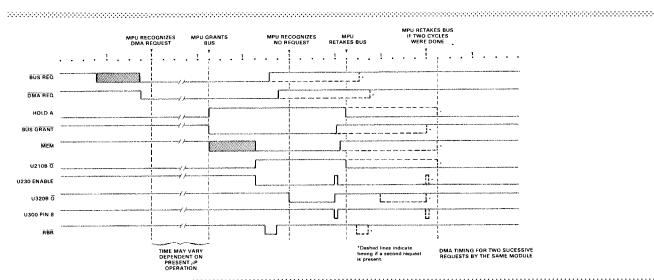
Waveform Conditions. The waveforms shown below were obtained using a test oscilloscope system with 10 MΩ input impedance, at least 60 MHz bandwidth and 10X probe (Tektronix 7603 Oscilloscope, 7B92 Time Base, 7A13 Differential Comparator and P6063A Probe).

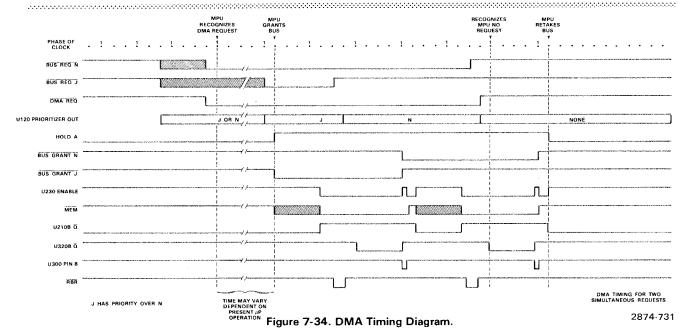
A Tektronix 7A26 Dual Trace Amplifier with controls set as follows: VOLTS/DIV (0.1 V); DISPLAY MODE (CH1); was installed in the LEFT VERT compartment of the 7854.

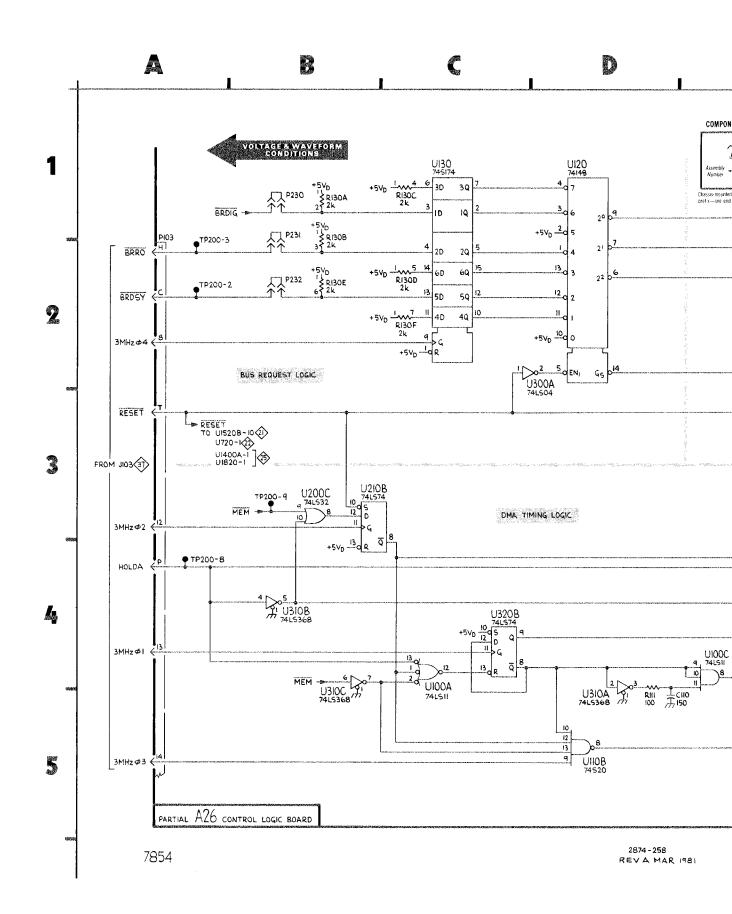
The 0.4 V CALIBRATOR signal was applied to the channel 1 bnc connector.

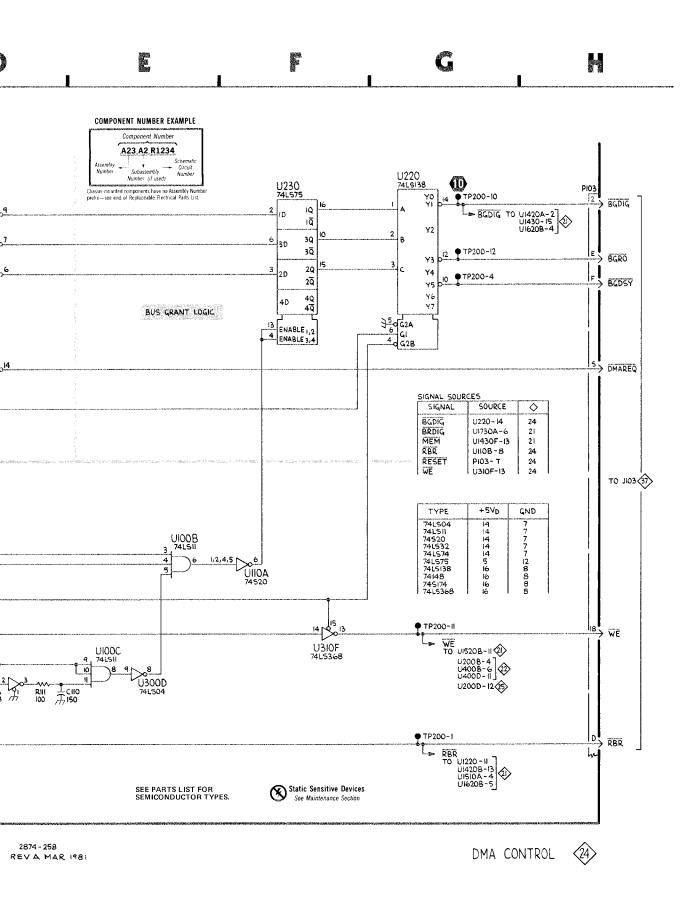
A Tektronix 7B15 Time Base with controls set as follows: TRIGGERING (NORM, AC, INT); TIME/DIV (500  $\mu$ s); was installed in the B HORIZ compartment of the 7854.











24 DMA Control

Reverse Side A26



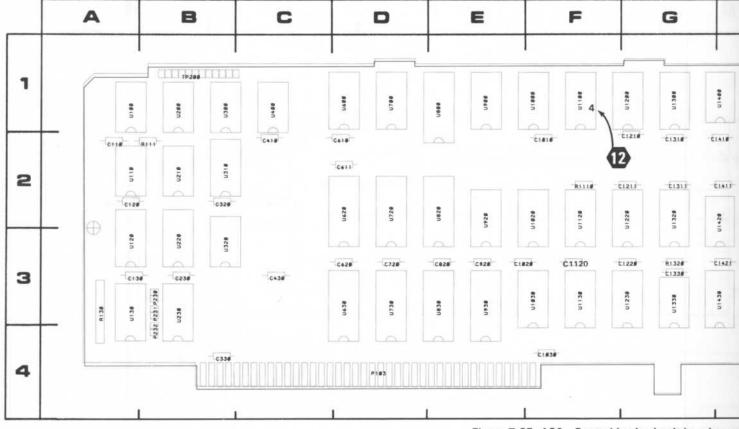


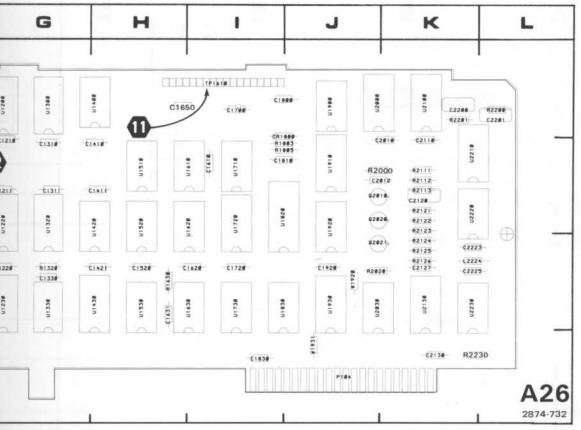
Figure 7-35. A26-Control Logic circuit board asser



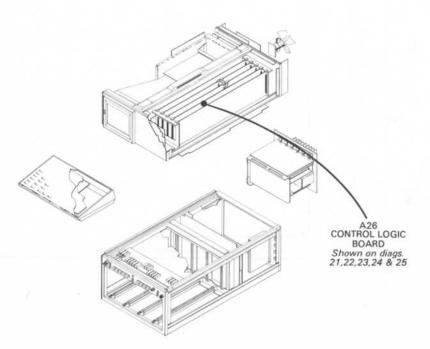
### COMPONENT NUMBER EXAMPLE

|                    | Component Numbe                 | r                              |
|--------------------|---------------------------------|--------------------------------|
|                    | A23 A2 R123                     | -                              |
| Assembly<br>Number | Subassembly<br>Number (it used) | Schematic<br>Circuit<br>Number |

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.



ogic circuit board assembly.



REV A MAR 1981

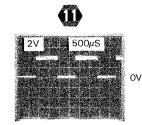
# DIGITIZER SWEEP COUNTER DIAGRAM 25

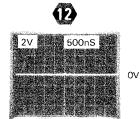
| PARTIAL           | A26 ASSY          |                   |                                                                        |
|-------------------|-------------------|-------------------|------------------------------------------------------------------------|
| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~                                |
| C1610             | D2                | 12                | #2/2 #7/2001 19-4 #44 (1997, 1997) 14-0 ESSAN (1997, 1997) 14-6 (1997) |
| P103              | A1                | D4                |                                                                        |
| P103              | F3                | D4                |                                                                        |
| P104              | A1                | J4                |                                                                        |
| P104              | A3                | J4                |                                                                        |
| R2020             | В3                | J3                |                                                                        |
| TP1610            | A2                | 11                |                                                                        |
| TP1610            | A1                | 11                |                                                                        |
| TP1610            | C3                | 11                |                                                                        |
| U200D             | B1                | B1                |                                                                        |
| U1000             | D2                | F1                |                                                                        |
| U1100             | D1                | F1                |                                                                        |
| U1400A            | C3                | H1                |                                                                        |
| U1530B            | B3                | HЗ                |                                                                        |
| U1610A            | C2                | 12                |                                                                        |
| U1610B            | C2                | 12                |                                                                        |
| U1710A            | C3                | 12                |                                                                        |
| U1710C            | D3                | 12                |                                                                        |
| U1720             | 81                | 12                |                                                                        |
| U1820             | E1                | 12                |                                                                        |
| U1830A            | C2                | 13                |                                                                        |
| U2030B            | E3                | J3                |                                                                        |
| U2220A            | A1                | К2                |                                                                        |
| U2220B            | A1                | К2                |                                                                        |
| U2220C            | A2                | К2                |                                                                        |
| U2220D            | A2                | К2                |                                                                        |
| U2230A            | C2                | К3                |                                                                        |
| U2230B            | C2                | K3                |                                                                        |
| U2230C            | A3                | K3                |                                                                        |
| U2230F            | D1                | КЗ                |                                                                        |
| Partial A26 A     | ASSY also sh      | own on diagi      | ams 21, 22, 23 and 24.                                                 |

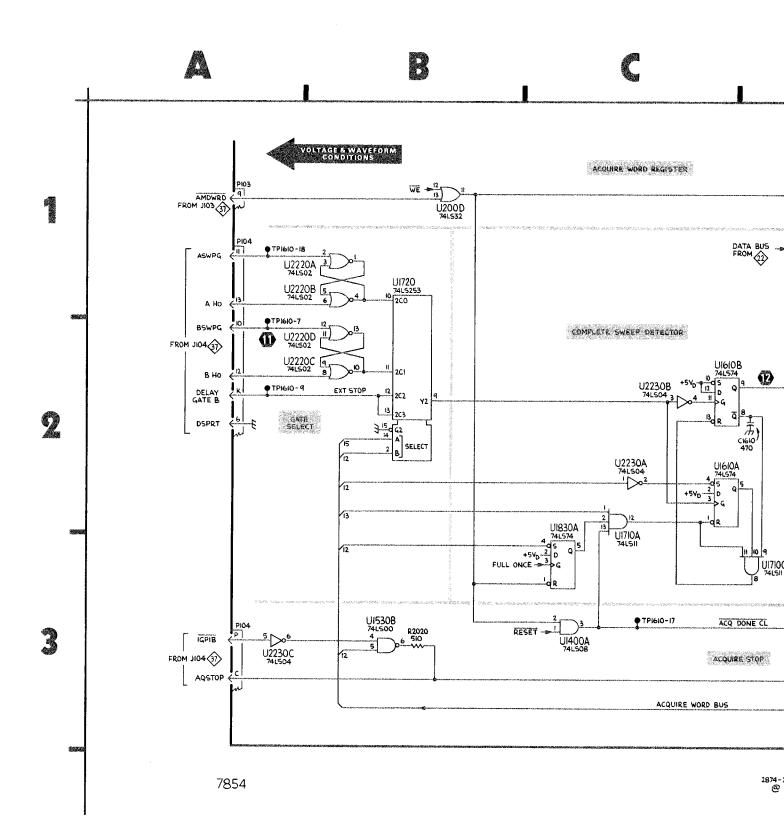
## WAVEFORM CONDITIONS

The waveforms shown were taken with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B); READOUT INTENSITY (MIDRANGE).

Waveform Conditions. The waveforms shown below were obtained using a test oscilloscope system with 10 M $\Omega$  input impedance, at least 60 MHz bandwidth and 10X probe (Tektronix 7603 Oscilloscope, 7B92 Time Base, 7A13 Differential Comparator and P6063A Probe).



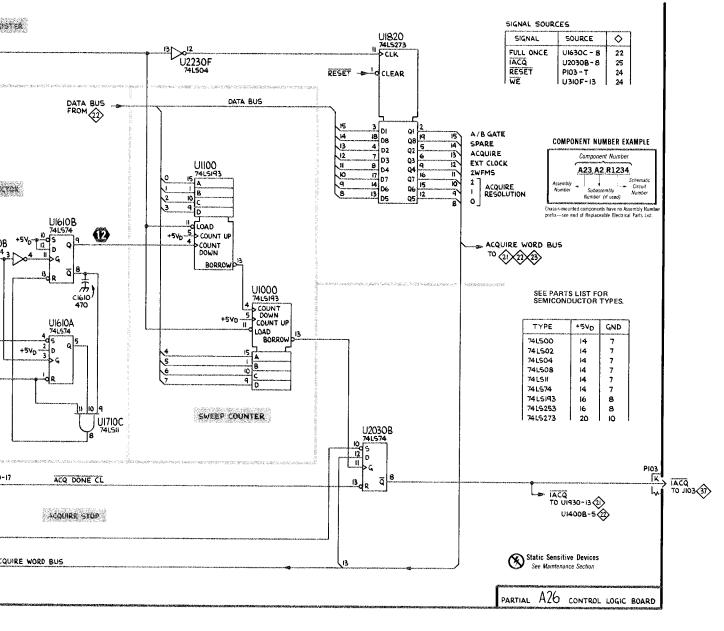




25 Digitizer Sweep Counter

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Reverse Side A25



DIGITIZER SWEEP COUNTER

2874 - 259 @ D

DIY AZD

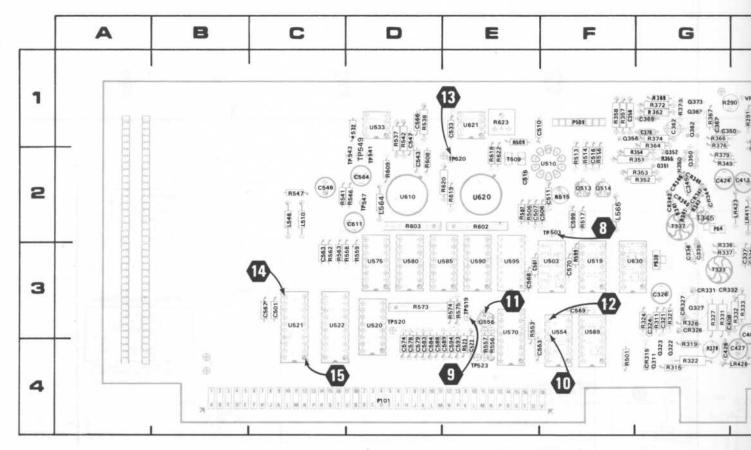


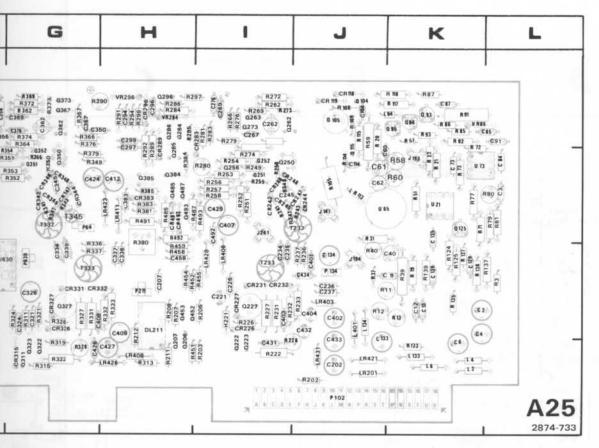
Figure 7-36. A25-Digitizer circuit board assemb

Static Sensitive Devices See Maintenance Section

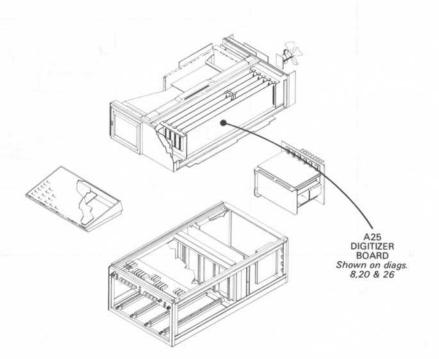
COMPONENT NUMBER EXAMPLE

|                    | Component Number                |
|--------------------|---------------------------------|
|                    | A23 A2 R1234                    |
| Assembly<br>Number | Subassembly<br>Number (if used) |

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.



zer circuit board assembly.



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| C3<br>F2<br>E2<br>E1<br>F2<br>E2<br>F2<br>E4<br>E1<br>D2<br>C2<br>D1<br>F4<br>E3<br>C3<br>D2<br>D1<br>C3<br>E3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F4<br>E2<br>E4<br>E4<br>E2<br>F2<br>E4<br>E4<br>E2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2 | Q556<br>R501<br>R502<br>R503<br>R504<br>R506<br>R509<br>R513<br>R514<br>R515<br>R516<br>R517<br>R523<br>R537<br>R538<br>R541<br>R542<br>R546<br>R547<br>R546<br>R547<br>R553<br>R556<br>R557<br>R558<br>R559<br>R558<br>R559<br>R562<br>R562<br>R563 | C2<br>A1<br>A1<br>A2<br>A2<br>A2<br>A2<br>A1<br>B1<br>B1<br>B1<br>C1<br>C1<br>C1<br>C1<br>C1<br>C1<br>F1<br>F1<br>F1<br>F1<br>F1<br>F1<br>F1<br>F1<br>F1<br>F1<br>F1<br>C2<br>C2<br>C2<br>C2<br>C2<br>D2<br>B3                                                                                       | E3<br>F4<br>F1<br>F1<br>E2<br>E2<br>E1<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2                                                                                                                                                                                                                                                                                                                                                                     | R609           R618           R619           R620           R621           T509           TP503           TP519           TP523           TP543           TP543           TP543           TP563           TP503A           U503A           U503C           U503C           U503C           U503D           U510           U519B                                                                                                                                                                                            | G2<br>G4<br>G3<br>G4<br>G4<br>G4<br>B1<br>A2<br>C1<br>D1<br>C1<br>F1<br>F1<br>F1<br>G1<br>G1<br>G1<br>A4<br>G3<br>G3<br>C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | D2<br>E2<br>E2<br>E2<br>E1<br>E2<br>E2<br>E1<br>E2<br>F2<br>E3<br>D3<br>E4<br>D2<br>D2<br>D2<br>D2<br>D2<br>D2<br>B4<br>E2<br>E2<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E2<br>E1<br>F2<br>E2<br>E4<br>E1<br>D2<br>C2<br>D1<br>F4<br>E3<br>C3<br>D2<br>D1<br>C3<br>E3<br>F3<br>F3<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                   | R502<br>R503<br>R504<br>R506<br>R507<br>R509<br>R513<br>R514<br>R515<br>R516<br>R517<br>R523<br>R532<br>R532<br>R532<br>R537<br>R538<br>R541<br>R542<br>R546<br>R547<br>R553<br>R556<br>R557<br>R558<br>R559<br>R562                                 | A1<br>A1<br>A2<br>A2<br>A1<br>B1<br>B1<br>C1<br>C1<br>C1<br>C1<br>C1<br>F1<br>F1<br>F1<br>F1<br>F1<br>F1<br>F1<br>C2<br>C2<br>C2<br>C2<br>C2<br>D2<br>D2                                                                                                                                             | F1<br>F1<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2                                                                                                                                                                                                                                                                                                                                                                                                   | R619<br>R620<br>R622<br>R623<br>T509<br>TP503<br>TP519<br>TP520<br>TP523<br>TP541<br>TP543<br>TP547<br>TP549<br>TP563<br>TP620<br>TP621<br>U503A<br>U503B<br>U503C<br>U503D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | G3<br>G4<br>G4<br>B1<br>A2<br>C1<br>D1<br>C1<br>F1<br>F1<br>G1<br>G3<br>G3<br>G3<br>C1<br>A2<br>A3<br>C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | E2<br>D2<br>E2<br>E1<br>E2<br>E3<br>D3<br>E4<br>D2<br>D2<br>D2<br>D2<br>D2<br>E2<br>E2<br>F3<br>F3<br>F3<br>F3<br>F3<br>F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| E1<br>F2<br>E2<br>F2<br>E4<br>E1<br>D2<br>C2<br>D1<br>F4<br>E3<br>C3<br>D2<br>D1<br>C3<br>E3<br>F3<br>F3<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                   | R502<br>R503<br>R504<br>R506<br>R507<br>R509<br>R513<br>R514<br>R515<br>R516<br>R517<br>R523<br>R532<br>R532<br>R532<br>R537<br>R538<br>R541<br>R542<br>R546<br>R547<br>R553<br>R556<br>R557<br>R558<br>R559<br>R562                                 | A1<br>A1<br>A2<br>A2<br>A1<br>B1<br>B1<br>C1<br>C1<br>C1<br>C1<br>C1<br>F1<br>F1<br>F1<br>F1<br>F1<br>F1<br>F1<br>C2<br>C2<br>C2<br>C2<br>C2<br>D2<br>D2                                                                                                                                             | F1<br>F1<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2                                                                                                                                                                                                                                                                                                                                                                                                   | R620<br>R622<br>R623<br>T509<br>TP503<br>TP519<br>TP520<br>TP523<br>TP541<br>TP543<br>TP549<br>TP563<br>TP620<br>TP621<br>U503A<br>U503B<br>U503C<br>U503D<br>U510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | G3<br>G4<br>G4<br>B1<br>A2<br>C1<br>D1<br>C1<br>F1<br>G1<br>G1<br>A4<br>G3<br>G3<br>G3<br>C1<br>A2<br>A3<br>C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | D2<br>E2<br>E1<br>E2<br>E3<br>D3<br>E4<br>D2<br>D2<br>D2<br>D2<br>B4<br>E2<br>E2<br>F3<br>F3<br>F3<br>F3<br>F3<br>F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| F2<br>F2<br>E4<br>E1<br>D2<br>C2<br>D1<br>F4<br>E3<br>C3<br>D2<br>D1<br>C3<br>E3<br>F3<br>F3<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                         | R503<br>R504<br>R506<br>R507<br>R509<br>R513<br>R514<br>R515<br>R516<br>R517<br>R538<br>R532<br>R532<br>R532<br>R532<br>R538<br>R541<br>R542<br>R546<br>R547<br>R553<br>R556<br>R557<br>R558<br>R559<br>R559<br>R562                                 | A1<br>A2<br>A2<br>A1<br>B1<br>B1<br>C1<br>C1<br>C1<br>C1<br>F1<br>F1<br>F1<br>F1<br>F1<br>F1<br>C2<br>C2<br>C2<br>C2<br>C2<br>D2<br>D2                                                                                                                                                               | F1<br>F1<br>E2<br>E2<br>E1<br>F2<br>F2<br>F2<br>F2<br>F2<br>E4<br>D1<br>D1<br>D1<br>C2<br>D1<br>D2<br>C2<br>E3<br>E4<br>E4<br>E4<br>E3<br>E4<br>E3<br>D3                                                                                                                                                                                                                                                                                                                                 | R622<br>R623<br>T509<br>TP503<br>TP519<br>TP520<br>TP523<br>TP541<br>TP543<br>TP547<br>TP549<br>TP563<br>TP620<br>TP621<br>U503A<br>U503B<br>U503C<br>U503D<br>U510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | G4<br>G4<br>B1<br>C1<br>D1<br>C1<br>F1<br>G1<br>G1<br>G3<br>G3<br>G3<br>C1<br>A2<br>A3<br>C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | E2<br>E1<br>E2<br>E3<br>D3<br>E4<br>D2<br>D2<br>D2<br>D2<br>E2<br>E2<br>F3<br>F3<br>F3<br>F3<br>F3<br>F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| E2<br>F2<br>E4<br>E1<br>D2<br>C2<br>D1<br>F4<br>E3<br>C3<br>D2<br>D1<br>C3<br>E3<br>F3<br>F3<br>F3<br>F3<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                         | R504<br>R506<br>R507<br>R509<br>R513<br>R514<br>R515<br>R516<br>R517<br>R523<br>R532<br>R532<br>R537<br>R538<br>R541<br>R542<br>R546<br>R547<br>R553<br>R556<br>R557<br>R558<br>R559<br>R559<br>R562                                                 | A2<br>A2<br>A1<br>B1<br>B1<br>C1<br>C1<br>C1<br>F1<br>F1<br>F1<br>F1<br>F1<br>F1<br>F1<br>C2<br>C2<br>C2<br>C2<br>C2<br>D2<br>D2                                                                                                                                                                     | F1<br>E2<br>E2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2<br>F2                                                                                                                                                                                                                                                                                                                                                                                             | R623<br>T509<br>TP503<br>TP519<br>TP520<br>TP523<br>TP541<br>TP543<br>TP547<br>TP563<br>TP620<br>TP621<br>U503A<br>U503B<br>U503C<br>U503D<br>U510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | G4<br>B1<br>A2<br>C1<br>D1<br>C1<br>F1<br>F1<br>G1<br>G1<br>G3<br>G3<br>G3<br>C1<br>A2<br>A3<br>C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | E1<br>E2<br>E3<br>D3<br>E4<br>D2<br>D2<br>D2<br>D2<br>D2<br>B4<br>E2<br>E2<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| F2<br>E4<br>E1<br>D2<br>C2<br>D1<br>F4<br>E3<br>C3<br>D2<br>D1<br>C3<br>E3<br>F3<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                                           | R506<br>R507<br>R509<br>R513<br>R514<br>R515<br>R516<br>R517<br>R523<br>R532<br>R537<br>R538<br>R541<br>R542<br>R547<br>R543<br>R546<br>R547<br>R553<br>R556<br>R556<br>R559<br>R559<br>R562                                                         | A2<br>A1<br>B1<br>C1<br>C1<br>C1<br>F1<br>F1<br>F1<br>F1<br>F1<br>F1<br>C2<br>C2<br>C2<br>C2<br>C2<br>D2<br>D2                                                                                                                                                                                       | E2<br>E1<br>F2<br>F2<br>F2<br>F2<br>E4<br>D1<br>D1<br>C2<br>D1<br>D2<br>C2<br>E3<br>E4<br>E4<br>E4<br>C3<br>D3                                                                                                                                                                                                                                                                                                                                                                           | T509<br>TP503<br>TP519<br>TP520<br>TP523<br>TP541<br>TP543<br>TP547<br>TP549<br>TP563<br>TP620<br>TP621<br>U503A<br>U503B<br>U503C<br>U503D<br>U510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | B1<br>A2<br>C1<br>D1<br>C1<br>F1<br>G1<br>A4<br>G3<br>G3<br>G3<br>C1<br>A2<br>A3<br>C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | E2<br>E3<br>D3<br>E4<br>D2<br>D2<br>D2<br>D2<br>B4<br>E2<br>E2<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| E4<br>E1<br>D2<br>C2<br>D1<br>F4<br>E3<br>C3<br>D2<br>D1<br>C3<br>E3<br>F3<br>F3<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                               | R507<br>R509<br>R513<br>R514<br>R515<br>R516<br>R517<br>R523<br>R537<br>R538<br>R541<br>R542<br>R546<br>R547<br>R553<br>R556<br>R557<br>R558<br>R559<br>R559<br>R562                                                                                 | A2<br>A1<br>B1<br>C1<br>C1<br>C1<br>F1<br>F1<br>F1<br>F1<br>F1<br>C2<br>C2<br>C2<br>C2<br>C2<br>C2<br>D2<br>D2                                                                                                                                                                                       | E2<br>E1<br>F2<br>F2<br>F2<br>E4<br>D1<br>D1<br>C2<br>D1<br>C2<br>E3<br>E4<br>E4<br>E4<br>C3<br>D3                                                                                                                                                                                                                                                                                                                                                                                       | TP503<br>TP519<br>TP520<br>TP523<br>TP541<br>TP543<br>TP547<br>TP549<br>TP563<br>TP620<br>TP621<br>U503A<br>U503B<br>U503C<br>U503D<br>U510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A2<br>C1<br>D1<br>C1<br>F1<br>G1<br>G1<br>G3<br>G3<br>G3<br>C1<br>A2<br>A3<br>C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | F2<br>E3<br>D3<br>E4<br>D2<br>D2<br>D2<br>D2<br>E2<br>F3<br>F3<br>F3<br>F3<br>F3<br>F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| E1<br>D2<br>C2<br>D1<br>F4<br>E3<br>C3<br>D2<br>D1<br>C3<br>E3<br>F3<br>F3<br>F3<br>F3<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                               | R509<br>R513<br>R514<br>R515<br>R516<br>R517<br>R523<br>R532<br>R537<br>R538<br>R541<br>R542<br>R546<br>R547<br>R553<br>R556<br>R557<br>R558<br>R559<br>R559<br>R562                                                                                 | A1<br>B1<br>B1<br>C1<br>C1<br>C1<br>F1<br>F1<br>F1<br>F1<br>F1<br>C2<br>C2<br>C2<br>C2<br>C2<br>D2<br>D2                                                                                                                                                                                             | E1<br>F2<br>F2<br>F2<br>F2<br>F2<br>E4<br>D1<br>D1<br>D1<br>C2<br>D1<br>D2<br>C2<br>E3<br>E4<br>E4<br>E4<br>C3<br>D3                                                                                                                                                                                                                                                                                                                                                                     | TP503<br>TP519<br>TP520<br>TP523<br>TP541<br>TP543<br>TP547<br>TP549<br>TP563<br>TP620<br>TP621<br>U503A<br>U503B<br>U503C<br>U503D<br>U510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A2<br>C1<br>D1<br>C1<br>F1<br>G1<br>G1<br>G3<br>G3<br>G3<br>C1<br>A2<br>A3<br>C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | F2<br>E3<br>D3<br>E4<br>D2<br>D2<br>D2<br>D2<br>E2<br>F3<br>F3<br>F3<br>F3<br>F3<br>F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| D2<br>C2<br>D1<br>F4<br>E3<br>C3<br>D2<br>D1<br>C3<br>E3<br>F3<br>F3<br>F3<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                                                 | R513<br>R514<br>R515<br>R516<br>R517<br>R523<br>R537<br>R538<br>R541<br>R542<br>R546<br>R547<br>R553<br>R556<br>R557<br>R558<br>R559<br>R559<br>R562                                                                                                 | B1<br>B1<br>C1<br>C1<br>F1<br>F1<br>F1<br>F1<br>F1<br>F1<br>C2<br>C2<br>C2<br>C2<br>C2<br>D2<br>D2                                                                                                                                                                                                   | F2<br>F2<br>F2<br>F2<br>F2<br>F1<br>D1<br>D1<br>D1<br>D1<br>D2<br>C2<br>E3<br>E4<br>E4<br>E4<br>C3<br>D3                                                                                                                                                                                                                                                                                                                                                                                 | TP519<br>TP520<br>TP523<br>TP541<br>TP543<br>TP547<br>TP549<br>TP563<br>TP620<br>TP621<br>U503A<br>U503B<br>U503C<br>U503D<br>U510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | C1<br>D1<br>F1<br>F1<br>G1<br>G3<br>G3<br>G3<br>C1<br>A2<br>A3<br>C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | E3<br>D3<br>E4<br>D2<br>D2<br>D2<br><b>D2</b><br>B4<br>E2<br>E2<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| C2<br>D1<br>F4<br>E3<br>C3<br>D2<br>D1<br>C3<br>E3<br>F3<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                                                             | R514<br>R515<br>R516<br>R517<br>R523<br>R532<br>R538<br>R541<br>R542<br>R546<br>R547<br>R553<br>R556<br>R557<br>R558<br>R559<br>R559<br>R562                                                                                                         | B1<br>B1<br>C1<br>C1<br>F1<br>F1<br>F1<br>F1<br>F1<br>C2<br>C2<br>C2<br>C2<br>C2<br>D2<br>D2                                                                                                                                                                                                         | F2<br>F2<br>F2<br>E4<br>D1<br>D1<br>C2<br>D1<br>C2<br>C2<br>E3<br>E4<br>E4<br>E4<br>C3<br>D3                                                                                                                                                                                                                                                                                                                                                                                             | TP519<br>TP520<br>TP523<br>TP541<br>TP543<br>TP547<br>TP549<br>TP563<br>TP620<br>TP621<br>U503A<br>U503B<br>U503C<br>U503D<br>U510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | C1<br>D1<br>F1<br>F1<br>G1<br>G3<br>G3<br>G3<br>C1<br>A2<br>A3<br>C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | E3<br>D3<br>E4<br>D2<br>D2<br>D2<br><b>D2</b><br>B4<br>E2<br>E2<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| F4<br>E3<br>C3<br>D2<br>D1<br>C3<br>F3<br>F3<br>F3<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                                                             | R516<br>R517<br>R523<br>R532<br>R537<br>R538<br>R541<br>R542<br>R546<br>R547<br>R553<br>R556<br>R557<br>R558<br>R559<br>R559<br>R562                                                                                                                 | C1<br>C1<br>F1<br>F1<br>F1<br>F1<br>F1<br>F1<br>C2<br>C2<br>C2<br>C2<br>C2<br>D2<br>D2                                                                                                                                                                                                               | F2<br>F2<br>E4<br>D1<br>D1<br>C2<br>C2<br>E3<br>E4<br>E4<br>E4<br>C3<br>D3                                                                                                                                                                                                                                                                                                                                                                                                               | TP520<br>TP523<br>TP541<br>TP543<br>TP549<br>TP563<br>TP620<br>TP621<br>U503A<br>U503B<br>U503C<br>U503D<br>U510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | D1<br>C1<br>F1<br>G1<br>G1<br>G3<br>G3<br>G3<br>C1<br>A2<br>A3<br>C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | E4<br>D2<br>D2<br><b>D2</b><br>B4<br>E2<br>E2<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| E3<br>C3<br>D1<br>C3<br>E3<br>F3<br>F3<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                                                                               | R517<br>R523<br>R532<br>R537<br>R538<br>R541<br>R542<br>R546<br>R547<br>R553<br>R556<br>R556<br>R556<br>R559<br>R559<br>R562                                                                                                                         | C1<br>C1<br>F1<br>F1<br>F1<br>F1<br>F1<br>F1<br>C2<br>C2<br>C2<br>C2<br>C2<br>D2<br>D2                                                                                                                                                                                                               | F2<br>E4<br>D1<br>D1<br>C2<br>D1<br>C2<br>C2<br>E3<br>E4<br>E4<br>C3<br>D3                                                                                                                                                                                                                                                                                                                                                                                                               | TP541<br>TP543<br>TP547<br>TP549<br>TP563<br>TP620<br>TP621<br>U503A<br>U503B<br>U503C<br>U503D<br>U510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | F1<br>F1<br>G1<br>A4<br>G3<br>G3<br>C1<br>A2<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | D2<br>D2<br>D2<br>B4<br>E2<br>E2<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| C3<br>D2<br>D1<br>C3<br>E3<br>F3<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                                                                               | R523<br>R537<br>R537<br>R548<br>R541<br>R546<br>R546<br>R547<br>R553<br>R556<br>R557<br>R558<br>R559<br>R562                                                                                                                                         | C1<br>F1<br>F1<br>F1<br>F1<br>F1<br>C2<br>C2<br>C2<br>C2<br>C2<br>C2<br>D2<br>D2                                                                                                                                                                                                                     | E4<br>D1<br>D1<br>C2<br>D1<br>C2<br>C2<br>E3<br>E4<br>E4<br>E4<br>C3<br>D3                                                                                                                                                                                                                                                                                                                                                                                                               | TP543<br>TP547<br>TP549<br>TP563<br>TP620<br>TP621<br>U503A<br>U503B<br>U503C<br>U503D<br>U510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | F1<br>G1<br>G1<br>A4<br>G3<br>G3<br>C1<br>A3<br>C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | D2<br>D2<br>D2<br>B4<br>E2<br>E2<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| D2<br>D1<br>C3<br>F3<br>F3<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                                                                                     | R532<br>R537<br>R538<br>R541<br>R542<br>R546<br>R547<br>R553<br>R556<br>R557<br>R558<br>R559<br>R559<br>R562                                                                                                                                         | F1<br>F1<br>F1<br>F1<br>F1<br>F1<br>C2<br>C2<br>C2<br>C2<br>C2<br>D2<br>D2                                                                                                                                                                                                                           | D1<br>D1<br>C2<br>D1<br>D2<br>C2<br>E3<br>E4<br>E4<br>E4<br>C3<br>D3                                                                                                                                                                                                                                                                                                                                                                                                                     | TP547<br>TP549<br>TP563<br>TP620<br>TP621<br>U503A<br>U503B<br>U503C<br>U503D<br>U510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | G1<br>G1<br>A4<br>G3<br>G3<br>C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | D2<br>D2<br>B4<br>E2<br>E2<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| D1<br>C3<br>F3<br>F3<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                                                                                           | R537<br>R538<br>R541<br>R542<br>R546<br>R547<br>R553<br>R556<br>R557<br>R558<br>R559<br>R559<br>R562                                                                                                                                                 | F1<br>F1<br>F1<br>F1<br>F1<br>C2<br>C2<br>C2<br>C2<br>D2<br>D2<br>D2                                                                                                                                                                                                                                 | D1<br>D1<br>C2<br>D1<br>D2<br>C2<br>E3<br>E4<br>E4<br>C3<br>D3                                                                                                                                                                                                                                                                                                                                                                                                                           | TP549<br>TP563<br>TP620<br>TP621<br>U503A<br>U503B<br>U503C<br>U503D<br>U503D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | G1<br>A4<br>G3<br>G3<br>A3<br>C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | D2<br>B4<br>E2<br>E2<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C3<br>E3<br>F3<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                                                                                                 | R538<br>R541<br>R542<br>R546<br>R547<br>R553<br>R556<br>R556<br>R558<br>R559<br>R559<br>R562                                                                                                                                                         | F1<br>F1<br>F1<br>F1<br>C2<br>C2<br>C2<br>C2<br>C2<br>D2<br>D2<br>D2                                                                                                                                                                                                                                 | D1<br>C2<br>D1<br>D2<br>C2<br>E3<br>E4<br>E4<br>C3<br>D3                                                                                                                                                                                                                                                                                                                                                                                                                                 | TP563<br>TP620<br>TP621<br>U503A<br>U503B<br>U503C<br>U503D<br>U510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | A4<br>G3<br>G3<br>C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | B4<br>E2<br>E2<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F3<br>F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| E3<br>F3<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                                                                                                       | R541<br>R542<br>R546<br>R547<br>R553<br>R556<br>R557<br>R558<br>R558<br>R559<br>R559                                                                                                                                                                 | F1<br>F1<br>F1<br>C2<br>C2<br>C2<br>C2<br>D2<br>D2                                                                                                                                                                                                                                                   | C2<br>D1<br>D2<br>C2<br>E3<br>E4<br>E4<br>C3<br>D3                                                                                                                                                                                                                                                                                                                                                                                                                                       | TP620<br>TP621<br>U503A<br>U503B<br>U503C<br>U503D<br>U510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | G3<br>G3<br>C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | E2<br>E2<br>F3<br>F3<br>F3<br>F3<br>F3<br>F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| F3<br>F3<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                                                                                                             | R542<br>R546<br>R547<br>R553<br>R556<br>R557<br>R558<br>R559<br>R559<br>R562                                                                                                                                                                         | F1<br>F1<br>C2<br>C2<br>C2<br>D2<br>D2                                                                                                                                                                                                                                                               | D1<br>D2<br>C2<br>E3<br>E4<br>E4<br>C3<br>D3                                                                                                                                                                                                                                                                                                                                                                                                                                             | TP621<br>U503A<br>U503B<br>U503C<br>U503D<br>U510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | G3<br>C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | E2<br>F3<br>F3<br>F3<br>F3<br>F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| F3<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                                                                                                                   | R546<br>R547<br>R553<br>R556<br>R557<br>R558<br>R559<br>R559                                                                                                                                                                                         | F1<br>F1<br>C2<br>C2<br>C2<br>D2<br>D2<br>D2                                                                                                                                                                                                                                                         | D2<br>C2<br>E3<br>E4<br>E4<br>C3<br>D3                                                                                                                                                                                                                                                                                                                                                                                                                                                   | U503A<br>U503B<br>U503C<br>U503D<br>U510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | A3<br>C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | F3<br>F3<br>F3<br>F3<br>F3<br>F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>D4<br>E4                                                                                                                                                                                                                                                                         | R547<br>R553<br>R556<br>R557<br>R558<br>R559<br>R559<br>R562                                                                                                                                                                                         | F1<br>C2<br>C2<br>C2<br>D2<br>D2<br>D2                                                                                                                                                                                                                                                               | C2<br>E3<br>E4<br>E4<br>C3<br>D3                                                                                                                                                                                                                                                                                                                                                                                                                                                         | U503B<br>U503C<br>U503D<br>U510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | C1<br>A2<br>A3<br>B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | F3<br>F3<br>F3<br>F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| F 2                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | E1<br>F3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | F3<br>F3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                            | F2<br>D4<br>D4<br>D4<br>D4                                                                                                                                                                                                                           | F2         R574<br>R575           D4         R509           D4         R602A           D4         R602B           D4         R602C           D4         R602D           J4         R603D           J4         R603A           F1         R603B           G3         R603C           F2         R603E | F2         R574         D4           R575         D4           D4         R599         E5           D4         R602A         G2           D4         R602B         G3           D4         R602C         G3           D4         R602C         G3           J4         R602C         G3           J4         R603C         G3           F1         R603B         F4           G3         R603C         F4           R603D         F4         F603D           F2         R603E         F4 | F2         R574         D4         E3           R575         D4         E3           D4         R599         E5         F3           D4         R602A         G2         E2           D4         R602B         G3         E2           D4         R602C         G3         E2           D4         R602C         G3         E2           D4         R602C         G3         E2           J4         R602C         G3         E2           J4         R603C         G3         D2           F1         R603B         F4         D2           G3         R603C         F4         D2           R603D         F4         D2           F2         R603E         F4         D2 | F2         R574         D4         E3         U569A           R575         D4         E3         U569B           D4         R599         E5         F3         U570           D4         R602A         G2         E2         U575           D4         R602B         G3         E2         U580           D4         R602C         G3         E2         U590           J4         R602C         G3         E2         U590           J4         R602E         G3         E2         U590           J4         R603A         G3         D2         U610           F1         R603B         F4         D2         U620           G3         R603C         F4         D2         U621A           R603D         F4         D2         U621B         F2           F2         R603E         F4         D2         U621A | F2         R574         D4         E3         U569A         D4           R575         D4         E3         U569B         C3           D4         R599         E5         F3         U570         C3           D4         R602A         G2         E2         U575         F3           D4         R602B         G3         E2         U580         F3           D4         R602C         G3         E2         U585         E3           D4         R602C         G3         E2         U585         E3           D4         R602C         G3         E2         U585         D4           J4         R602E         G3         E2         U590         E4           J4         R603A         G3         D2         U610         G3           F1         R603B         F4         D2         U620         G4           G3         R603C         F4         D2         U621A         G2           F2         R603E         F4         D2         U630A         F5 |

# **DIGITIZER DIAGRAM 26**

#### WAVEFORM CONDITIONS

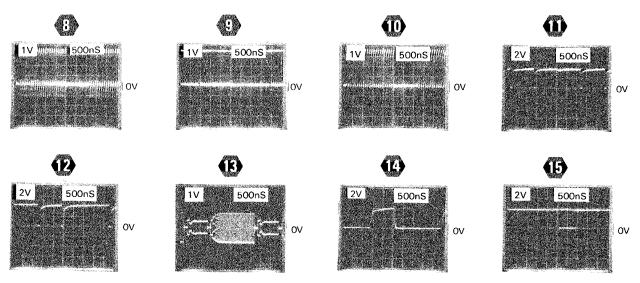
The waveforms shown were taken with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B); READOUT INTENSITY (MIDRANGE).

Waveform Conditions. The waveforms shown below were obtained using a test oscilloscope system with 10 M $\Omega$  input impedance, at least 60 MHz bandwidth and 10X probe (Tektronix 7603 Oscilloscope, 7B92 Time Base, 7A13 Differential Comparator and P6063A Probe).

A Tektronix 7A26 Dual Trace Amplifier with controls set as follows: VOLTS/DIV (0.1 V); DISPLAY MODE (CH1); was installed in the LEFT VERT compartment of the 7854.

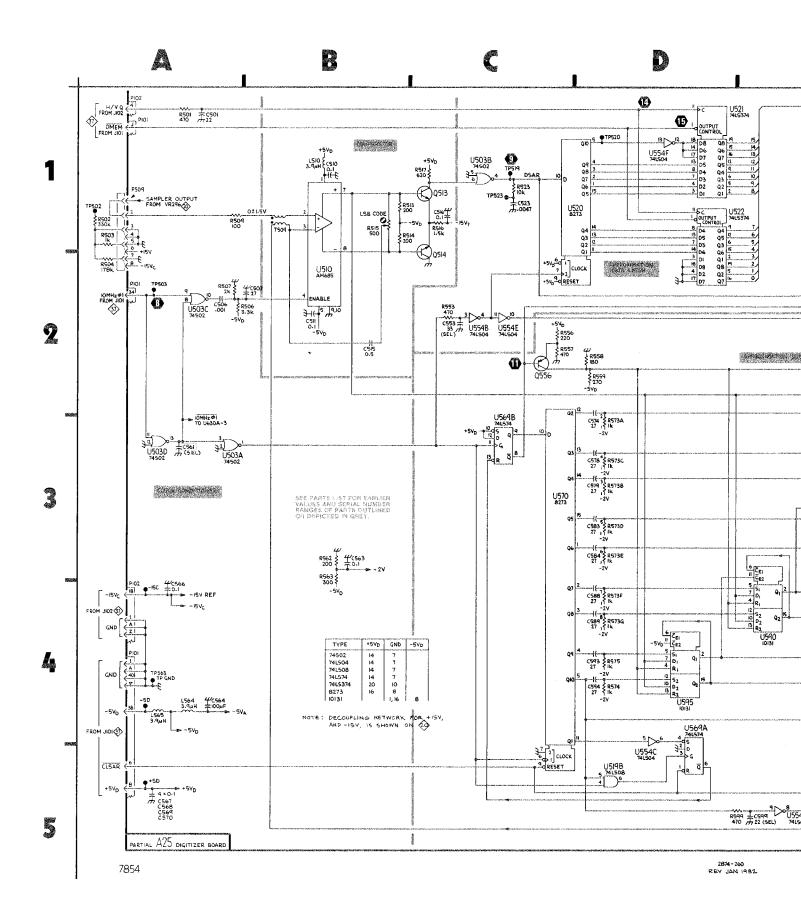
The 0.4 V CALIBRATOR signal was applied to the channel 1 bnc connector.

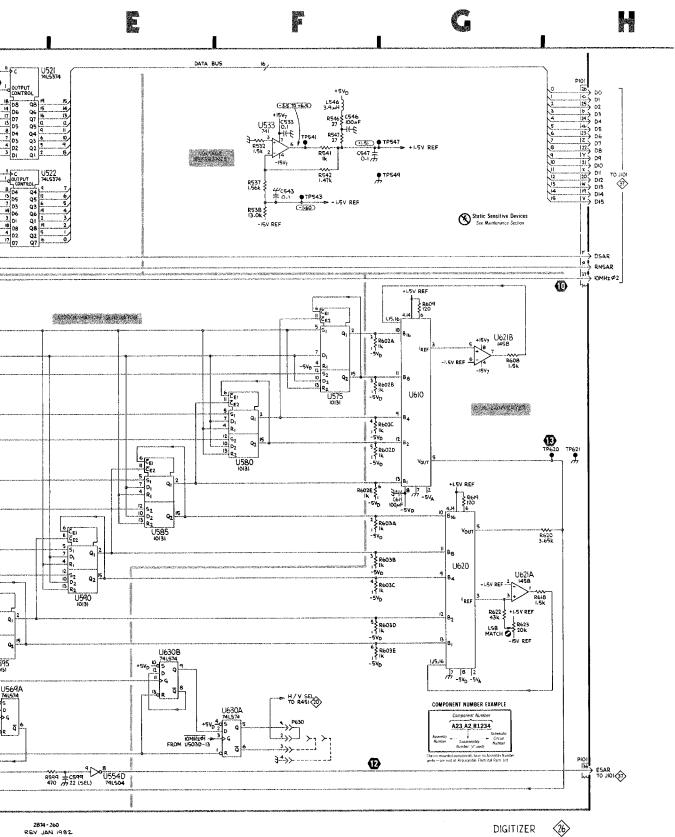
A Tektronix 7B15 Time Base with controls set as follows: TRIGGERING (NORM, AC, INT); TIME/DIV (1 ms); was installed in the B HORIZ compartment of the 7854.



### Selectable Electrical Parts Table For Schematic 26.

| Component Number | Reason for Selection                                                                                                                      | Component Value              |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| A25C553          | Falling edge of last clock should be<br>20-30ns later than rising edge of<br>pulse at TP519. (Select C553 first<br>to avoid interaction). | 33pF<br>27pF<br>40pF<br>47pF |
| A25C561          | Increase C561 until R515 has proper range.                                                                                                | 33-62pF                      |
| A25C599          | Rising edge at pin 36 of P101 should<br>be 5-15ns later than rising edge<br>at TP520.                                                     | 15рF<br>27рF<br>ЗЗрF         |

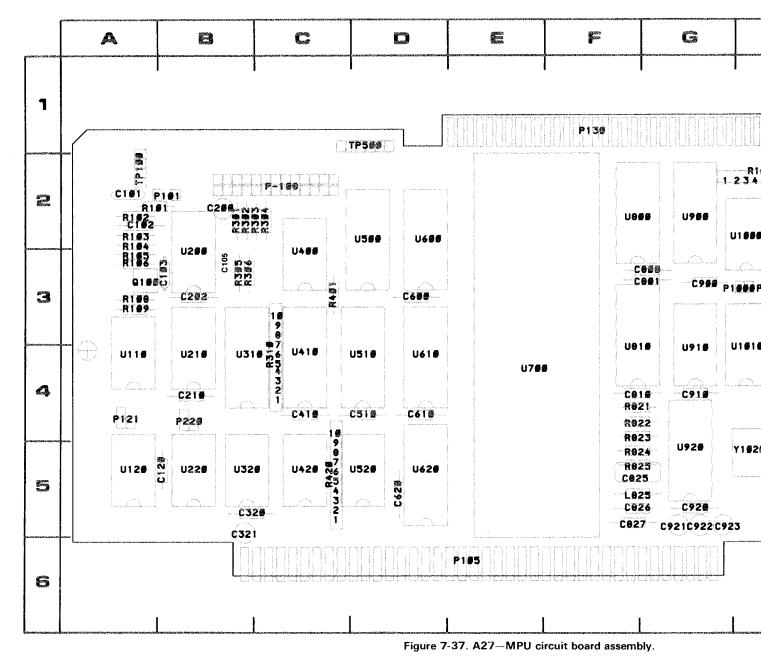




26 Digitizer

Reverse Side



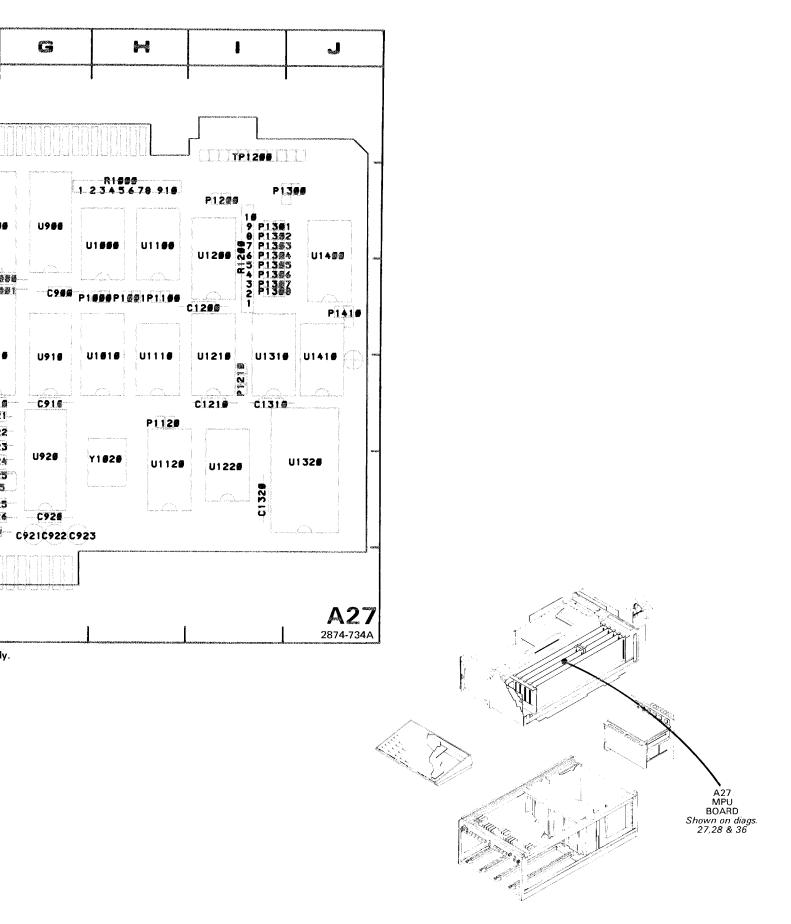


Static Sensitive Devices See Maintenance Section

# COMPONENT NUMBER EXAMPLE

|                    | Component Numb                  | er                             |
|--------------------|---------------------------------|--------------------------------|
| , r                | A23 A2 R123                     | 4                              |
| Assembly<br>Number | Subassembly<br>Number (if used) | Schematic<br>Circuit<br>Number |

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.





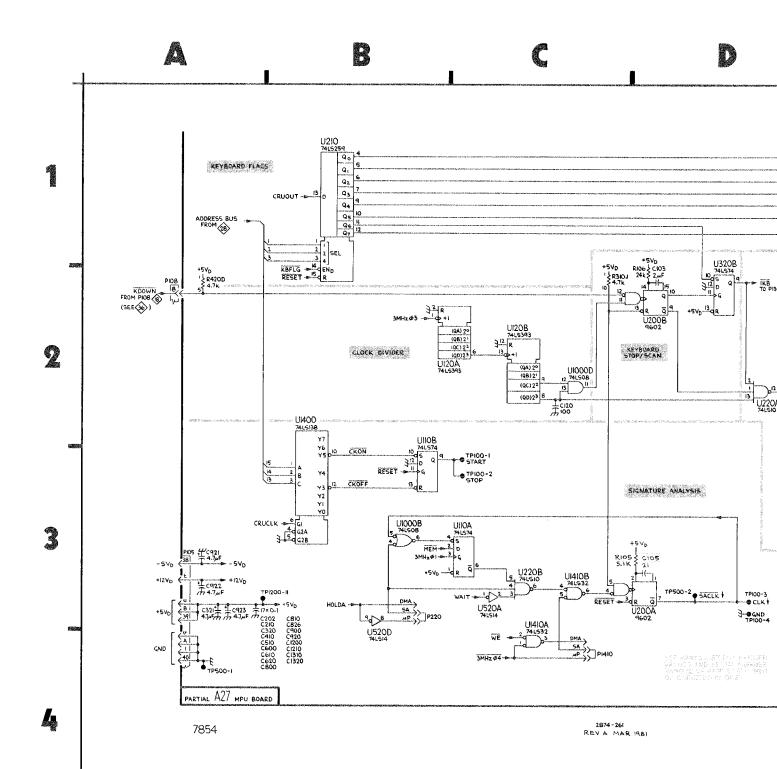
# KEYBOARD INTERFACE AND SIGNATURE ANALYSIS DIAGRAM 27

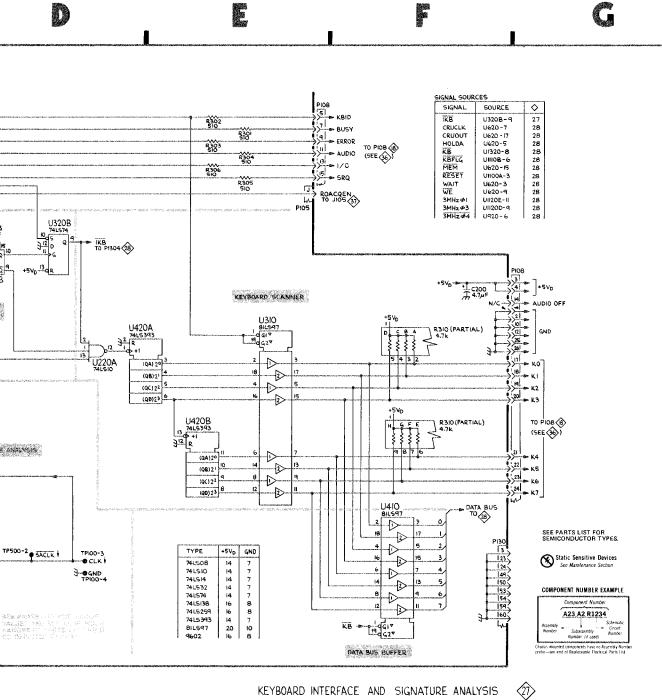
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L.

| PARTIAL           | A27 ASSY          |                   |                      |                   |                                                                                                                  |
|-------------------|-------------------|-------------------|----------------------|-------------------|------------------------------------------------------------------------------------------------------------------|
| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER    | SCHEM<br>LOCATION | BOARD<br>LOCATION                                                                                                |
| C103              | D2                | B2                | R303                 | E1                | B2                                                                                                               |
| C105*             | 02                | B3                | R304                 | E1                | C2                                                                                                               |
| C120              | C2                | B5                | R305                 | E1                | B3                                                                                                               |
| C200              | F2                | B2                | R306                 | E1                | B3                                                                                                               |
| C202              | A3                | B3                | R310                 | F2                | C4                                                                                                               |
| C210              | A3                | B4                | R310                 | F3                | C4                                                                                                               |
| C320              | A3                | B5                | R310J                | C2                | C4                                                                                                               |
| C321              | A3                | 85                | R420D                | A2                | C5                                                                                                               |
| C410              | A3                | C4                |                      |                   |                                                                                                                  |
| C510              | A3                | D4                | TP100                | C3                | A2                                                                                                               |
| C600              | A3                | D3                | TP100                | D3                | A2                                                                                                               |
| C610              | A3                | D4                | TP500                | A4                | D1                                                                                                               |
| C620              | A3                | D5                | TP500                | D3                | D1                                                                                                               |
| C800              | A3                | G3                | TP1200               | A3                | 11                                                                                                               |
| C810              | A3                | G4                |                      |                   |                                                                                                                  |
| C826              | A3                | G5                | U110A                | C3                | A4                                                                                                               |
| C900              | A3                | G3                | U110B                | B2                | A4                                                                                                               |
| C920              | A3                | G5                | U120A                | C2                | A5                                                                                                               |
| C921              | A3                | G5                | U120B                | C2                | A5                                                                                                               |
| C922              | A3                | G5                | U200A                | D3                | B3                                                                                                               |
| C923              | A3                | G5                | U200B                | D2                | B3                                                                                                               |
| C1200             | A3                | 13                | U210                 | B1                | B4                                                                                                               |
| C1210             | A3                | 14                | U220A                | D2                | B5                                                                                                               |
| C1310             | A3                | 14                | U220B                | C3                | B5                                                                                                               |
| C1320             | A3                | 15                | U310                 | E2                | B4                                                                                                               |
|                   |                   |                   | U320B                | D1                | B5                                                                                                               |
| P105              | A3                | E6                | U410                 | F3                | C4                                                                                                               |
| P105              | E1                | E6                | U420A                | D2                | C5                                                                                                               |
| P108              | E1                | C2                | U420B                | E3                | C5                                                                                                               |
| P108              | G2                | C2                | U520A                | C3                | D5                                                                                                               |
| P130              | F3                | F1                | U520D                | B3                | D5                                                                                                               |
| P220              | B3                | B4                | U1000B               | B3                | H2                                                                                                               |
| P1410             | C4                | 73                | U1000D               | C2                | H2                                                                                                               |
| P105              | D2                | 4.2               | U1400<br>U1410A      | B2                | J2                                                                                                               |
| R105              | D3<br>D2          | A3                | U1410A               | C3<br>C3          | J4                                                                                                               |
| R106              | E1                | A3                |                      | L3                | J4                                                                                                               |
| R301              |                   | B2                |                      |                   |                                                                                                                  |
| R302              | E 1               | B2                | Kineperint Interview | ****              | and the second |
|                   |                   | own on diagrai    |                      |                   |                                                                                                                  |

\*See Parts List for serial number ranges.





KEYBOARD INTERFACE AND SIGNATURE ANALYSIS

Keybd Interface

Reverse Side



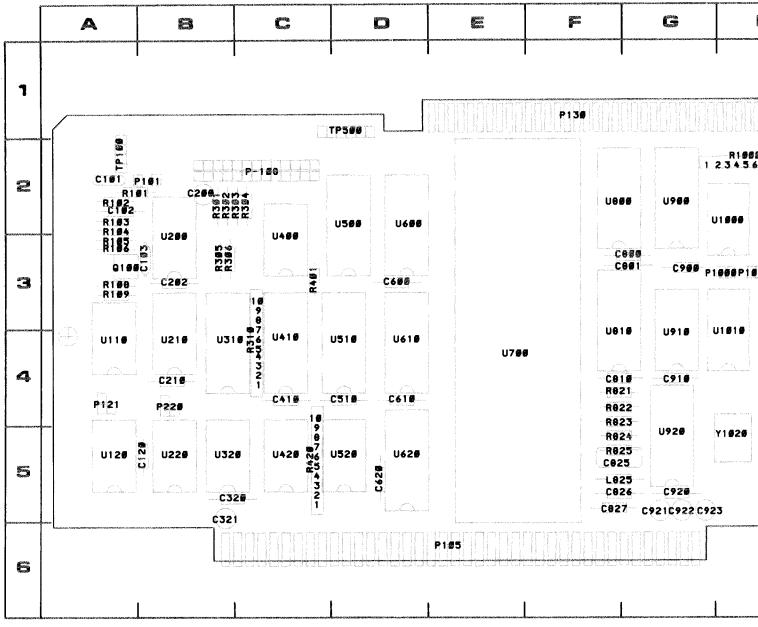
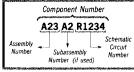


Figure 7-38. A27---MPU circuit board assembly.

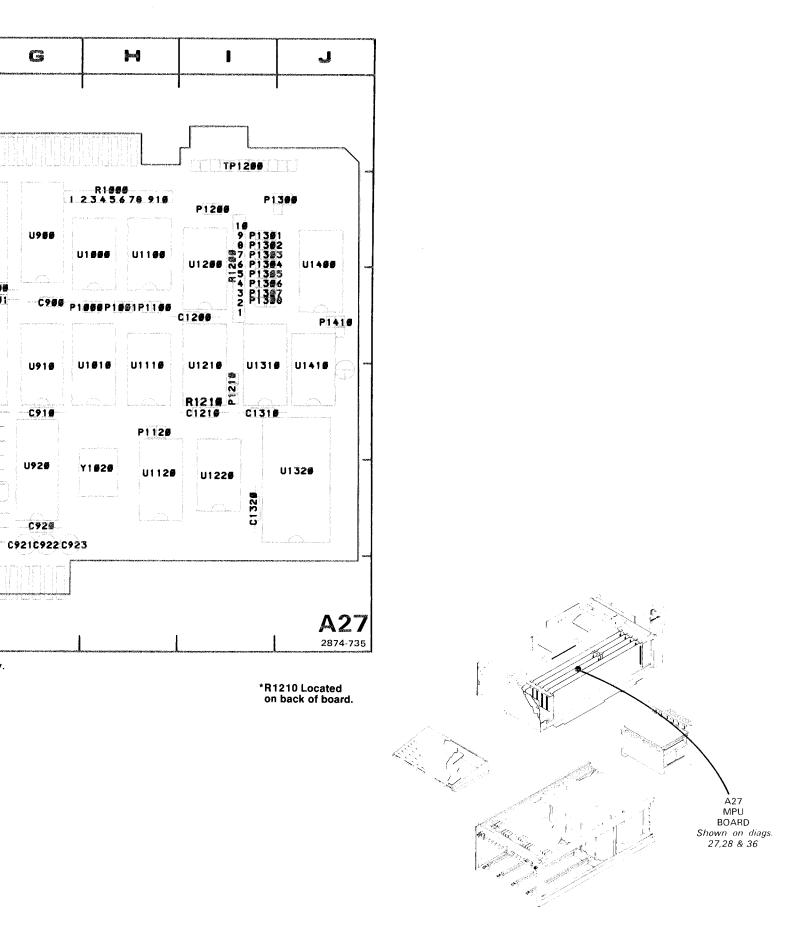


COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Numbe prefix—see end of Replaceable Electrical Parts List.

ASSEMDIN MC /

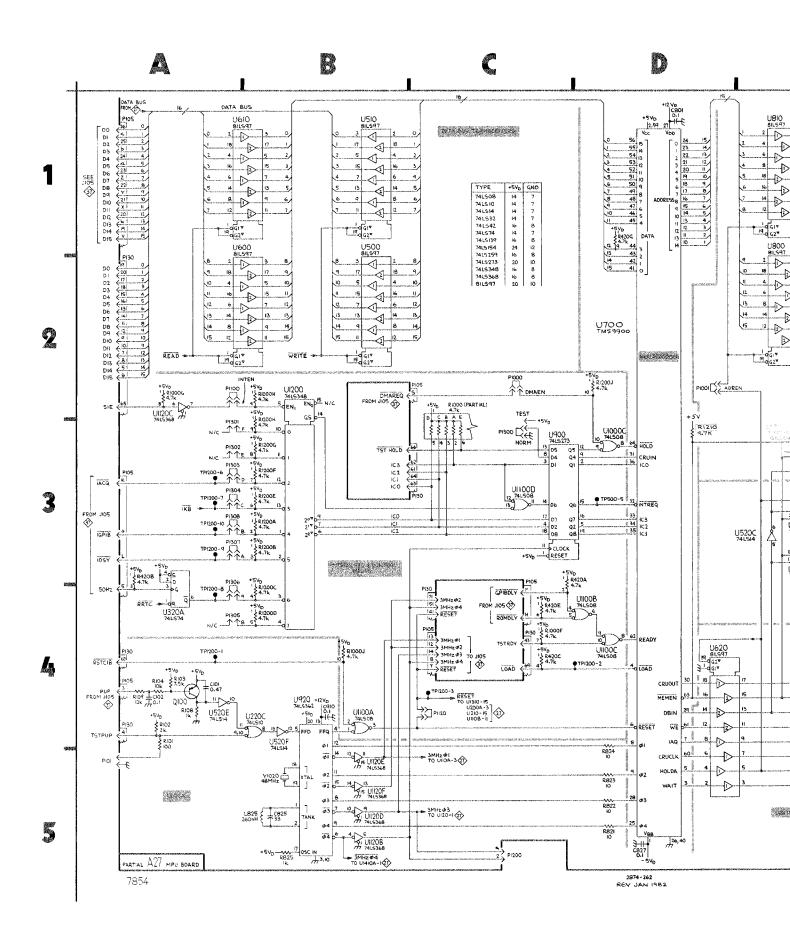


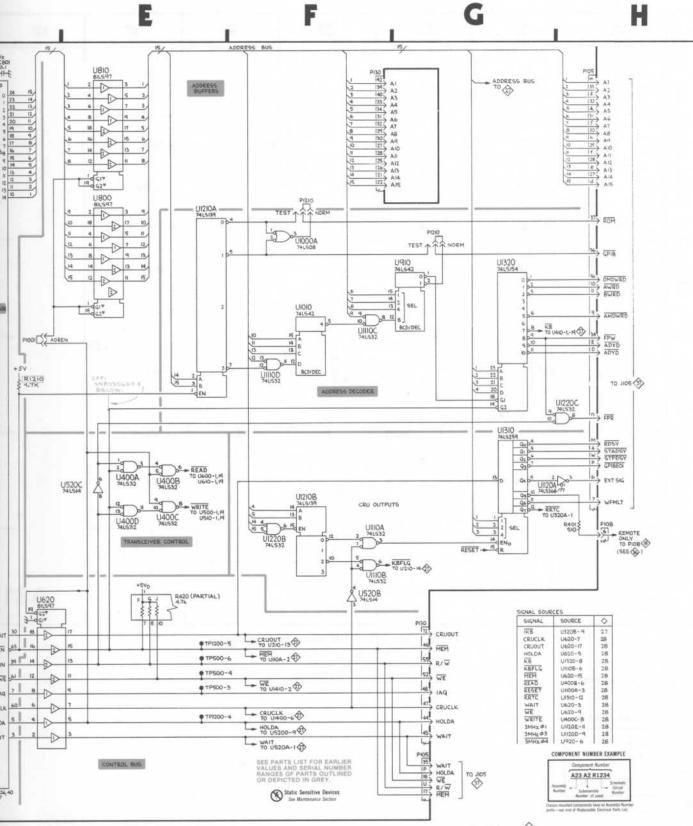
## **REV JUN 1981**

| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM    | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATIO |
|-------------------|-------------------|-------------------|-------------------|----------|-------------------|-------------------|-------------------|------------------|
| C101              | A4                | A2                | R102              | A4       | A2                | U400B             | E3                | C3               |
| C102              | A4                | A2                | R103              | A4       | A2                | U400C             | E3                | C3               |
| C801              | D1                | G3                | R104              | A4       | A2                | U400D             | E3                | C3               |
| C825              | B5                | G5                | R108              | A4       | A3                | U500              | B2                | D2               |
| C827              | D5                | G5                | R109              | A4       | A3                | U510              | B1                | D4               |
| C910              | 84                | G4                | R401              | H3       | C3                | U520B             | F4                | D5               |
| 1005              | Dr                | C.F.              | R420              | E4       | C5                | U520C             | E3                | D5               |
| L825              | B5                | G5                | R420A             | C4       | C5                | U520E             | A4                | D5               |
| <b>D101</b>       | 4.5               | <b>D</b> 2        | R420B             | A3       | C5                | U520F             | B4                | D5               |
| P101<br>P105      | A5<br>A1          | B2<br>E6          | R420C<br>R420E    | C4<br>C4 | C5<br>C5          | U600<br>U610      | A2                | D2               |
| P105<br>P105      | A1<br>A3          | E6                | R420E<br>R420G    | D1       | C5<br>C5          | U610              | A1<br>D4          | D4               |
| P105<br>P105      | A3<br>A4          | E6                | R821              | D5       | G4                | U700              | D4<br>D2          | D5               |
| P105              | C2                | E6                | R822              | D5<br>D5 | G4<br>G4          | U800              | 62<br>E2          | E4               |
| P105              | C2<br>C4          | E6                | R823              | D5       | G4<br>G4          | U800              | E2                | G2<br>G4         |
| P105              | G1                | E6                | R824              | D5       | G5                | U900              | C3                | G2               |
| P105              | G5                | E6                | R825              | 85       | G5                | U910              | G2                | G2<br>G4         |
| P108              | G3                | C2                | R1000             | C3       | H2                | U920              | 82<br>B5          | G5               |
| P121              | F1                | A4                | R1000F            | C4       | H2                | U1000A            | F2                | H2               |
| P130              | A2                | F1                | R1000G            | A2       | H2                | U1000C            | D3                | H2               |
| P130              | A4                | F1                | R1000H            | 82       | H2                | U1000D            | C3                | H2               |
| P130              | C3                | F1                | R1000J            | B4       | H2                | U1010             | F2                | H4               |
| P130              | C4                | F1                | R1200A            | B3       | 12                | U1100A            | B4                | H2               |
| P130              | F1                | F1                | R1200B            | B3       | 12                | U1100B            | D4                | H2               |
| P130              | G4                | F1                | R1200C            | B4       | 12                | U1100C            | D4                | H2               |
| P1000             | C2                | H3                | R1200D            | B4       | 12                | U1110A            | F4                | H4               |
| P1001             | D2                | нз                | R1200E            | B3       | 12                | U1110B            | F4                | H4               |
| P1100             | A2                | нз                | R1200F            | B3       | 12                | U1110C            | F2                | H4               |
| P1120             | C4                | H4                | R1200G            | B3       | 12                | U1110D            | F2                | H4               |
| P1200             | C5                | 12                | R1200H            | В3       | 12                | U1120A            | G3                | H5               |
| P1210             | G2                | 14                | R1200J            | D2       | 12                | U1120B            | <b>B</b> 5        | H5               |
| P1300             | C3                | J2                | R1210             | D3       | •                 | U1120C            | A2                | H5               |
| P1301             | A3                | 12                |                   |          |                   | U1120D            | B5                | H5               |
| P1302             | A3                | 12                | TP500             | D3       | D1                | U1120E            | B5                | H5               |
| P1303             | A3                | 12                | TP500             | E4       | D1                | U1120F            | B5                | H5               |
| P1304             | A3                | 12                | TP1200            | A4       | 11                | U1200             | B3                | 12               |
| P1305             | A4                | 13                | TP1200            | A3       | 11                | U1210A            | E2                | 13               |
| P1306             | A3                | 13                | TP1200            | A4       | 11                | U1210B            | F3                | 13               |
| P1307             | A3                | 13                | TP1200            | C4       | 11                | U1220B            | F3                | 15               |
| P1308             | A3                | 13                | TP1200            | D4       | 11                | U1220C            | нз                | 15               |
|                   |                   |                   | TP1200            | E4       | 1                 | U1310             | G3                | 14               |
| Q100              | A4                | A3                | U220C             | В4       | B5                | U1320             | G2                | J5               |
| B101              | A4                | A2                | U320C             | 84<br>A4 | 85<br>85          | VICES             | 07                |                  |
| R101              | A4                | AZ                | U400A             | E3       | в5<br>С3          | Y1020             | B5                | H5               |

# MICROPROCESSOR AND CONTROL DIAGRAM 28

\*Located on back of board.





MICROPROCESSOR AND CONTROL

28 Microprocessor and Control

Reverse Side

d.

Naseminy AGT

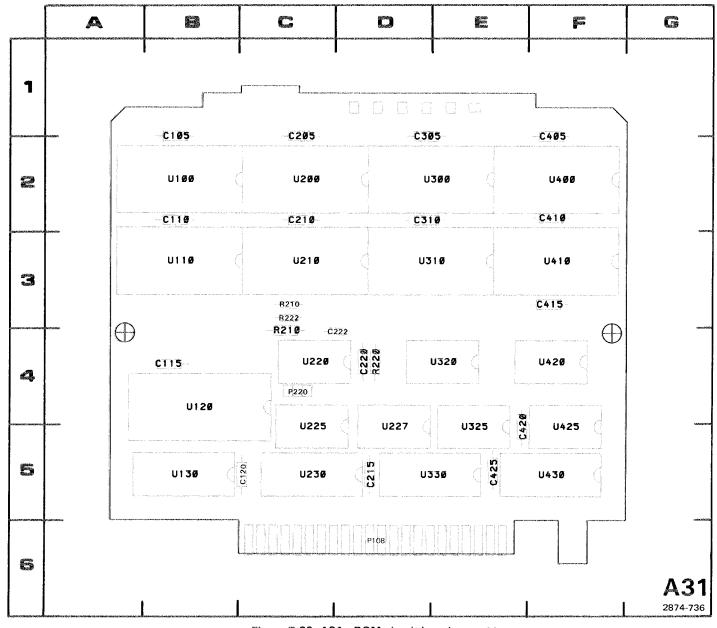


Figure 7-39. A31-ROM circuit board assembly.



COMPONENT NUMBER EXAMPLE

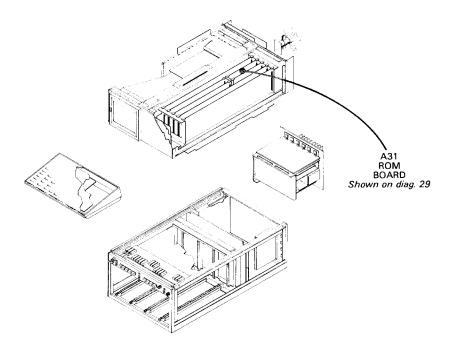


Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

REV A M

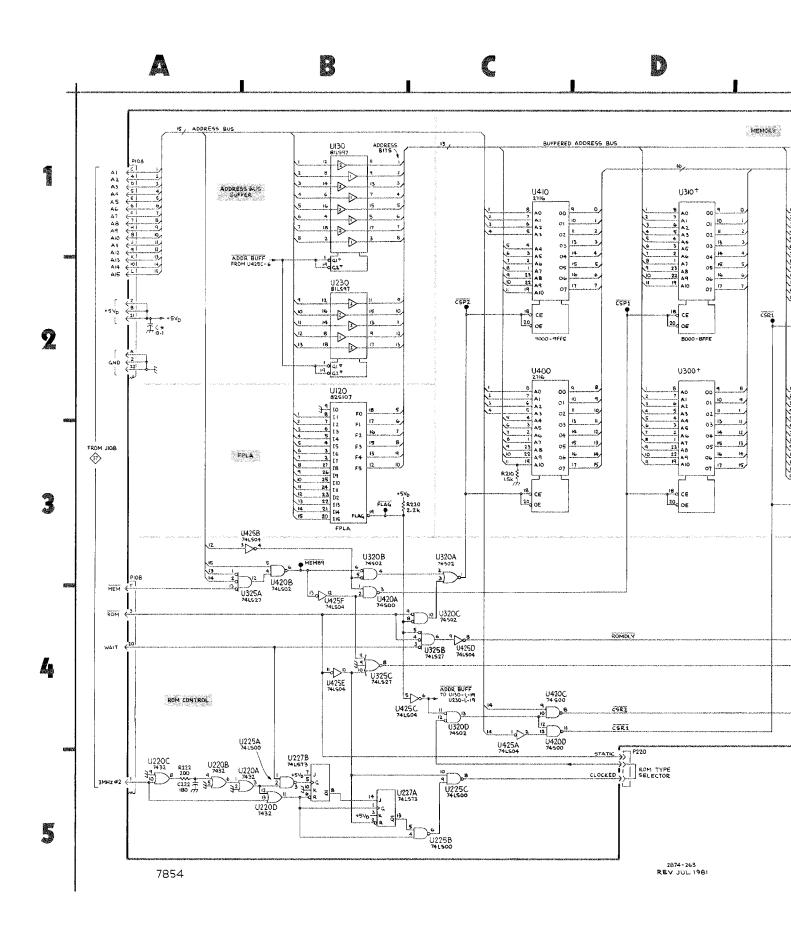
## **READ ONLY MEMORY DIAGRAM 29**

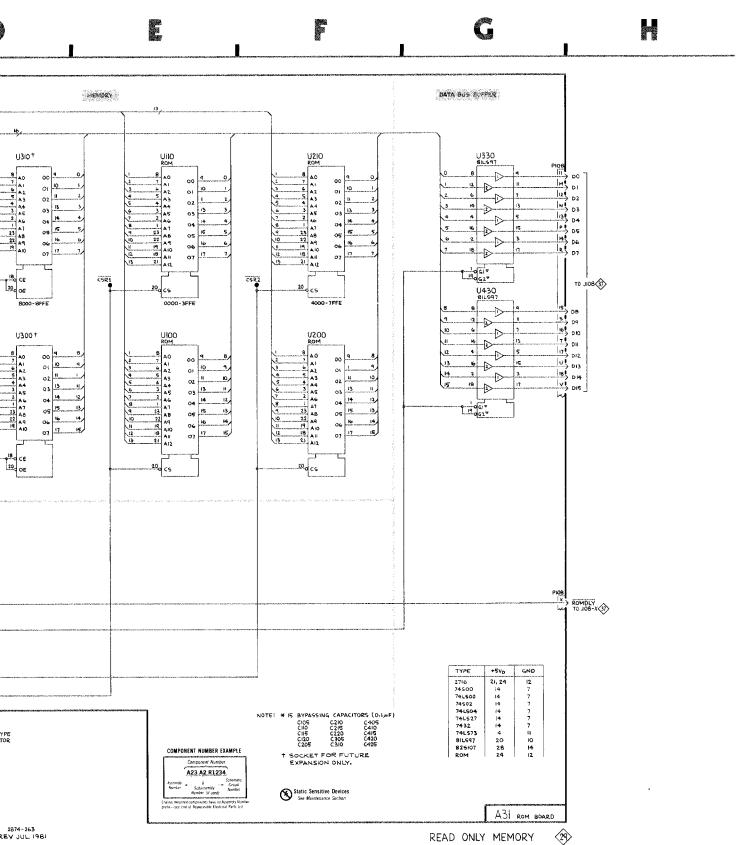
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | n an |            |                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------------|--------------------------------|
| A31 ASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Y        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                          |            |                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          | ******                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                          |            |                                |
| CIRCUIT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SCHEM    | BOARD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | CIRCUIT                                  | SCHEM      | BOARD                          |
| NUMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | LOCATION | LOCATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | NUMBER                                   | LOCATION   | LOCATION                       |
| AND A DESCRIPTION OF A |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                          |            |                                |
| C105                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A2       | B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U220B                                    | A5         | C4                             |
| C110                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A2       | B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U220C                                    | A5         | C4<br>C4                       |
| C115                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A2       | B4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U220D                                    | B5         |                                |
| C120                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A2       | B5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U225A                                    | B4         | C5                             |
| C205                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A2       | C1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U225B                                    | C5         | C5                             |
| C210                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A2       | C2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U225C                                    | C5         | C5                             |
| C215                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A2       | D5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U227A                                    | B5         | D4                             |
| C220                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A2       | D4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U227B                                    | B5         | D4                             |
| C222                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A5       | C3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U230                                     | B2         | C5                             |
| C305                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A2       | D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U300                                     | D2         | E2                             |
| C310                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A2       | D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U310                                     | D1         | E3                             |
| C405                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A2       | F1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U320A                                    | C3         | E4                             |
| C410                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A2       | F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U320B                                    | B3         | E4                             |
| C415                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A2       | F3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U320C                                    | C4         | E4                             |
| C420                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A2       | E5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U320D                                    | C4         | E4                             |
| C425                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A2       | E5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U325A                                    | В4         | E5                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | U325B                                    | C4         | E5                             |
| P108                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A1       | D5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U325C                                    | B4         | E5                             |
| P108                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A3       | D5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U330                                     | G1         | E5                             |
| P108                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | G1       | D5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U400                                     | C2         | F2                             |
| P220                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | D5       | C4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U410                                     | C1         | F3                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | U420A                                    | B4         | F4                             |
| R210                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | C3       | C4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U420B                                    | В3         | F4                             |
| R220                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | C3       | D4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U420C                                    | C4         | F4                             |
| R222                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A5       | C1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U420D                                    | C4         | F4                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | U425A                                    | C4         | F5                             |
| U100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | E2       | B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U425B                                    | <b>B</b> 3 | F5                             |
| U110                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | E1       | В3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U425C                                    | Β4         | F5                             |
| U120                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | В2       | B4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U425D                                    | C4         | F5                             |
| U130                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B1       | B5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U425E                                    | Β4         | F5                             |
| U200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | F2       | C2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U425F                                    | B4         | F5                             |
| U210                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | F1       | C3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | U430                                     | G2         | F5                             |
| U220A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | B5       | C4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                          |            |                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          | a and a statement of the second statement of th |                                          |            | 142240304507500004500000000000 |



**A31** 2874-736

REV A MAR 1981





READ ONLY MEMORY

29 Memory

A28

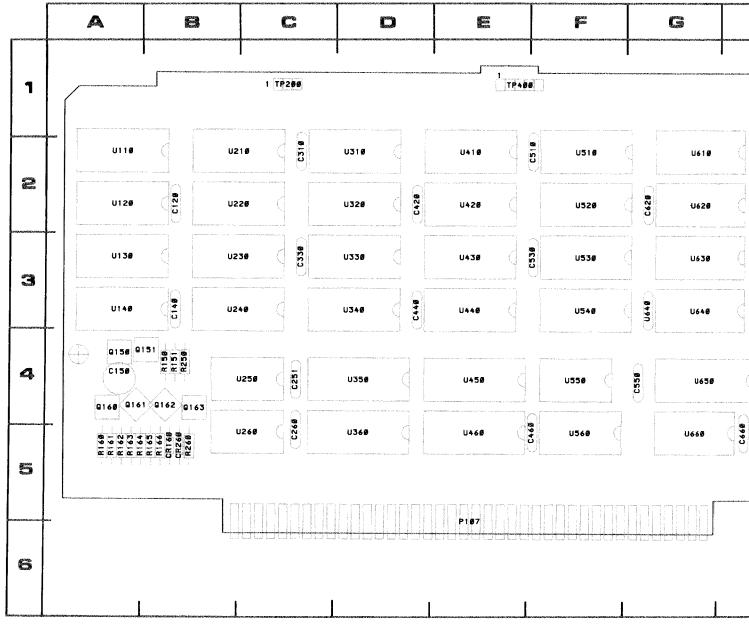


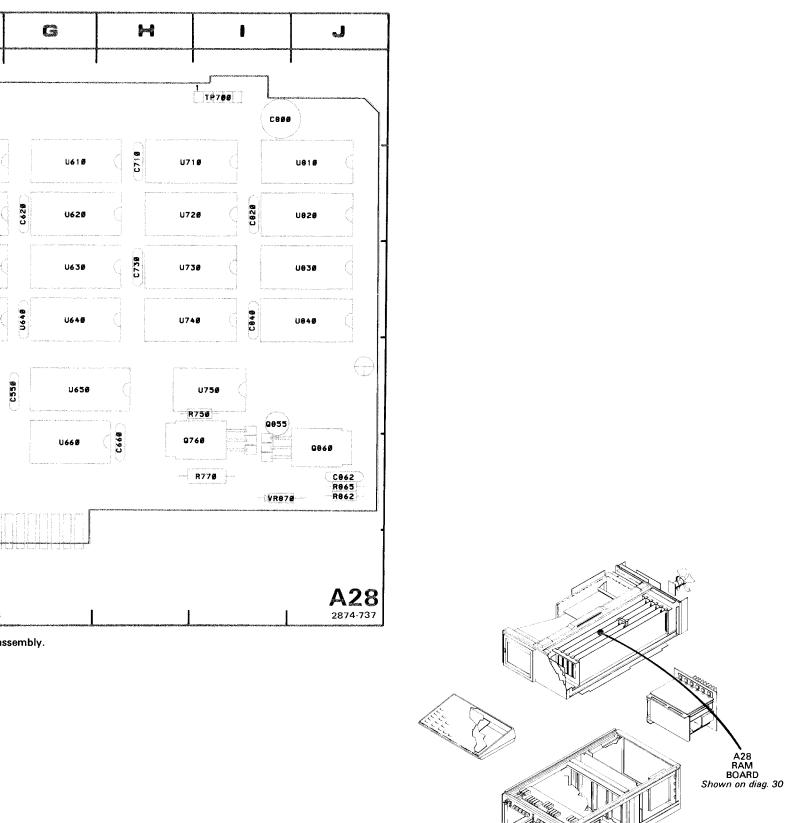
Figure 7-40. A28-RAM circuit board assembly.

COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

Static Sensitive Devices See Maintenance Section



REV A MAR 1981

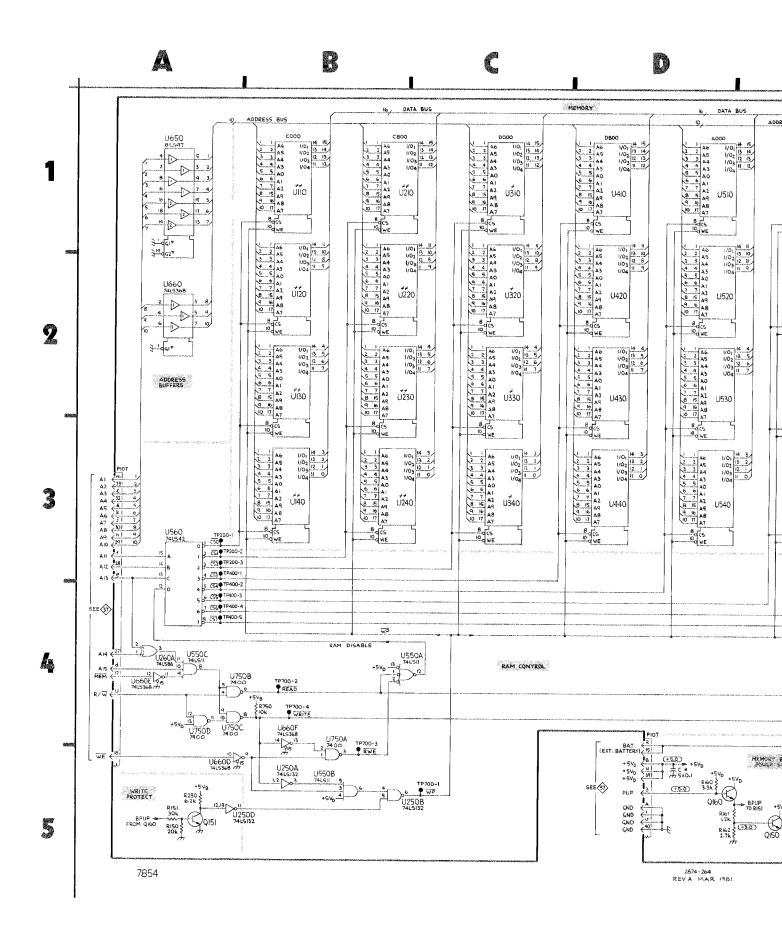
| A28 ASSY          |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |                   |                   |                   |                   |                                            |  |
|-------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------------------------------|--|
| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION        | BOARD<br>LOCATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION                          |  |
| C120              | F5                       | B2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | R150              | A5                | B4                | U340              | C3                | D3                                         |  |
| C140              | F5                       | B3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | R151              | A5                | 84                | U350              | G3                | D4                                         |  |
| C150              | E5                       | A4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | R160              | D5                | A5                | U360              | G4                | D5                                         |  |
| C251              | D5                       | C4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | R161              | D5                | A5                | U410              | D1                | E2                                         |  |
| C260              | D5                       | C5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | R162              | D5                | A5                | U420              | D2                | E2                                         |  |
| C310              | F5                       | C2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | R163              | E5                | A5                | U430              | D2                | E3                                         |  |
| C330              | F5                       | C3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | R164              | E5                | A5                | U440              | D3                | E3                                         |  |
| C420              | F5                       | D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | R165              | F5                | 85                | U450              | G1                | E4                                         |  |
| C440              | F5                       | D3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | R166              | F5                | B5                | U460              | G2                | E5                                         |  |
| C460              | D5                       | F5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | R250              | A5                | B4                | U510              | D1                | F2                                         |  |
| C510              | F5                       | F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | R260              | F5                | B5                | U520              | D2                | F2                                         |  |
| C530              | F5                       | F3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | R750              | B4                | 14                | U530              | D2                | F3                                         |  |
| C550              | D5                       | G4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | R770              | F5                | 15                | U540              | D3                | F3                                         |  |
| C620              | F5                       | G2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | R862              | £5                | J5                | U550A             | B4                | F4                                         |  |
| C640              | F5                       | G3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | R865              | E5                | J5                | U550B             | B5                | F4                                         |  |
| C660              | D5                       | H5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   |                   |                   | U550C             | A4                | F4                                         |  |
| C710              | F5                       | H2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TP200             | A3                | C1                | U560              | A3                | F5                                         |  |
| C730              | F5                       | нз                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TP400             | A4                | E1                | U610              | E1                | G2                                         |  |
| C800              | F5                       | 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TP400             | A3                | E1                | U620              | E2                | G2<br>G2                                   |  |
| C820              | F5                       | 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TP400             | A3                | E1                | U630              | E2                | G2<br>G3                                   |  |
| C840              | F5                       | КЗ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TP700             | 85                | 11                | U640              | E3                | G3                                         |  |
| C862              | E5                       | J5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TP700             | B4                | 11                | U650              | A1                | G3<br>G4                                   |  |
|                   |                          | 00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TP700             | C5                | 11                | U660              | A1<br>A2          | G4<br>G5                                   |  |
| CR160             | F5                       | B5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TP700             | F5                | 11                | U660D             | AZ<br>A5          |                                            |  |
| CR260             | F5                       | 85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 11700             | 13                | .,                | U660E             | A5<br>A4          | G5<br>G5                                   |  |
| 0.1200            | 10                       | 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | U110              | B1                | A2                | U660F             | А4<br>В4          | G5<br>G5                                   |  |
| P107              | A3                       | E6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | U120              | B2                | A2<br>A2          | U710              |                   |                                            |  |
| P107              | D4                       | E6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | U130              | B2<br>B2          | A2<br>A3          | U720              | F1<br>F2          | 12                                         |  |
| P107              | H1                       | E6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | U140              | B3                | A3<br>A3          | U720<br>U730      | _                 | 12                                         |  |
| 1107              |                          | 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | U210              | B3<br>B1          | C2                |                   | F2                | 13                                         |  |
| Q150              | E5                       | A4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | U220              | B1<br>B2          | C2                | U740              | F3                | 13                                         |  |
| Q151              | A5                       | B4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | U220<br>U230      |                   |                   | U750A             | B5                | 14                                         |  |
| Q160              | A5<br>D5                 | 64<br>A4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | U230<br>U240      | 82<br>83          | C3                | U750B             | A4                | 14                                         |  |
| Q161              | E5                       | A4<br>A4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | U240<br>U250A     | вз<br>85          | C3                | U750C             | A4                | 14                                         |  |
| Q162              | E5<br>F5                 | 84<br>84                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | U250A<br>U250B    | 85<br>85          | C4                | U750D             | A4                | 14                                         |  |
| Q162              | F5<br>F5                 | 64<br>84                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |                   | C4                | U810              | F1                | J2                                         |  |
| Q760              | E5                       | 84<br>15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | U250D             | A5                | C4                | U820              | F2                | J2                                         |  |
| Q855              | E5<br>F5                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | U260A             | A4                | C5                | U830              | F2                | 13                                         |  |
|                   | F5<br>F5                 | 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | U310              | C1                | D2                | U840              | F3                | J3                                         |  |
| Q860              | ro                       | J5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | U320              | C2                | D2                |                   | _                 |                                            |  |
|                   | Statement and the second | are in a second s | U330              | C2                | D3                | VR870             | F5                | 15<br>#################################### |  |

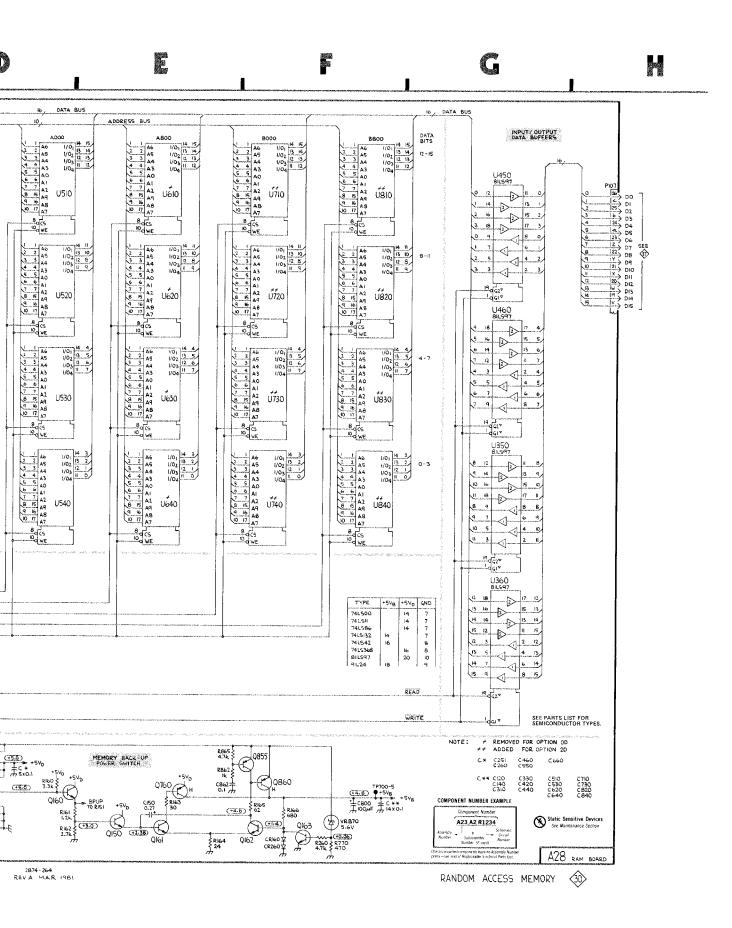
# RANDOM ACCESS MEMORY DIAGRAM 30

#### VOLTAGE CONDITIONS

The voltages were taken with the 7854 controls set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B); READOUT INTENSITY (OFF).

Voltage Conditions. The voltages on the diagram were taken using a digital multimeter with a 10 M $\Omega$  input impedance (Tektronix DM 501 Digital Multimeter installed in a TM 501 Power Module or a Tektronix 7D13 Digital Multimeter used with a readout-equipped 7000-Series Oscilloscope).





30 Random Access Reverse Side

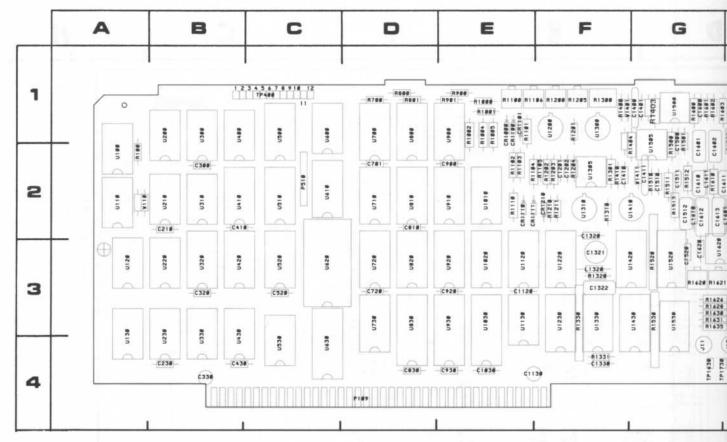
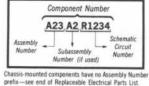


Figure 7-41. A29-Display circuit board assembl

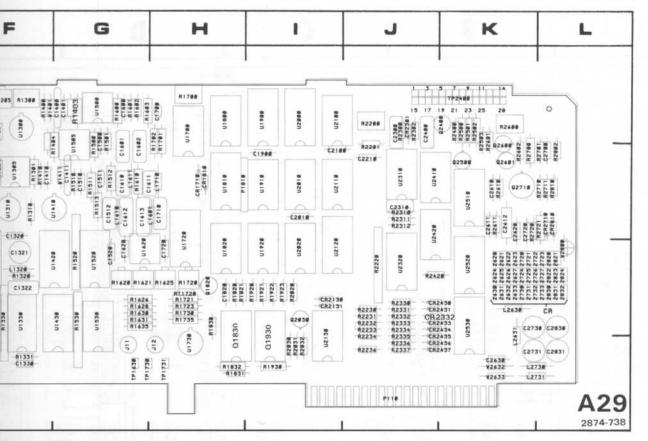
Static Sensitive Devices See Maintenance Section

COMPONENT NUMBER EXAMPLE

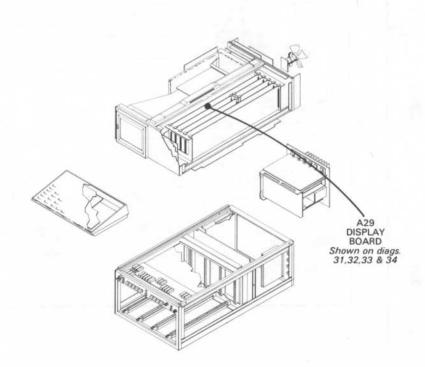


@

Assembly A29

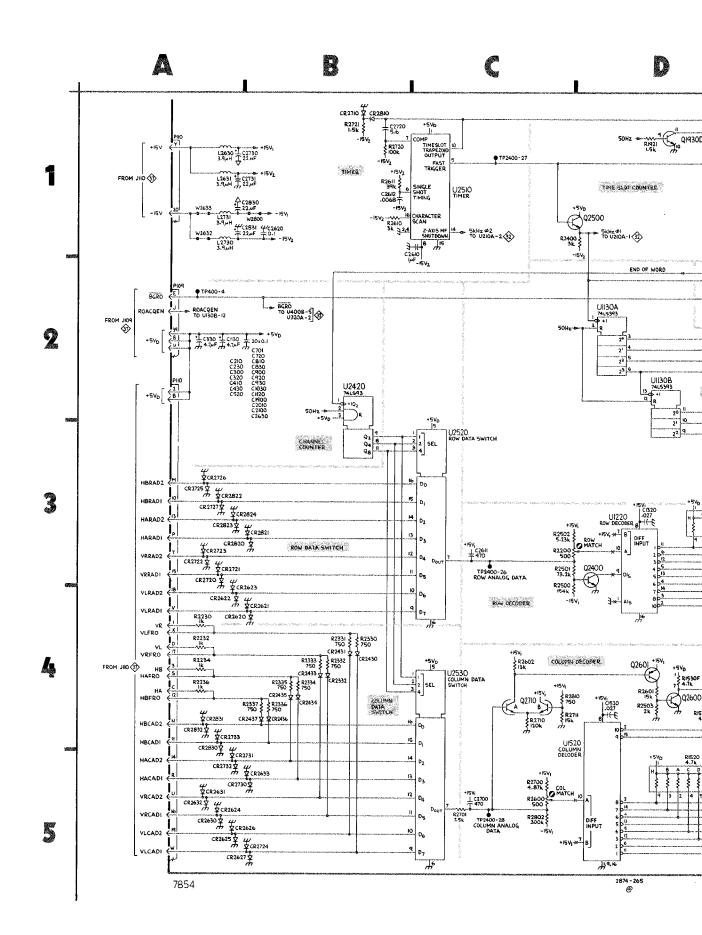


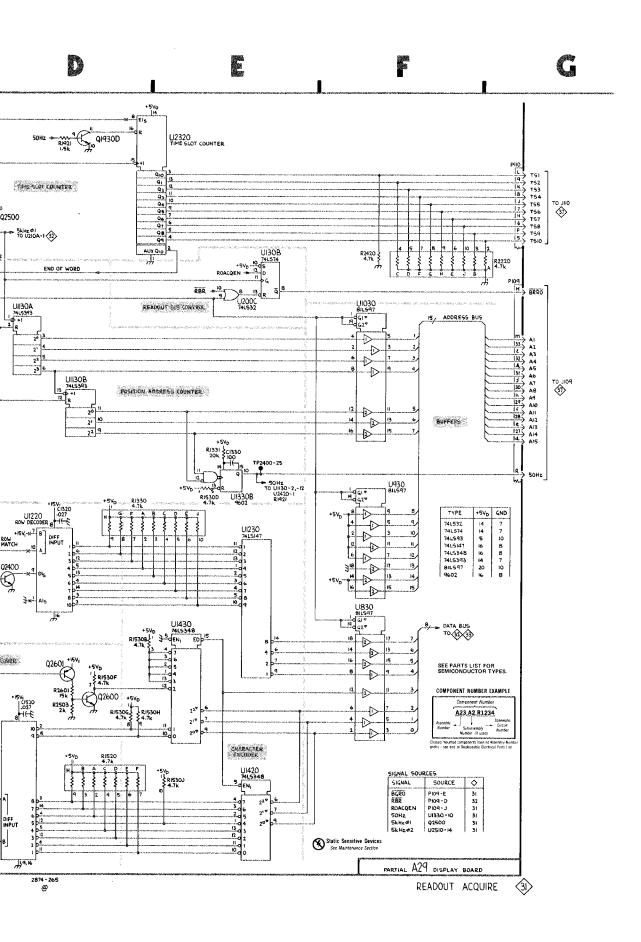
Display circuit board assembly.



| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION                        | BOARD<br>LOCATION | CIRCUIT<br>NUMBER                                    | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER                 | SCHEM<br>LOCATION | BOARD                               |
|-------------------|------------------------------------------|-------------------|------------------------------------------------------|-------------------|-------------------|-----------------------------------|-------------------|-------------------------------------|
| C210              | A2                                       | B2                | CR2720                                               | A 0               |                   | D0004                             |                   |                                     |
| C230              | A2                                       | B4                | CR2720                                               | A3<br>A3          | КЗ<br>КЗ          | R2331<br>R2332                    | B4                | J3                                  |
| C300              | A2                                       | B2                | CR2722                                               | A3                | K3                | R2332                             | B4<br>B4          | J3                                  |
| C320              | A2                                       | B3                | CR2723                                               | A3                | L3                | R2334                             | В4<br>В4          | J3                                  |
| C330              | A2                                       | В4                | CR2724                                               | B5                | кз                | R2335                             | B4<br>B4          | 13<br>13                            |
| C410              | A2                                       | B2                | CR2725                                               | A3                | КЗ                | R2336                             | B4                | J3                                  |
| C430              | A2                                       | B4                | CR2726                                               | A3                | КЗ                | R2337                             | B4                | J4                                  |
| C520              | A2                                       | C3                | CR2727                                               | A3                | L3                | R2400                             | C1                | К1                                  |
| C701              | B2                                       | D2                | CR2730                                               | A5                | КЗ                | R2420                             | F1                | 13                                  |
| C720              | B2                                       | D3                | CR2731                                               | A5                | КЗ                | R2500                             | C4                | К1                                  |
| C810              | B2                                       | D2                | CR2732                                               | A5                | КЗ                | R2501                             | C3                | K1                                  |
| C830              | B2                                       | D4                | CR2733                                               | A4                | L3                | R2502                             | C3                | K 1                                 |
| C900              | B2                                       | E2                | CR2810                                               | B1                | L2                | R2503                             | D4                | К1                                  |
| C920              | B2                                       | E3                | CR2820                                               | A3                | L3                | R2600                             | C5                | K1                                  |
| C930              | B2                                       | E4                | CR2821                                               | B3                | L3                | R2601                             | D4                | K1                                  |
| C1030             | B2                                       | E4                | CR2822                                               | A3                | L3                | R2602                             | C4                | К2                                  |
| C1120<br>C1130    | B2                                       | E3                | CR2823                                               | A3                | L3                | R2610                             | 61                | K2                                  |
| C1130             | A2<br>D3                                 | E4<br>F2          | CR2824                                               | A3                | L3                | R2611                             | B1                | К2                                  |
| C1320             | E3                                       | F2<br>F4          | CR2830<br>CR2831                                     | A4                | L3                | R2700                             | C5                | K2                                  |
| C1520             | D4                                       | G3                | CR2831<br>CR2832                                     | A4                | L3                | R2701                             | C5                | L2                                  |
| C1900             | B2                                       | 12                | CH2032                                               | A4                | L3                | R2710                             | C4                | L2                                  |
| C2010             | B2                                       | 12                | L2630                                                | A1                | K D               | R2711                             | C4                | L2                                  |
| C2100             | B2                                       | 12                | L2630                                                | A1                | К3<br>К3          | R2720                             | B1                | K2                                  |
| C2610             | B1                                       | K2                | L2730                                                | A1                | кз<br>К4          | R2721                             | B1                | K2                                  |
| C2611             | C3                                       | K2                | L2731                                                | A1                | K4<br>K4          | R2802                             | C5                | L2                                  |
| C2612             | 81                                       | K2                | 62731                                                | AI                | Ν4                | R2810                             | C4                | L2                                  |
| C2620             | B1                                       | K2                | P109                                                 | A2                | D4                | TP400                             |                   |                                     |
| C2630             | B2                                       | K4                | P109                                                 | G2                | D4<br>D4          | TP2400                            | A2                | C1                                  |
| C2700             | C5                                       | L2                | P110                                                 | A1                | J4                | TP2400                            | C5<br>C3          | К1<br>К1                            |
| C2720             | B1                                       | K2                | P110                                                 | A2                | J4                | TP2400                            | C3<br>C1          | K1                                  |
| C2730             | B1                                       | КЗ                | P110                                                 | G1                | J4                | TP2400                            | E3                | K1                                  |
| C2731             | B1                                       | К4                |                                                      |                   |                   |                                   | 20                | K.                                  |
| C2830             | B1                                       | L3                | Q1930D                                               | D1                | 13                | U130B                             | E2                | A3                                  |
| C2831             | B1                                       | L3                | Q2400                                                | D3                | J1                | U200C                             | E2                | B1                                  |
|                   |                                          |                   | O2500                                                | D1                | К2                | U830                              | F4                | D3                                  |
| CR2332            | B4                                       | J3                | Q2600                                                | D4                | К2                | U930                              | F3                | E3                                  |
| CR2430            | B4                                       | J3                | Q2601                                                | D4                | К2                | U1030                             | F2                | E3                                  |
| CR2431            | B4                                       | J3                | 02710                                                | C4                | К2                | U1130A                            | D2                | E3                                  |
| CR2433            | B4                                       | J3                |                                                      |                   |                   | U1130B                            | D2                | E3                                  |
| CR2434            | B4                                       | J3                | R1330                                                | D3                | F3                | U1220                             | D3                | F3                                  |
| CR2435<br>CR2436  | 84<br>84                                 | J3<br>K4          | R1331                                                | E3                | F4                | U1230                             | E3                | F3                                  |
| CR2436<br>CR2437  | В4<br>В4                                 | K4<br>J4          | R1520                                                | D5                | G3                | U1330B                            | E3                | F3                                  |
| CR2620            | 84<br>A4                                 | J4<br>K3          | R1530B<br>R1530D                                     | D4<br>E3          | G3                | U1420                             | E5                | F3                                  |
| CR2620            | B4                                       | КЗ                | R1530D<br>R1530F                                     | E3<br>D4          | G3                | U1430                             | E4                | G3                                  |
| CR2622            | A4                                       | K3                | R1530F<br>R1530G                                     | D4<br>D4          | G3<br>G3          | U1520                             | D5                | G3                                  |
| CR2623            | A4                                       | K3                | R1530G                                               | D4<br>D4          | G3<br>G3          | U2320                             | E1                | J3                                  |
| CR2624            | A5                                       | кз                | R1530J                                               | E5                | G3                | U2420<br>U2510                    | B2                | J2                                  |
| CR2625            | A5                                       | кз                | R1921                                                | D1                | 13                | U2520                             | C1                | K2                                  |
| CR2626            | A5                                       | кз                | R2200                                                | C3                | J1                | U2520<br>U2530                    | C3<br>C4          | К3<br>К3                            |
| CR2627            | A5                                       | К3                | R2220                                                | G2                | J3                | 02000                             | C4                | K3                                  |
| CR2630            | A5                                       | КЗ                | R2230                                                | A4                | J3                | W2632                             | A1                | К4                                  |
| CR2631            | A5                                       | КЗ                | R2232                                                | A4                | J3                | W2633                             | A1                | к4<br>К4                            |
| CR2632            | A5                                       | КЗ                | R2234                                                | A4                | J3                | W2800                             | B1                | K4<br>L3                            |
| CR2633            | B5                                       | кз                | R2236                                                | A4                | J3                |                                   | 01                | L3                                  |
| CR2710            | B1                                       | L.2               | R2330                                                | B4                | J3                |                                   |                   |                                     |
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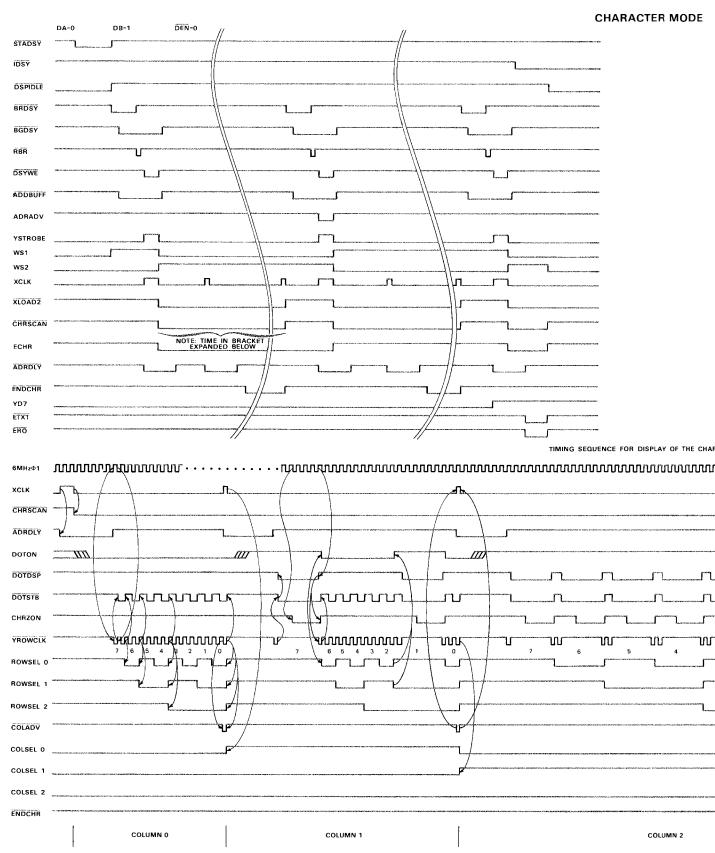
# READOUT ACQUIRE DIAGRAM 31





Acquire

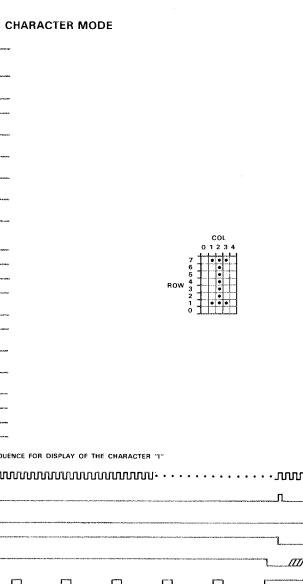
Heverse Side Character Mode Timing Diagram



Timing Diagram

Figure 7-42. Character Mod

REV A MAR 198



# NOTE: ARROW DIRECTION INDICATES WHICH TRANSITION INDICATES FOLLOWING TRANSITION(S).

| wwww                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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2874-739

ure 7-42. Character Mode Timing Diagram.

#### **REV A MAR 1981**

#### WAVEFORM CONDITIONS

The waveforms shown were obtained with the 7854 controls set as follows: CRT DISPLAY (STORED): VERTICAL MODE (LEFT); HORIZONTAL MODE (B): READOUT (OFF, for Y-T Mode and X-Y Mode ON, for Character Mode).

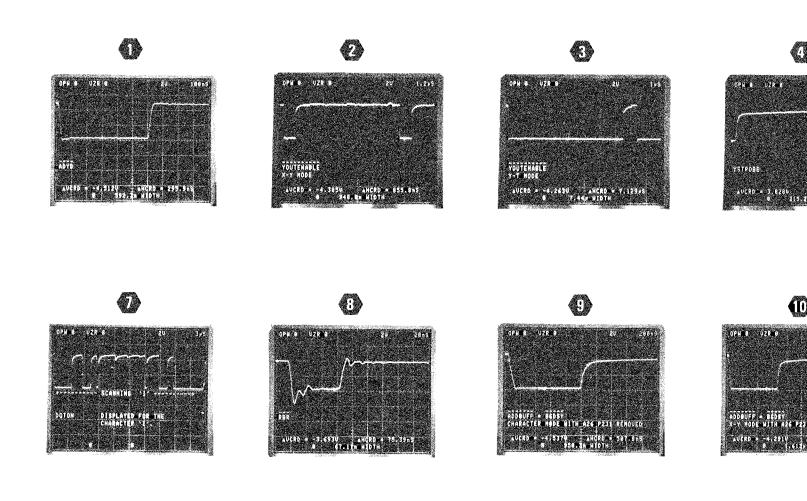
Refer to the waveform photos for additional setup information. No plug-in units were installed in the 7854.

Waveform Conditions. The waveforms shown were obtained with a 7854 Oscilloscope system. Any test oscilloscope system with 10MΩ impedance, at least 60 MHz bandwidth and 10X probe may be used. (Tektronix 7603 Oscilloscope, 7880 Time Base, 7A26 Dual Trace Amplifier and P6063A Probe). The 7B80 Time Base was triggered on the input signal. A logic analyzer (Tektronix WR501) with P6451 Probe and test leads was used for waveforms 6 and 7 only.

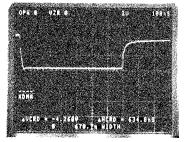
Waveforms 6 and 7 Conditions.

The 7B80 Time Base was triggered by the WR501 Logic Analyzer trigger output. The WR501 inputs were connected as follows (see Table 7-1 below):

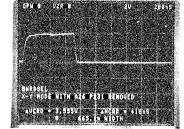
| TABLE 7-1         Setup For Waveforms 6, 7, 27 and 28 |              |             |  |  |  |  |  |
|-------------------------------------------------------|--------------|-------------|--|--|--|--|--|
| WR501 Input No.                                       | Connected To | Logic Level |  |  |  |  |  |
| 0                                                     | U620-22      | 1           |  |  |  |  |  |
| 1                                                     | U620-23      | 0           |  |  |  |  |  |
| 2                                                     | U620-1       | 0           |  |  |  |  |  |
| 3                                                     | U620-2       | 1           |  |  |  |  |  |
| 4                                                     | U620-3       | 0           |  |  |  |  |  |
| 5                                                     | U620-4       | 0           |  |  |  |  |  |
| 6                                                     | U620-5       | 1           |  |  |  |  |  |
| 7                                                     | U630-19      | 1           |  |  |  |  |  |



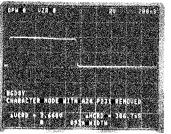






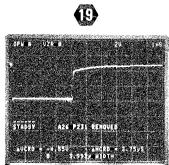


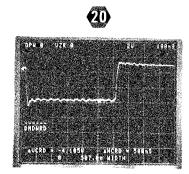


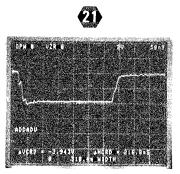




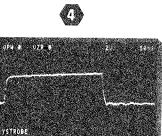




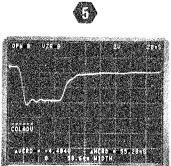




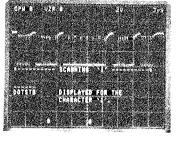




AUCRD = 3.8280 AHCRD = 18655 9 315.25 HIDTH

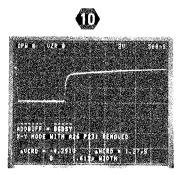




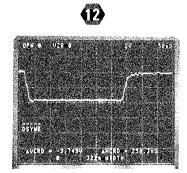


Display System Waveforms

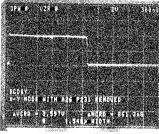
Reverse Side X-Y Mode Timing Diagram



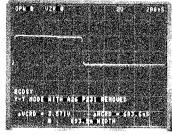




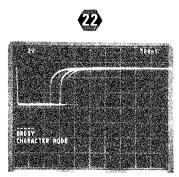


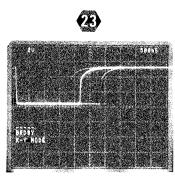


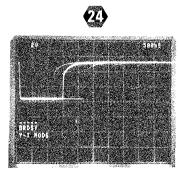
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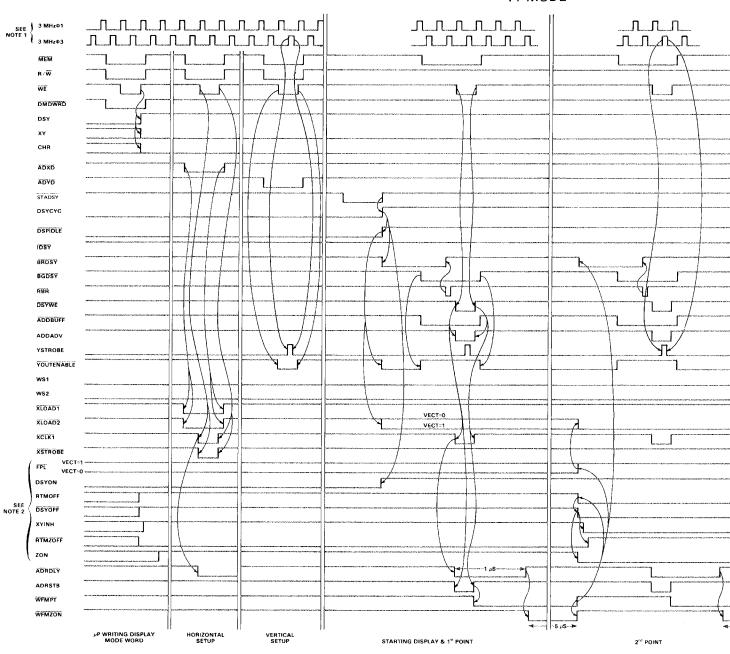






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YT MODE

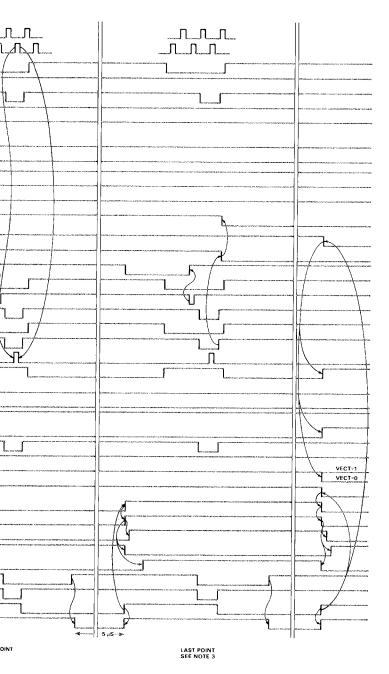


NOTE 1. 3 MH/61 AND 3 MH/63 ONLY SHOWN WHERE THEIR TIMING RELATIONSHIP APPLIES. Note 2: real time mode bit, rt, is assumed to be a logical '1' (in 'both' display mode). Note 3: the last point is the (p/W) 'point' (ie. ) f points'/waveform = 128 then last point = 128" point).

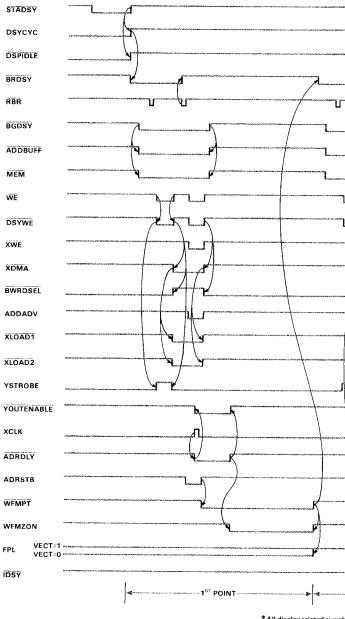
ARROW DIRECTION INDICATES WHICH TRANSITION INITIATES FOLLOWING TRANSITION(S).

Figure 7-43. YT Mode Timing Diagram.

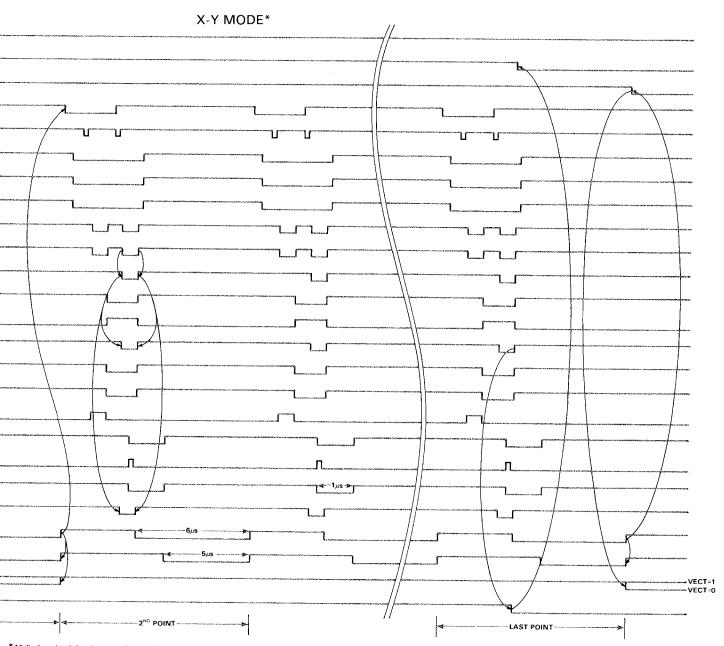
A-Y & Y I WOOD Timing Diagrams







\* All display related signal further assumes that the is LO and ZON is HI), XY timing diagram for the [



\* All display related signals are not shown on this timing diagram. In X-Y mode, DSY is HI, XY is HI and CHR is LO. This timing diagram further assumes that the Real Time mode bit (RT) is LO (and thus DSYON is HI, RTMOFF is HI, <u>DSYOFF</u> is HI, XYINH is HI, <u>RTMZOFF</u> is LO and ZON is HI). XY is HI and CHR is LO (resulting in both WS1 and WS2 being LO). Refer to the first 3 sections of the Y-T MODE timing diagram for the Display Mode Word, Horizontal and Vertical setup sequences.

Figure 7-44. X-Y Mode Timing Diagram.

2874-741

#### WAVEFORM CONDITIONS

The waveforms shown were obtained with the 7854 controls set as follows: CRT DISPLAY (STORED): VERTICAL MODE (LEFT); HORIZONTAL MODE (B); READOUT (OFF; for Y-T Mode and X-Y Mode; ON for Character Mode). Refer to the waveform photos for additional setup information. No plug-in units were installed in the 7854.

**Waveform Conditions.** The waveforms shown were obtained with a 7854 Oscilloscope system. Any test oscilloscope system with  $10M\Omega$  impedance, at least 60 MHz bandwidth and 10X probe may be used. (Tektronix 7603 Oscilloscope, 7B80 Time Base, 7A26 Dual Trace Amplifier and P6063A Probe). The 7B80 Time Base was triggered on the input signal. A logic analyzer (Tektronix WR501) with P6451 Probe and test leads was used for waveforms 25, 27, 28, 30, 37, 41 and 42 only.

Setup A: Waveform 18 conditions. The 7B80 Time Base was triggered on 5 kHz Φ1.

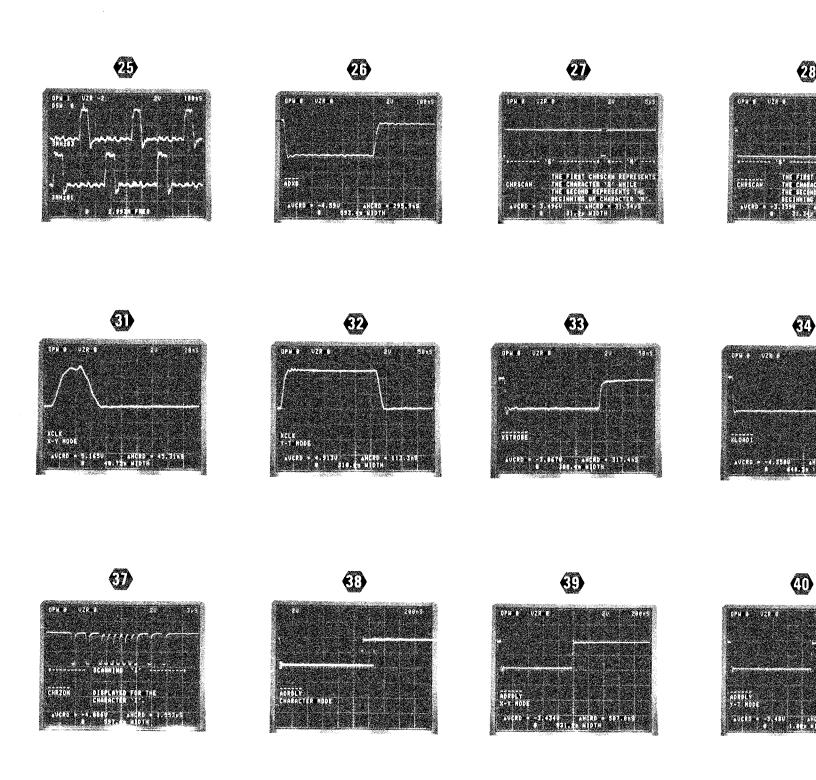
Setup B: Waveform 25 conditions. The 7B80 Time Base was triggered on 3 MHz Φ1.

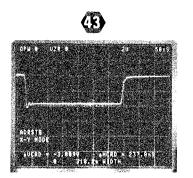
Setup C: Waveforms 27 and 28 conditions. The 7B80 Time Base was triggered by the WR501 Logic Analyzer trigger output. The WR501 inputs were connected and corresponding switches set as follows (see Table 7-2 below):

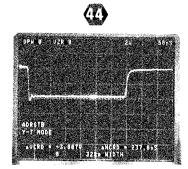
Setup D: Waveforms 30, 35, 37, 41 and 42 conditions. Same as setup C except as follows (see Table 7-1 below):

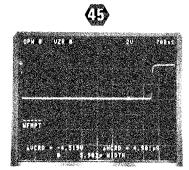
| TABLE 7-1           Setup For Waveforms 6, 7, 27 and 28 |              |             |  |  |
|---------------------------------------------------------|--------------|-------------|--|--|
| WR501 Input No.                                         | Connected To | Logic Level |  |  |
| 0                                                       | U620-22      | 1           |  |  |
| 1                                                       | U620-23      | 0           |  |  |
| 2                                                       | U620-1       | 0           |  |  |
| 3                                                       | U620-2       | 1           |  |  |
| 4                                                       | U620-3       | 0           |  |  |
| 5                                                       | U620-4       | 0           |  |  |
| 6                                                       | U620-5       | 1           |  |  |
| 7                                                       | U630-19      | 1           |  |  |

| TABLE 7-2           Setup For Waveforms 30, 35, 37, 41 and 42 |              |                                                                                                                                         |  |  |
|---------------------------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------|--|--|
| WR501 Input No.                                               | Connected To | Logic Level                                                                                                                             |  |  |
| 0                                                             | U620-22      | nn 1965 (na 1967)<br>1975 - Anna Martin Martin<br>1 |  |  |
| 1                                                             | U620-23      | 0                                                                                                                                       |  |  |
| 2                                                             | U620-1       | 1                                                                                                                                       |  |  |
| 3                                                             | U620-2       | 0                                                                                                                                       |  |  |
| 4                                                             | U620-3       | 0                                                                                                                                       |  |  |
| 5                                                             | U620-4       | 1                                                                                                                                       |  |  |
| 6                                                             | U620-5       | 1                                                                                                                                       |  |  |
| 7                                                             | U630-19      | 1                                                                                                                                       |  |  |

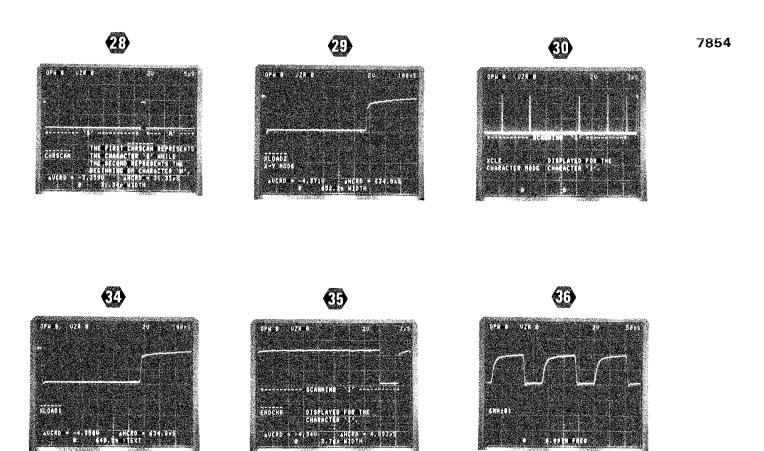


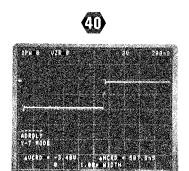










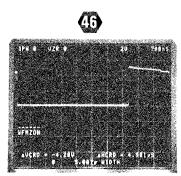




| OPN 8 VZ  | $\mathbf{p} = \mathbf{p}$ | - 20                                     | 3.6 |
|-----------|---------------------------|------------------------------------------|-----|
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| Jacks 197 | $\sim$                    | 0.000                                    |     |
|           |                           |                                          |     |
|           | SCARDING                  | n an |     |
|           |                           |                                          |     |
| DOTOSP    | DISPLAYED<br>CHARACTER    | FOR THE                                  |     |
|           | 2                         | 2.0 State 2.0 State                      |     |
|           |                           | ANCRO = 2+38<br>MIDTH                    |     |



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Display System Waveforms

Reverse Side

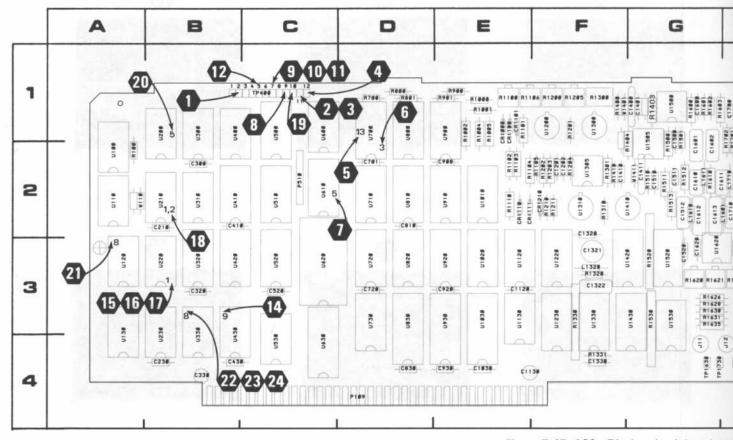


Figure 7-45. A29-Display circuit board ass

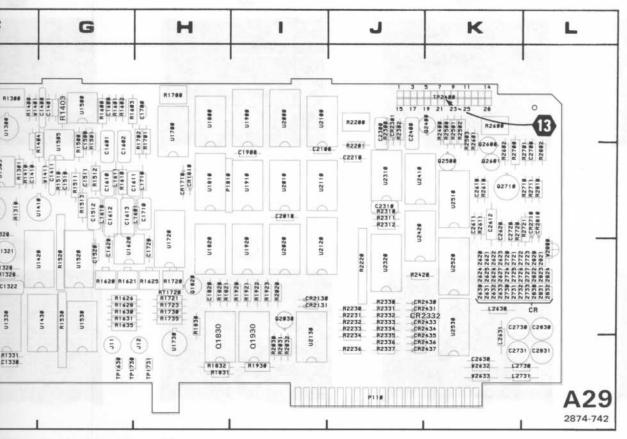
Static Sensitive Devices See Maintenance Section

### COMPONENT NUMBER EXAMPLE

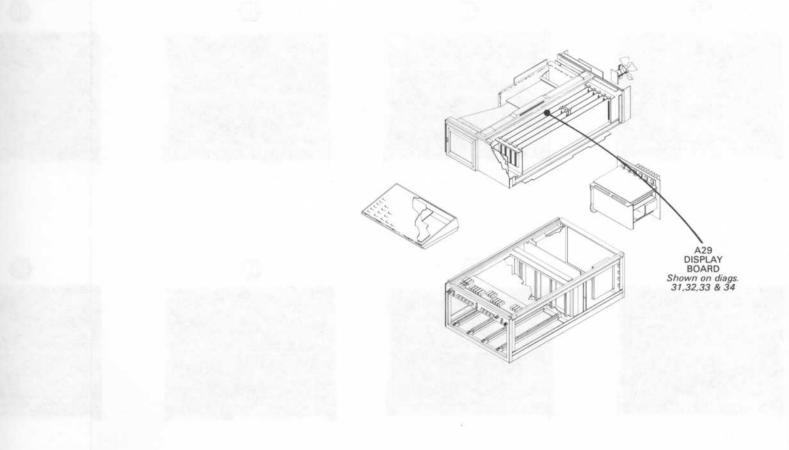
|                    | Component Number                |
|--------------------|---------------------------------|
|                    | A23 A2 R1234                    |
| Assembly<br>Number | Subassembly<br>Number (if used) |

prefix—see end of Replaceable Electrical Parts List.

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9-Display circuit board assembly.



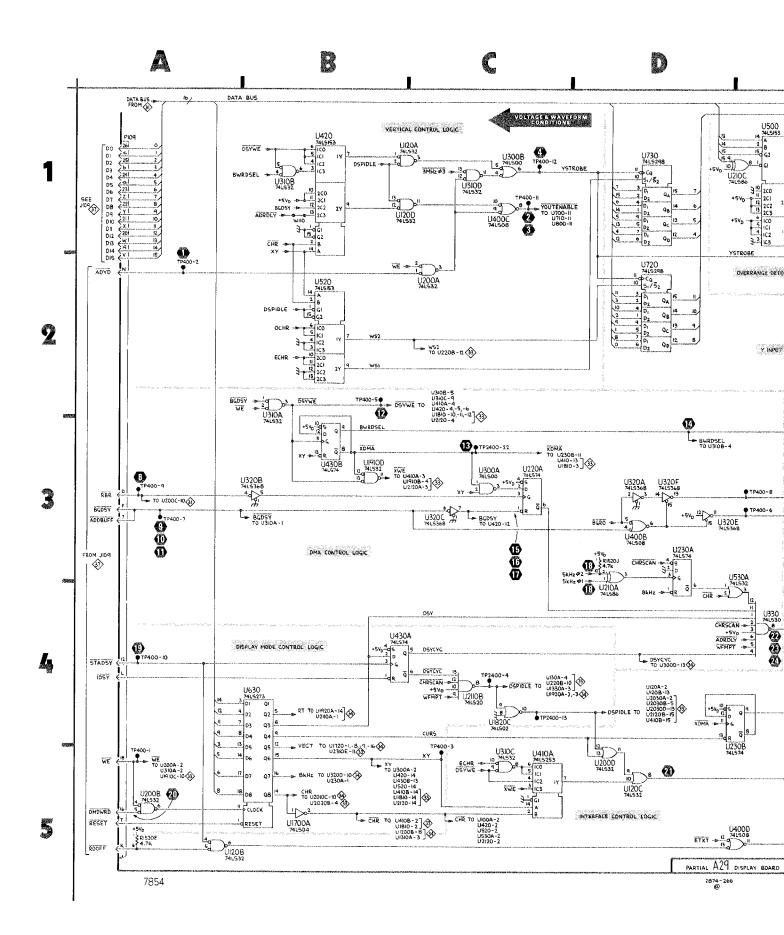
## VERTICAL DISPLAY AND CONTROL DIAGRAM 32

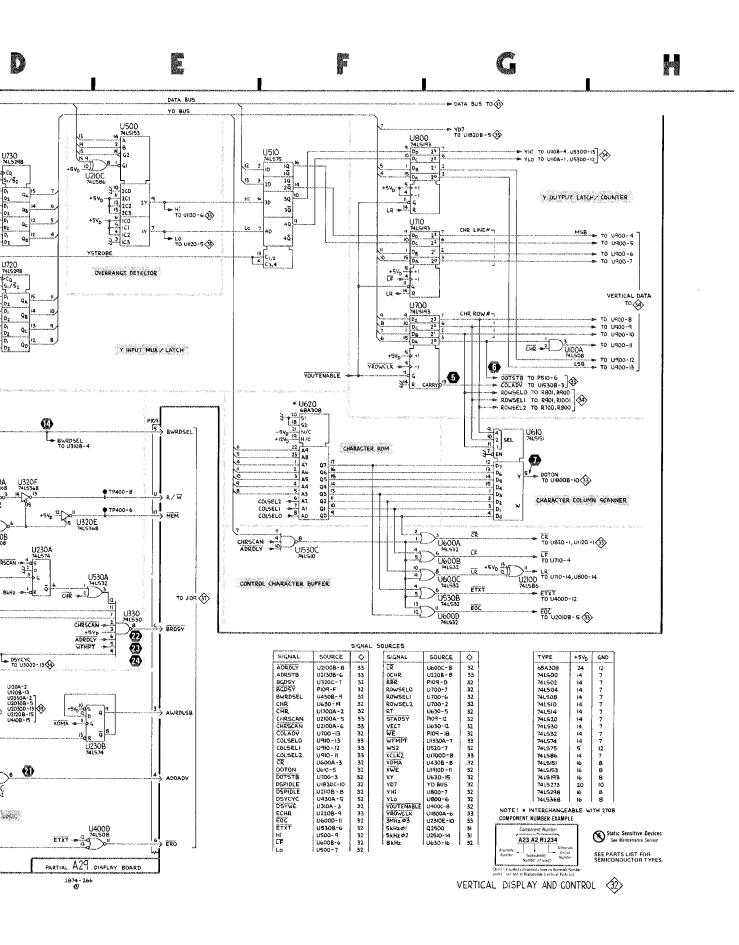
1. Sec. 1.

1. State 1.

| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| P109              | A1                | D4                | U320B             | B3                | B3                |
| P109              | E3                | D4                | U320C             | C3                | B3                |
|                   |                   |                   | U320E             | D3                | В3                |
| R1520E            | A5                | G3                | U320F             | D3                | B3                |
|                   |                   |                   | U330              | E4                | B4                |
| TP400             | A3                | C1                | U400B             | D3                | B1                |
| TP400             | A4                | C1                | U400C             | C1                | B1                |
| TP400             | A2                | C1                | U400D             | E5                | B1                |
| TP400             | A5                | C1                | U410A             | C5                | B2                |
| TP400             | B2                | C1                | U420              | B1                | B3                |
| TP400             | C5                | C1                | U430A             | B4                | C4                |
| TP400             | C1                | C1                | U430B             | B3                | C4                |
| TP400             | E3                | C1                | U500              | E1                | C1                |
| TP2400            | C4                | К1                | U510              | F1                | C2                |
|                   |                   |                   | U520              | В2                | С3                |
| U100A             | G2                | A2                | U530A             | E3                | C4                |
| U120A             | B1                | A3                | U530B             | G4                | C4                |
| U120B             | A5                | A3                | U600A             | G3                | C1                |
| U120C             | D5                | A3                | U600B             | G3                | C1                |
| U120D             | B1                | A3                | U600C             | G3                | C1                |
| U200A             | C2                | B1                | U6000             | G4                | C1                |
| U200B             | A5                | B1                | U610              | G3                | C2                |
| U200D<br>U210A    | D5<br>D4          | B1<br>B2          | U620<br>U630      | F2<br>B4          | C3                |
| U210A             | E1                | B2<br>B2          | U630<br>U700      |                   | C4                |
| U210C             | G3                | в∠<br>В2          | U710              | F2<br>F1          | D1<br>D2          |
| U220A             | C3                | B3                | U720              | D2                | D2<br>D2          |
| U230A             | D3                | B3<br>B4          | U730              | D2<br>D1          | D2<br>D3          |
| U230B             | E4                | B4                | U800              | F1                | D1                |
| U300A             | C3                | B1                | U1530C            | F3                | G3                |
| U300B             | C1                | B1                | U1700A            | B5                | H1                |
| U310A             | B2                | B2                | U1820C            | C4                | НЗ                |
| U310B             | B1                | B2                | U1910D            | B3                | 12                |
| U310C             | C5                | B2                | U2110B            | C4                | 12                |
| U310D             | C1                | B2                |                   |                   |                   |
| U320A             | D3                | B3                | W110              | B1                | A2                |

Partial A29 ASSY also shown on diagrams 31, 33 and 34.





and Control

A29 🐺

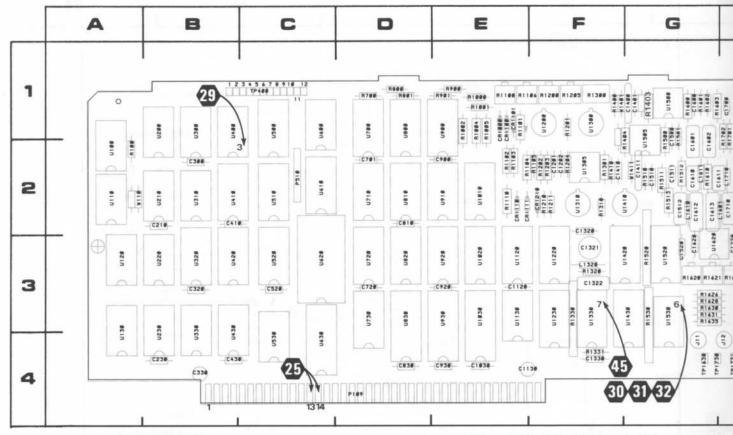


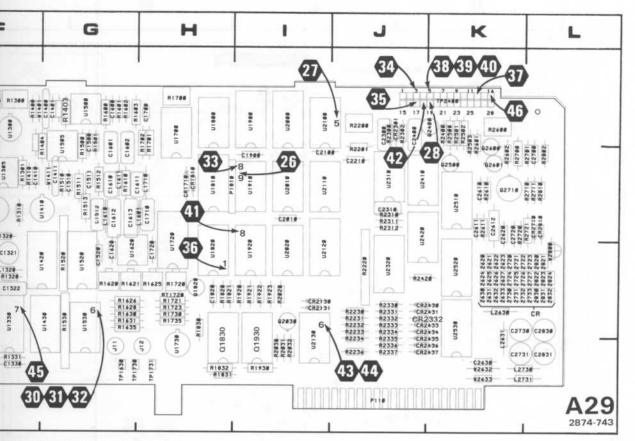
Figure 7-46. A29-Display circuit board assembly

Static Sensitive Devices See Maintenance Section COMPONENT NUMBER EXAMPLE Component Number

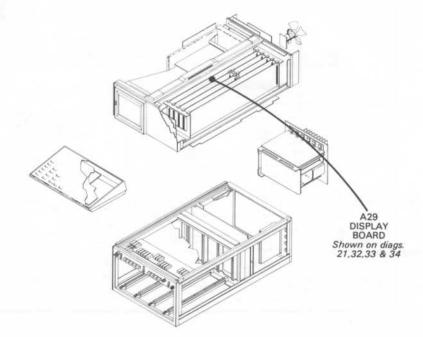


Chassis-mounted components have no Assembly Number prefix-see end of Replaceable Electrical Parts List.

Assembly A29



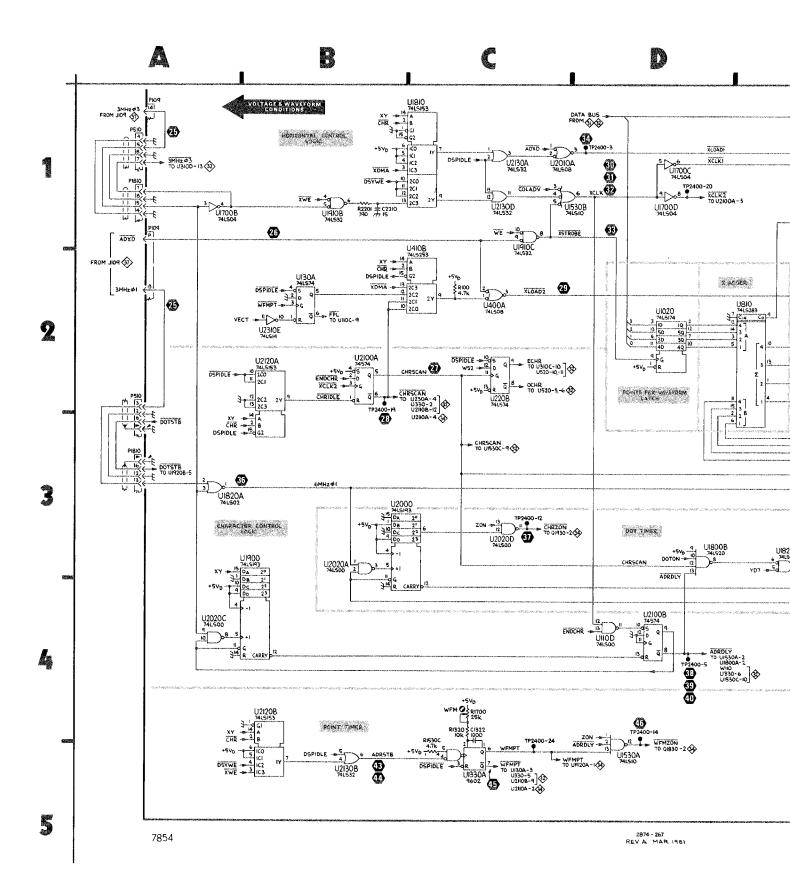
isplay circuit board assembly.

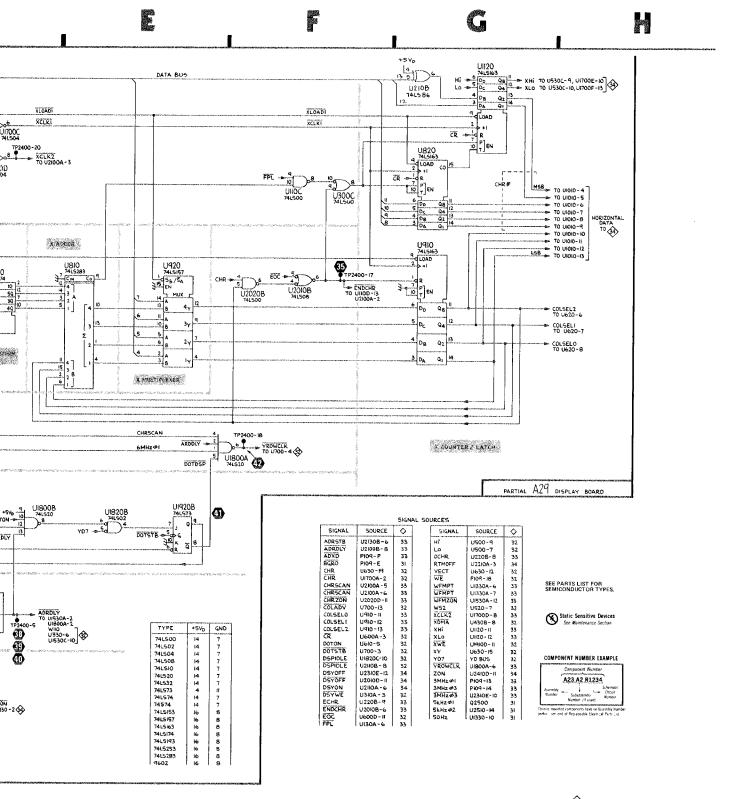


| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER |          | BOARD<br>LOCATION |
|-------------------|-------------------|-------------------|-------------------|----------|-------------------|
| C1322             | C4                | F3                | U1020             | D2       | E3                |
| C2210             | B1                | J2                | U1120             | G1       | E3                |
|                   |                   |                   | U1330A            | C5       | F3                |
| P109              | A1                | D4                | U1530A            | D5       | G3                |
| P510              | A1                | C2                | U1530B            | C1       | G3                |
| P510              | A2                | C2                | U1700B            | A1       | H1                |
| P1810             | A1                | H2                | U1700C            | D1       | H1                |
| P1810             | A3                | H2                | U1700D            | D1       | H1                |
|                   |                   |                   | U1800A            | F3       | H1                |
| R100              | C2                | A2                | U1800B            | D3       | H1                |
| R1320             | C4                | F3                | U1810             | C1       | H2                |
| R1530C            | C4                | G3                | U1820A            | A3       | нз                |
| R1700             | C4                | H1                | U1820B            | E3       | нз                |
| R2201             | B1                | J2                | U1900             | B3       | 11                |
| ***               |                   |                   | U1910B            | B1       | 12                |
| TP2400            | C5                | K1                | U1910C            | C1       | 12                |
| TP2400            | C3                | H2                | U1920B            | E3       | 13                |
| TP2400            | D4                | К1                | U2000             | B3       | 11                |
| TP2400            | D1                | К1                | U2010A            | C1       | 12                |
| TP2400            | F2                | K1                | U2010B            | F2       | 12                |
| TP2400            | F3                | К1                | U2020A            | B3       | 13                |
| 111100            | <b>F1</b>         | 4.0               | U2020B            | F2       | 13                |
| U110C             | F1<br>D4          | A2                | U2020C            | A4       | 13                |
| U110D<br>U130A    | D4<br>B2          | A2<br>A3          | U2020D            | C3       | 13                |
| U220B             | В2<br>С2          | B3                | U2100A<br>U2100B  | B2<br>D4 | 1                 |
| U300C             | E1                | B1                | U2100B            | B2       | 11<br>13          |
| U400A             | C2                | B1                | U2120A            | B2       | 13                |
| U410B             | C2                | B2                | U2130A            | C1       | 13                |
| U810              | F2                | D2                | U2130A            | B5       | 14                |
| U820              | G1                | D2                | U2130D            | C1       | 14                |
| U910              | G2                | E2                | U2310E            | B2       | J2                |
| U920              | E2                | E3                | 020102            | 02       | 52                |
| 0320              | L. Z              | LJ                |                   |          |                   |

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# HORIZONTAL DISPLAY AND CONTROL DIAGRAM 33





HORIZONTAL DISPLAY AND CONTROL

A29 And Control Reverse Side

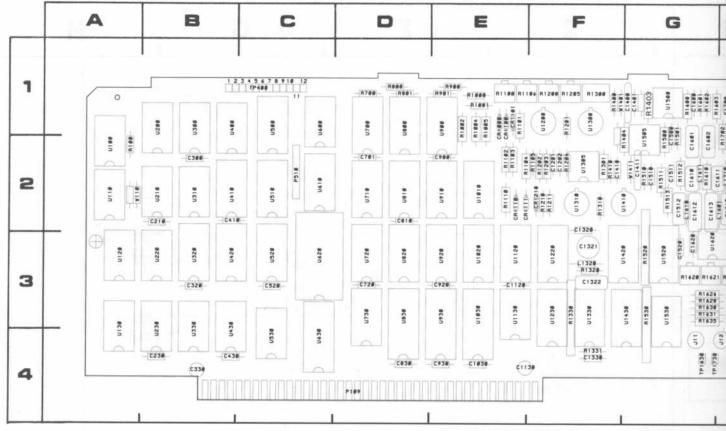


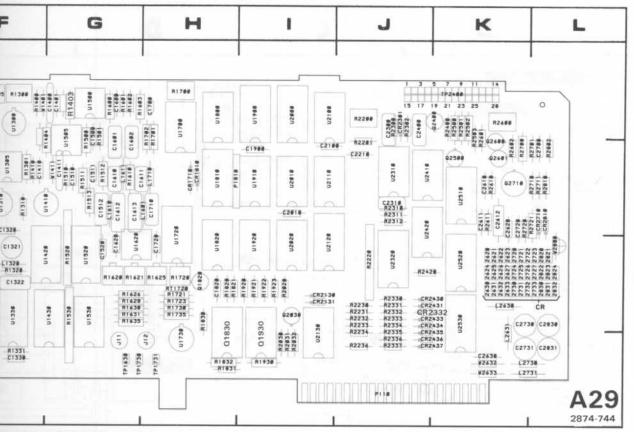
Figure 7-47. A29-Display circuit board assembly

Static Sensitive Devices See Maintenance Section

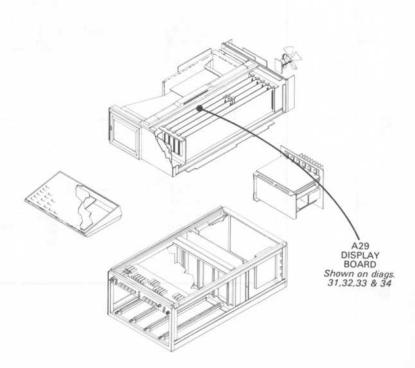
## COMPONENT NUMBER EXAMPLE

|                    | Component Nun                  | nber                           |
|--------------------|--------------------------------|--------------------------------|
| 1                  | A23 A2 R12                     | 234                            |
| Assembly<br>Number | Subassembly<br>Number (if used | Schematic<br>Circuit<br>Number |

chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.



isplay circuit board assembly.



| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD    |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------|
| C410              | <b>B</b> 2        | B2                | P109              | A1                | D4                | R1500             | E3                | G1                | TP1630            | G1                | G4       |
| C1201             | B2                | F2                | P109              | G4                | D4                | R1501             | E3                | G1                | TP1730            | G2                | G4       |
| C1202             | B1                | F2                | P110              | A4                | J4                | R1510             | D3                | G2                | TP1731            | G3                | H4       |
| C1321             | A2                | F3                | P110              | G1                | J4                | R1511             | E3                | G2                | TP2400            | A4                | K1       |
| C1400             | E1                | G1                |                   |                   |                   | R1512             | E3                | G2                | TP2400            | F4                | К1       |
| C1401             | F2                | G1                | Q1820             | F4                | H3                | R1513             | E3                | G2                | TP2400            | G5                | К1       |
| C1410             | B2                | F2                | Q1830A            | B1                | H4                | R1600             | E1                | G1                | TP2400            | G4                | К1       |
| C1411             | E3                | G2                | Q1830B            | B1                | H4                | R1601             | E1                | G1                |                   |                   |          |
| C1500             | F2                | G1                | Q1830C            | G4                | H4                | R1602             | E2                | G1                | U110A             | D2                | A2       |
| C1500             | F3                | G1                | Q1830D            | F4                | H4                | R1603             | E1                | G1                | U110B             | D1                | A2       |
| C1510             | F2                | G2                | Q1830E            | A1                | H4                | R1610             | E3                | G2                | U300D             | B5                | B1       |
| C1511             | E3                | G2                | Q1930A            | B1                | 13                | R1620             | F3                | G3                | U320D             | A5                | B3       |
| C1512             | F3                | G2                | Q1930B            | B1                | 13                | R1621             | F3                | G3                | U530C             | D3                | C4       |
| C1600             | E2                | G1                | Q1930E            | A1                | 13                | R1625             | F1                | нз                | U530D             | D1                | C4       |
| C1601             | E3                | G1                | Q2030             | G4                | 13                | R1626             | F3                | G3                | U900              | C2                | E1       |
| C1602<br>C1610    | E1<br>F3          | G1                | 8700              |                   |                   | R1628             | F3                | G3                | U1010             | C3                | E2       |
|                   | F3<br>F1          | G2                | R700              | D2                | D1                | R1630             | F3                | G3                | U1200A            | D1                | F1       |
| C1611             |                   | G2                | R800              | D2                | D1                | R1631             | F3                | G3                | U1200B            | E2                | F1       |
| C1612             | F3<br>F1          | G2                | R801              | D2                | D1                | R1635             | F2                | G3                | U1300             | D2                | F1       |
| C1613             |                   | G2                | R900              | D2                | E1                | R1701             | E1                | H1                | U1305             | B2                | F2       |
| C1620             | F2                | G3                | R901              | D2                | E1                | R1702             | E1                | H1                | U1310A            | D4                | F2       |
| C1700<br>C1710    | E1<br>F1          | H1                | R1000             | D2                | E1                | R1720             | F1                | Н3                | U1310B            | D3                | F2       |
| C1720             | F1<br>F2          | H2                | R1001             | D2                | E1                | R1721             | G3                | H3                | U1410             | D3                | F2       |
| C1720<br>C1820    | FZ<br>B1          | H3                | R1002             | C2                | E1                | R1723             | F1                | H3                | U1500             | E1                | G1       |
| C2300             | E<br>F5           | H3<br>J1          | R1004             | C2                | E1                | R1730             | F1                | H3                | U1505             | E3                | G1       |
| C2300<br>C2310    | F5<br>F4          | J1<br>J2          | R1005             | C2                | E1                | R1735             | F1                | НЗ                | U1620A            | F1                | G3       |
| C2400             | F4<br>F5          | J2<br>J1          | R1100             | E2                | E1                | R1820             | F4                | H3                | U1620B            | F3                | G3       |
| 02400             | FD                | 31                | R1101<br>R1102    | D1<br>C3          | E1                | R1821             | F4                | H3                | U1700E            | D3                | H1       |
| CR1000            | C1                | E1                | R1102             | C3                | E2<br>E2          | R1830             | F4                | НЗ                | U1700F            | D3                | H1       |
| CR11000           | C1                | E1                | R1103             | D3                | E2<br>E2          | R1831             | A1                | H4                | U1720             | G1                | НЗ       |
| CR1101            | C1                | E1                | R1104             | C4                | E2                | R1832<br>R1920    | A1<br>F4          | H4                | U1730             | G4                | H4       |
| CR1110            | C3                | E2                | R1105             | D2                | E2<br>E1          | R1920<br>R1922    |                   | 13                | U1820D            | F5                | H3       |
| CR1111            | C3                | E2                | R1110             | C4                | E2                | R1922<br>R1923    | A1                | 13                | U1920A            | C4                | 13       |
| CR1210            | C3                | F2                | R1200             | D4                | F1                | R1923             | A1                | 13                | U2010C            | G4                | 12       |
| CR1710            | E4                | H2                | R1200             | D4<br>D1          | F1                | R1930<br>R2020    | A1<br>G4          | 14                | U2010D            | D4                | 12       |
| CR1810            | E4                | H2                | R1202             | A2                | F2                | R2020             | G4<br>A1          | 13<br>14          | U2110A            | B5                | 12       |
| CR2130            | G4                | 13                | R1202             | B2                | F2<br>F2          | R2030             | B1                | 14                | U2310A            | F5                | J2       |
| CR2131            | G4                | 13                | R1203             | B1                | F2<br>F2          | R2037             | B1                | 14                | U2310B            | F4                | J2       |
| CR2301            | F5                | J1                | R1204             | D3                | F1                | R2032             | G4                | J3                | U2310D            | F5                | J2       |
|                   | . 2               |                   | R1210             | E4                | F1                | R2233             | G4<br>G5          | 13<br>13          | U2310E            | E4                | J2       |
| J11               | G1                | G4                | R1214             | E4                | F2                | R2300             | 65<br>F5          | J3 J1             | U2410A            | C5                | J2       |
| J12               | G3                | G4                | R1300             | E3                | F1                | R2302             | F5<br>F5          | J1                | U2410D            | F5                | J2       |
|                   | -                 | 1                 | R1301             | A2                | F2                | R2310             | F4                | J2                | W1401             | E1                | F1       |
| L1320             | A2                | F3                | R1310             | D3                | F2                | R2310             | F4<br>F4          | J2<br>J2          | W1401<br>W1411    | E1<br>E3          | F1<br>G2 |
| L1601             | F1                | G2                | R1400             | D2                | F1                | R2312             | F4<br>F5          | J2<br>J2          | VV1411            | E3                | 62       |
| L1610             | F3                | G2                | R1403             | E1                | F2                |                   | 15                | 52                |                   |                   |          |
| L1611             | E3                | G2                | R1404             | E3                | F2                | RT1720            | G3                | нз                |                   |                   |          |
| L1710             | E1                | H2                | R1410             | B2                | F2                |                   |                   | no                |                   |                   |          |

DISPLAY D/A AND AMPLIFIER DIAGRAM 34

Page and

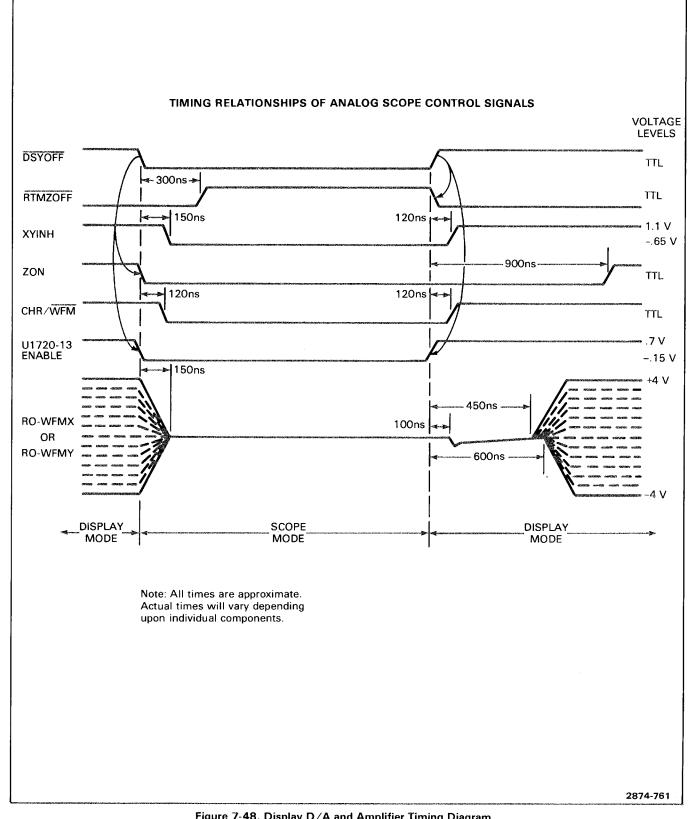
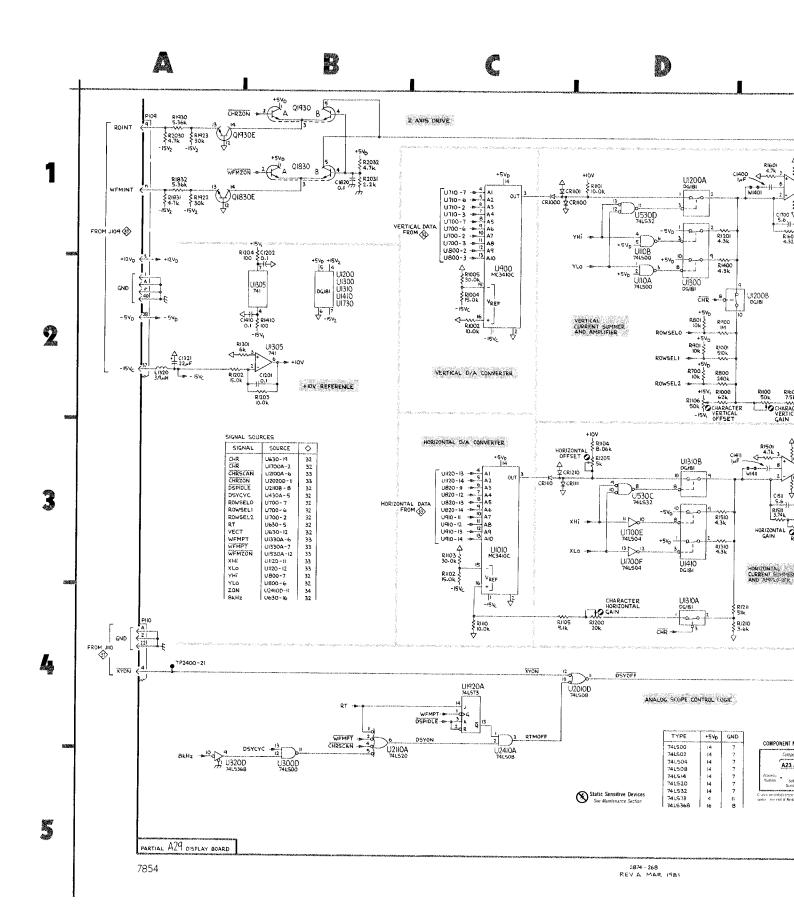
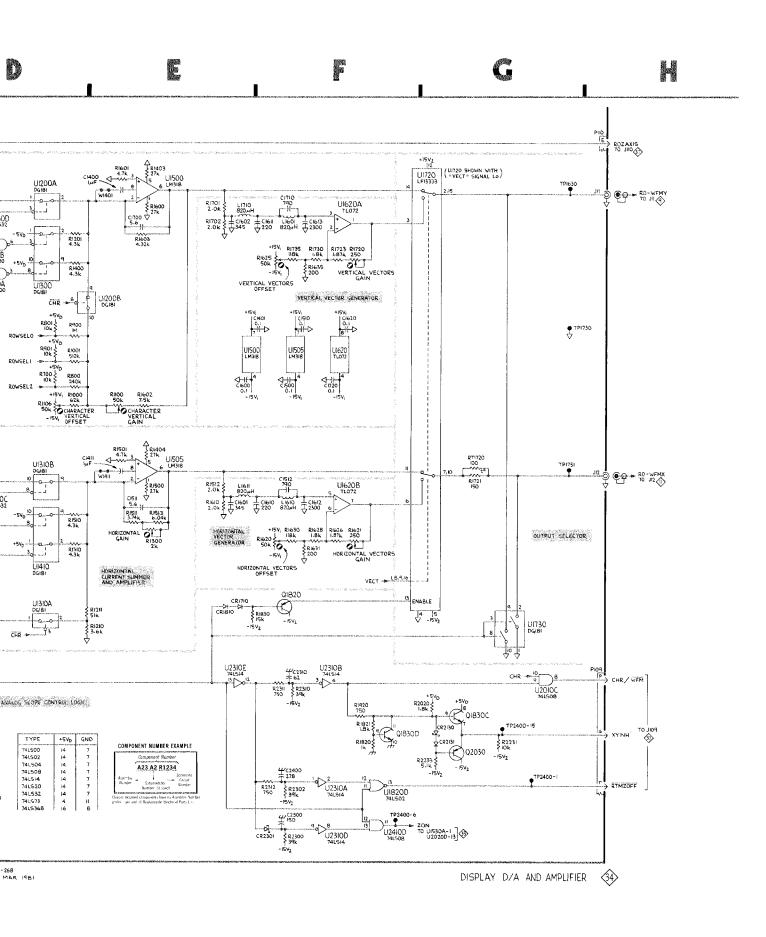


Figure 7-48. Display D/A and Amplifier Timing Diagram.





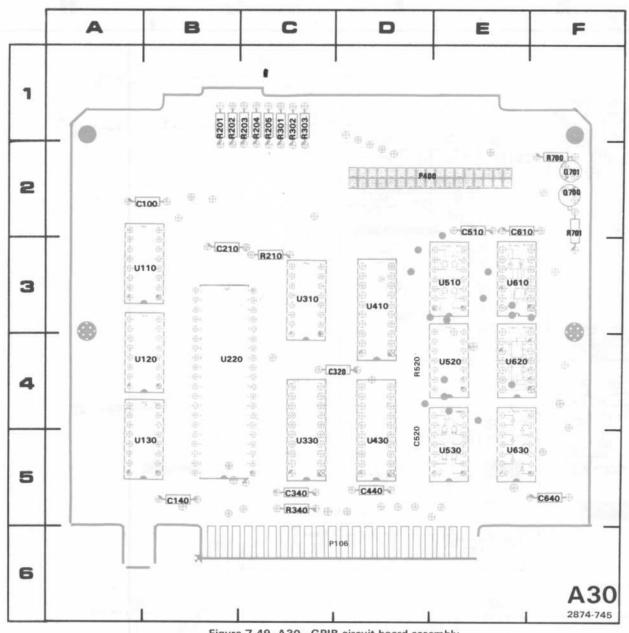
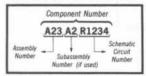


Figure 7-49. A30-GPIB circuit board assembly.

#### COMPONENT NUMBER EXAMPLE

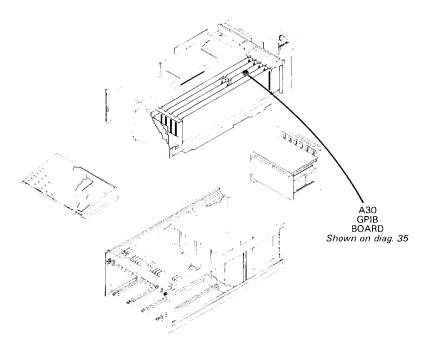


Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

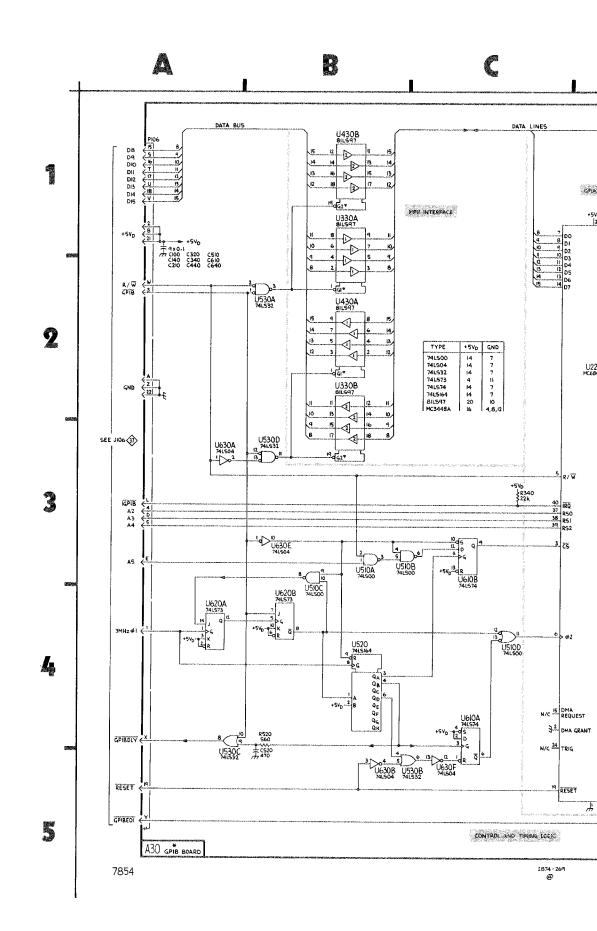
Static Sensitive Devices See Maintenance Section

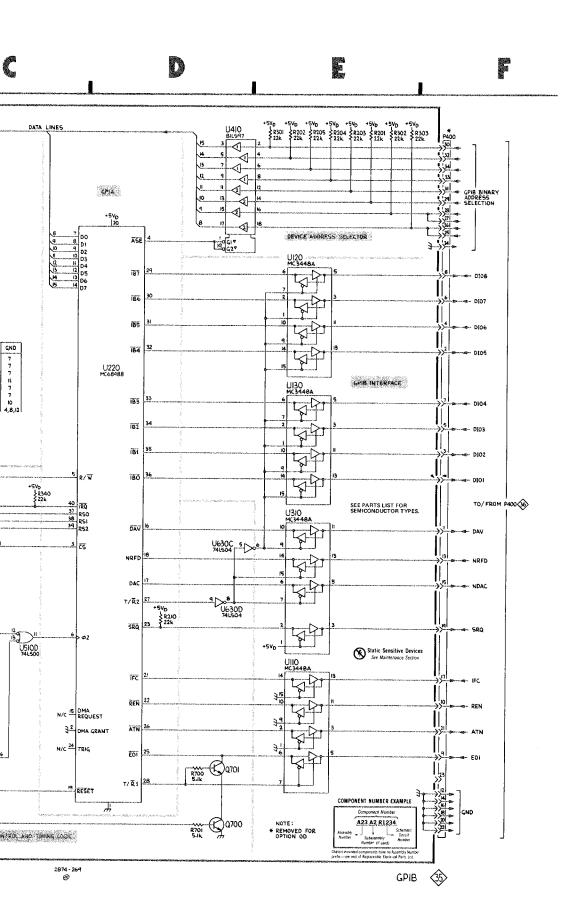
**GPIB DIAGRAM 35** 

| STATE OF STATE OF STATE | 244010144001247002      |                                                   |
|-------------------------|-------------------------|---------------------------------------------------|
| A30 ASS                 | Y                       | feature de arrecter a trace a tanta da angalagana |
| CIRCUIT<br>NUMBER       | SCHEM<br>LOCATION       | BOARD<br>LOCATION                                 |
| C100                    | A1                      | B2                                                |
| C140                    | A2                      | B5                                                |
| C210                    | A2                      | B3                                                |
| C320<br>C340            | A1<br>A2                | D4<br>C5                                          |
| C440                    | A2<br>A2                | D5                                                |
| C510                    | A1                      | E2                                                |
| C520                    | B4                      | D5                                                |
| C610                    | A2                      | E2                                                |
| C640                    | A2                      | F5                                                |
| P106                    | A1                      | C5                                                |
| P400                    | F1                      | D2                                                |
| Q700                    | D5                      | F2                                                |
| Q701                    | D5                      | F2                                                |
|                         |                         |                                                   |
| R201<br>R202            | E1<br>E1                | B1<br>B1                                          |
| R203                    | E1                      | C1                                                |
| R204                    | E1                      | C1                                                |
| R205                    | E1                      | C1                                                |
| R210<br>R301            | D4<br>E1                | C3                                                |
| R301                    | E1                      | C1<br>C1                                          |
| R303                    | E1                      | C1                                                |
| R340                    | C3                      | C5                                                |
| R520                    | B4                      | D4                                                |
| R700<br>R701            | D5<br>D5                | F2<br>F2                                          |
|                         | 00                      | 12                                                |
| U110                    | E4                      | B3                                                |
| U120<br>U130            | E2<br>E2                | B4<br>B5                                          |
| U220                    | D2                      | B3                                                |
| U310                    | E3                      | C3                                                |
| U330A                   | B1                      | C5                                                |
| U330B<br>U410           | 82<br>D1                | C5<br>D3                                          |
| U430A                   | B2                      | D5                                                |
| U430B                   | B1                      | D5                                                |
| U510A                   | B3                      | E3                                                |
| U510B<br>U510C          | В3<br>В4                | E3<br>E3                                          |
| U510D                   | C4                      | E3                                                |
| U520                    | B4                      | E4                                                |
| U530A<br>U530B          | 82<br>C5                | £5<br>E5                                          |
| U530B                   | A5                      | E5                                                |
| U530D                   | B3                      | E5                                                |
| U610A                   | C4                      | E3                                                |
| U610B<br>U620A          | C3<br>A4                | E3<br>E4                                          |
| U620B                   | B4                      | E4                                                |
| U630A                   | A3                      | E5                                                |
| U630B                   | B5<br>D2                | E5                                                |
| U630C<br>U630D          | D3<br>D4                | E5<br>E5                                          |
| U630E                   | B3                      | E5                                                |
| U630F                   | C5                      | E5                                                |
|                         | No. of Concession, Name | Construction of the second second                 |



**REV JAN 1982** 





35 GPIB

Reverse Side

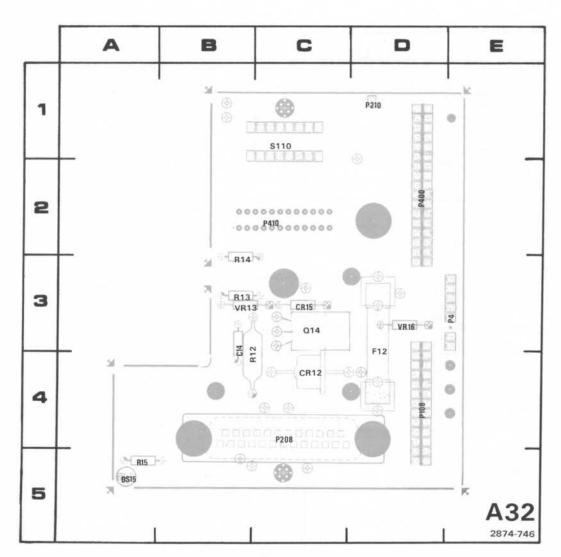
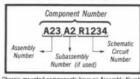


Figure 7-50. A32-Rear Panel Connector circuit board assembly.

## COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Numbe prefix—see end of Replaceable Electrical Parts List.

Static Sensitive Devices See Maintenance Section



Figure

0120

R130 B131

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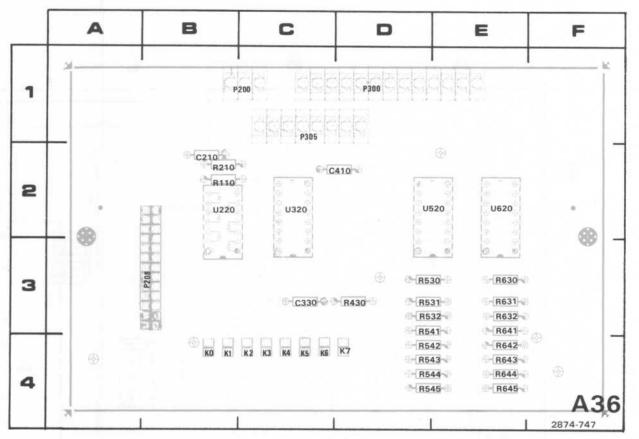


Figure 7-51. A36—Calculator Keyboard circuit board assembly.

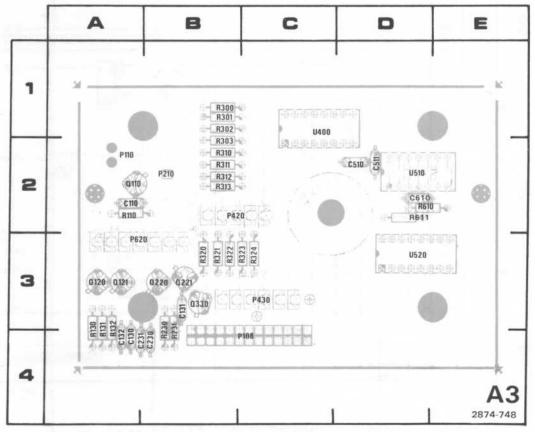


Figure 7-52. A3—Front Panel Keyboard Electronics circuit board assembly.

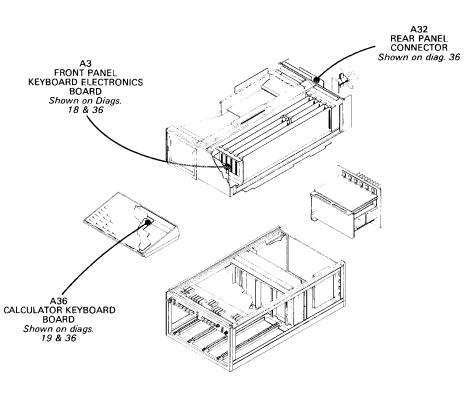
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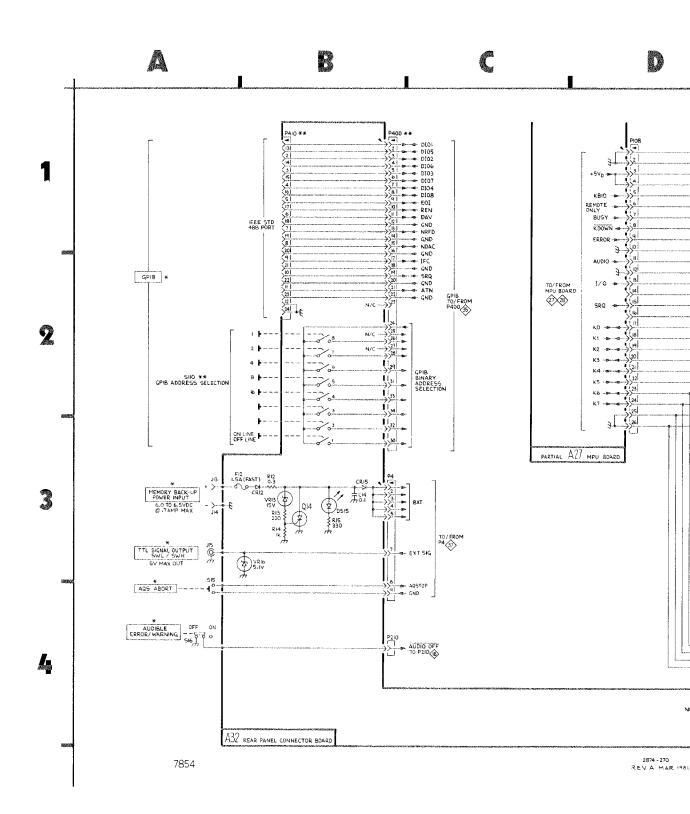
KEYB

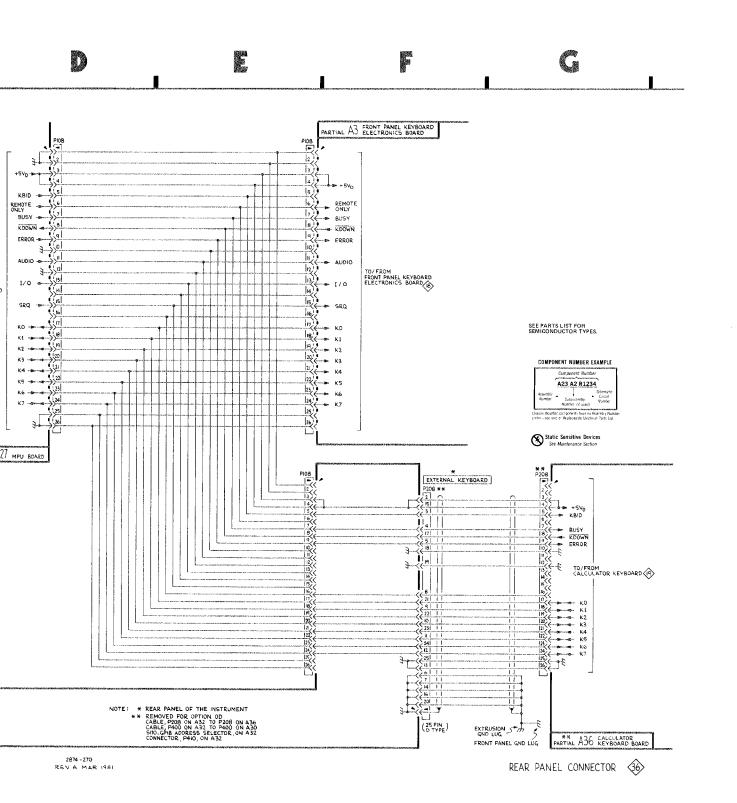
CALCULATO BC Shown 19

## REAR-PANEL CONNECTORS DIAGRAM 30

| PARTIAL           | A3 ASSY           |                    | n an   |
|-------------------|-------------------|--------------------|--------------------------------------------|
| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD              |                                            |
| P108              | E1                | С3                 |                                            |
|                   |                   | wn on diagrar      |                                            |
|                   | A27 ASSY          |                    |                                            |
| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION  |                                            |
| P108              | D1                | C1                 | ing the second second                      |
|                   |                   | own on diagra      |                                            |
| A32 ASS           |                   | NANANA PENDENKI ME | and an |
|                   |                   | BUVDD              |                                            |
| NUMBER            | SCHEM<br>LOCATION | LOCATION           |                                            |
| C14               | В3                | D4                 |                                            |
| CR12<br>CR15      | В3<br>В3          | C4<br>C3           |                                            |
| DS15              | B3                | A5                 |                                            |
| F12               | В3                | D4                 |                                            |
| P4                | В3                | E3                 |                                            |
| P108<br>P208      | E3<br>F3          | D4<br>C4           |                                            |
| P208<br>P210      | F3<br>B4          | C4<br>D1           |                                            |
| P400              | B1                | D2                 |                                            |
| P410              | B1                | C2                 |                                            |
| Q14               | B3                | C3                 |                                            |
| R12               | B3                | D4<br>B2           |                                            |
| R13<br>R14        | B3<br>B3          | В3<br>В3           |                                            |
| R15               | B3                | A5                 |                                            |
| S110              | A2                | C1                 |                                            |
| VR13<br>VR16      | В3<br>В3          | B3<br>D3           |                                            |
|                   |                   | دی<br>مرتبع        | STRAID CONTRACTOR                          |
| PARTIAL           | A36 ASSY          |                    |                                            |
| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION  |                                            |
|                   |                   | B3                 |                                            |
|                   |                   |                    | 10                                         |
|                   |                   | own on diagra      |                                            |
| CHASSIS           |                   |                    |                                            |
| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION  |                                            |
| J13               | A3                | CHASSIS            |                                            |
| J14               | A3                | CHASSIS            |                                            |
| J <b>1</b> 5      | A3                | CHASSIS            |                                            |
| S15               | A3<br>A4          | CHASSIS<br>CHASSIS |                                            |







36 Rear Panel Connector

Reverse Side

493

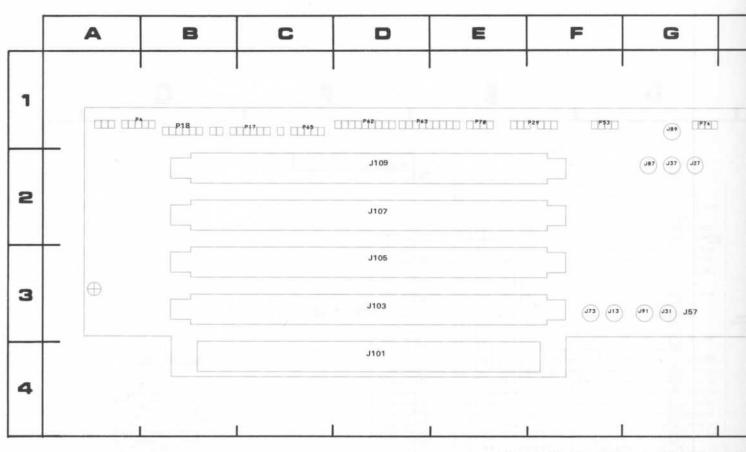


Figure 7-53. A8-Mother circuit board assembly



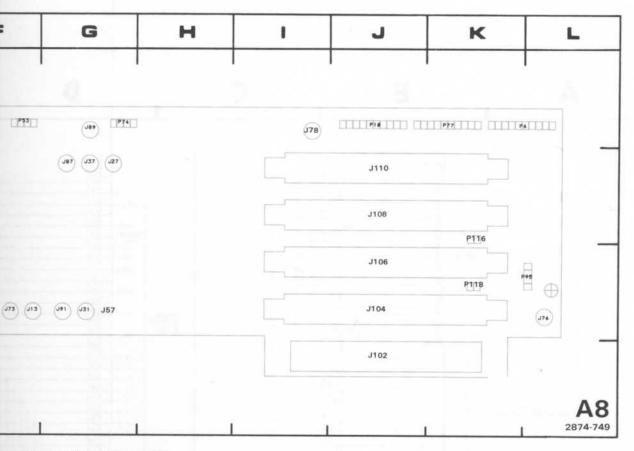
Assembly A8

### COMPONENT NUMBER EXAMPLE

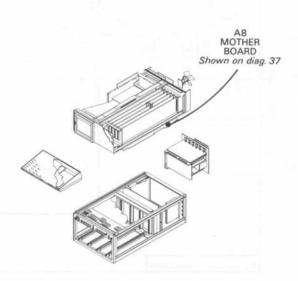
|                    | Component Number                |                                |  |  |
|--------------------|---------------------------------|--------------------------------|--|--|
|                    | A23 A2 R123                     | 4                              |  |  |
| Assembly<br>Number | Subassembly<br>Number (if used) | Schematic<br>Circuit<br>Number |  |  |

Chassis-mounted components have no Assembly Number prefix-see end of Replaceable Electrical Parts List.

7854



3-Mother circuit board assembly.

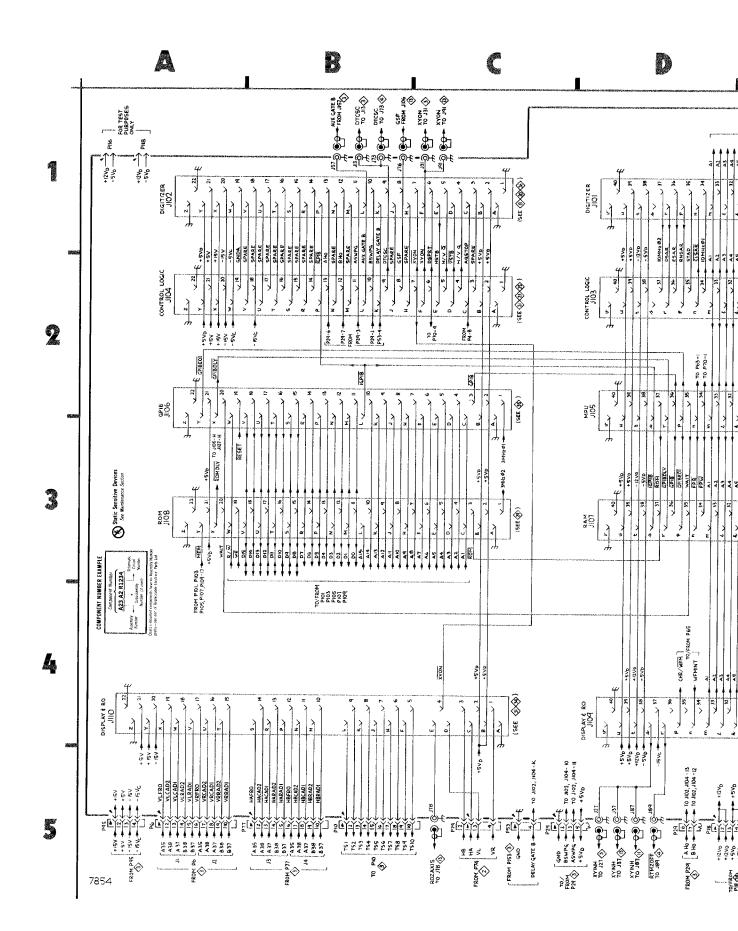


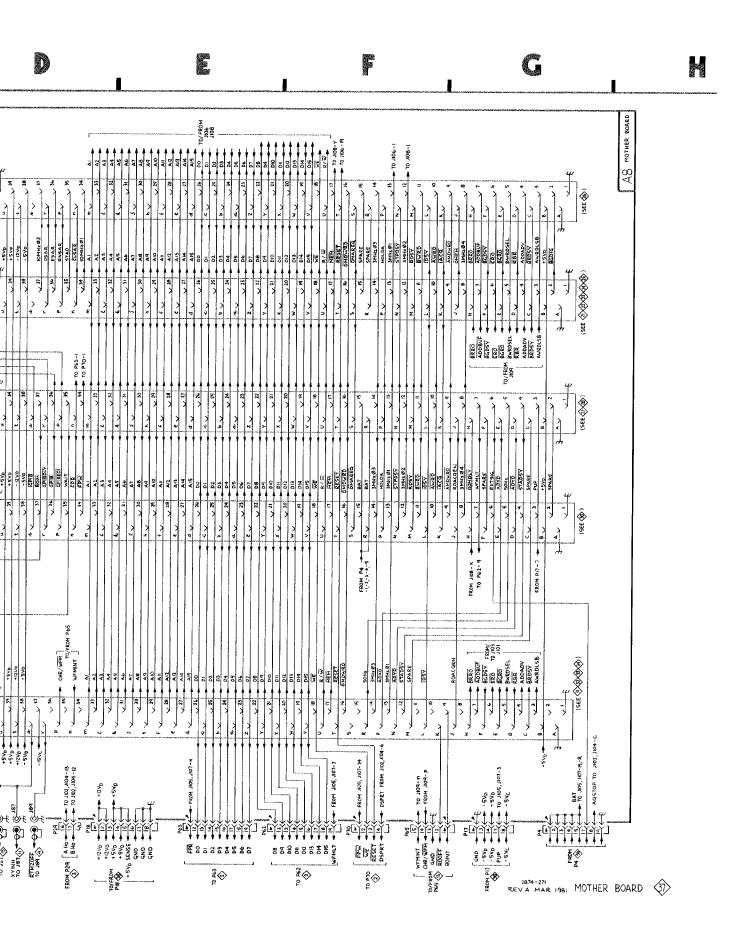
# MOTHER BOARD DIAGRAM 37

| A8 ASSY      |            |                            |
|--------------|------------|----------------------------|
| CIRCUIT      | SCHEM      | BOARD                      |
|              | LOCATION   |                            |
| J13          | B1         | F3                         |
| J27          | D5         | G2                         |
| J31          | C1         | G3                         |
| J37          | D5         | G2                         |
| J57          | B1         | G3                         |
| J73          | B1         | F3                         |
| J76          | B1         | L3                         |
| J78          | C5         | 11                         |
| J87          | D5         | G2                         |
| J89          | D5         | G1                         |
| J91          | C1         | G3                         |
| J101         | D1         | D4                         |
| J102         | A1         | J4                         |
| J103         | D2         | D3                         |
| J104         | A2         | J3                         |
| J105         | D2         | D3                         |
| J106         | A2         | J3                         |
| J107         | D3         | D2                         |
| J108         | A3         | J2                         |
| J109         | D4         | D2                         |
| J110         | A4         | J2                         |
| P4           | G5         | A1                         |
| P6           | A5         | K1                         |
| P10          | <b>B</b> 5 | B1                         |
| P17          | G5         | C1                         |
| P18          | D5         | B1                         |
| P29          | C5         | F1                         |
| P29          | D5         | F1                         |
| P53          | C5         | F1                         |
| P62          | E5         | D1                         |
| P63          | E5         | D1                         |
| P65          | F5         | C1                         |
| P70          | F5         | E1                         |
| P74          | C5         | G1                         |
| P77          | B5         | K1                         |
| P95<br>P116  | A5<br>A1   | L3                         |
| P116<br>P118 | AT<br>A1   | K3                         |
| FIIO         | A1         | К3                         |
|              |            | a transfer the post of the |

KNIPPREMISSION

CONTRACTOR DESIGNATION





37 Mother Board

Reverse Side

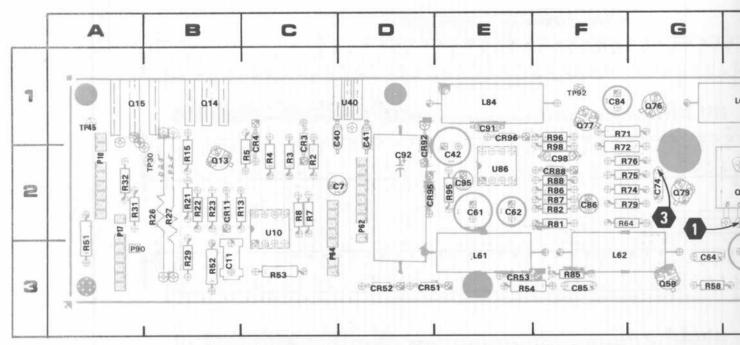


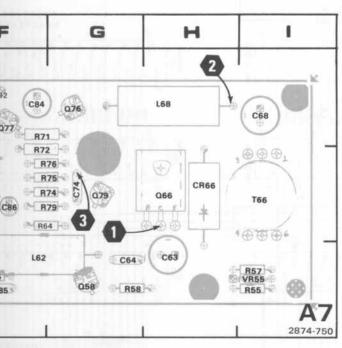
Figure 7-54. A7-Aux Regulator circuit board assembly.

COMPONENT NUMBER EXAMPLE

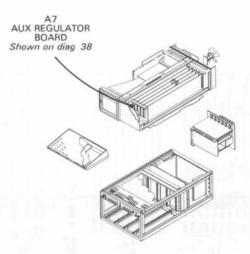


Chassis-mounted components have no Assembly Number prefix —see end of Replaceable Electrical Parts List.

> Static Sensitive Devices See Maintenance Section



assembly.



REV A MAR 1981

| CONTRACTOR CONTRACTORS | WITTER COMPANY                          |                                                  |                                                    |                                 |                                         |  |  |
|------------------------|-----------------------------------------|--------------------------------------------------|----------------------------------------------------|---------------------------------|-----------------------------------------|--|--|
| A7 ASSY                | RE-RECOVERED AND A CONTRACT OF CONTRACT | LI-LAND ALCOLUMBIAN MATERIA MANDA AND AND A ANAL |                                                    |                                 | une annue anne a mar anna ad aibhde i M |  |  |
| CIRCUIT<br>NUMBER      | SCHEM<br>LOCATION                       | BOARD<br>LOCATION                                | CIRCUIT<br>NUMBER                                  | SCHEM<br>LOCATION               | BOARD<br>LOCATION                       |  |  |
|                        |                                         |                                                  | 0.0                                                | 0.4                             | 0.0                                     |  |  |
| C7<br>C11              | C1<br>D1                                | D2<br>B3                                         | R2<br>R3                                           | C1<br>C1                        | C2<br>C2                                |  |  |
| C40                    | B3                                      | C1                                               | R4                                                 | C1                              | C2                                      |  |  |
| C40<br>C41             | C3                                      | D1                                               | R5                                                 | C2                              | C2                                      |  |  |
| C42                    | D3                                      | E2                                               | R7                                                 | C1                              | C2                                      |  |  |
| C61                    | B6                                      | E2                                               | R8                                                 | C1                              | C2                                      |  |  |
| C62                    | <b>B</b> 6                              | E2                                               | R13                                                | D2                              | B2                                      |  |  |
| C63                    | C6                                      | Н3                                               | R15                                                | E2                              | B2                                      |  |  |
| C64                    | C6                                      | G3                                               | R21                                                | E2                              | B2                                      |  |  |
| C68                    | D6                                      | 11                                               | R22                                                | E2                              | B2                                      |  |  |
| C74                    | D5                                      | G2                                               | R23                                                | E2                              | B2                                      |  |  |
| C84                    | E6                                      | F1                                               | R26                                                | E1                              | B2<br>B2                                |  |  |
| C85                    | F5<br>E5                                | F3<br>F2                                         | R27<br>R29                                         | E2<br>F2                        | B2<br>B3                                |  |  |
| C86<br>C91             | E 5<br>F 5                              | E1                                               | R31                                                | E1                              | A2                                      |  |  |
| C92                    | F5                                      | D2                                               | R32                                                | F1                              | A2                                      |  |  |
| C95                    | E4                                      | E2                                               | R51                                                | G3                              | A2                                      |  |  |
| C98                    | F5                                      | F2                                               | R52                                                | F3                              | B3                                      |  |  |
|                        |                                         |                                                  | R53                                                | G4                              | C3                                      |  |  |
| CR3                    | C1                                      | C1                                               | R54                                                | F4                              | E3                                      |  |  |
| CR4                    | C2                                      | C1                                               | R55                                                | E3                              | , 13 i                                  |  |  |
| CR11                   | D1                                      | B2                                               | R57                                                | F4                              | 13                                      |  |  |
| CR51                   | G3                                      | D3                                               | R58                                                | F4                              | G3                                      |  |  |
| CR52                   | G4                                      | D3                                               | R64                                                | C6                              | G2                                      |  |  |
| CR53                   | E3                                      | E3                                               | R71                                                | D4<br>D5                        | F1<br>F2                                |  |  |
| CR66<br>CR88           | C6<br>F4                                | H2<br>F2                                         | R72<br>R74                                         | D5                              | G2                                      |  |  |
| CR92                   | F6                                      | D2                                               | B75                                                | D5                              | G2<br>G2                                |  |  |
| CR95                   | E4                                      | D2                                               | R76                                                | C4                              | G2                                      |  |  |
| CR96                   | E4                                      | E1                                               | R79                                                | C5                              | G2                                      |  |  |
|                        |                                         |                                                  | R81                                                | E5                              | F2                                      |  |  |
| L61                    | B6                                      | E3                                               | R82                                                | E5                              | F2                                      |  |  |
| L62                    | B6                                      | F3                                               | R85                                                | F5                              | F3                                      |  |  |
| L68                    | E6                                      | H1                                               | R86                                                | F5                              | F2                                      |  |  |
| L84                    | E6                                      | E1                                               | R87                                                | E5                              | F2                                      |  |  |
|                        |                                         | 4.0                                              | R88                                                | F4                              | F2                                      |  |  |
| P17<br>P17             | H3<br>H6                                | A2<br>A2                                         | R95<br>R96                                         | E4<br>E4                        | E2<br>F1                                |  |  |
| P18                    | H0<br>H1                                | A2<br>A2                                         | R98                                                | F4                              | F2                                      |  |  |
| P62                    | A2                                      | D2                                               |                                                    | •••                             | • -                                     |  |  |
| P62                    | A5                                      | D2                                               | T66                                                | D6                              | 12                                      |  |  |
| P64                    | H3                                      | C3                                               |                                                    |                                 |                                         |  |  |
| P90                    | H5                                      | A3                                               | TP30                                               | G                               | B2                                      |  |  |
|                        |                                         |                                                  | TP45                                               | F2                              | A1                                      |  |  |
| Q13                    | D1                                      | B2                                               | TP92                                               | G                               | F1                                      |  |  |
| Q14                    | E1                                      | B1                                               | 11104                                              | D1                              | 62                                      |  |  |
| Q15                    | E1<br>F4                                | A1<br>G3                                         | U10A<br>U10B                                       | D1<br>E2                        | C2<br>C2                                |  |  |
| Q58<br>Q66             | F4<br>C6                                | H2                                               | U10B<br>U40                                        | C3                              | D1                                      |  |  |
| 076                    | C4                                      | G1                                               | U86A                                               | F5                              | E2                                      |  |  |
| 077                    | C4                                      | F1                                               | U86B                                               | E5                              | E2                                      |  |  |
| 079                    | C5                                      | G2                                               |                                                    |                                 |                                         |  |  |
|                        |                                         |                                                  | VR55                                               | D4                              | 13                                      |  |  |
| CHASSIS MOUNTED PARTS  |                                         |                                                  |                                                    |                                 |                                         |  |  |
| CIRCUIT                | SCHEM                                   | BOARD                                            | CIRCUIT                                            | SCHEM                           | BOARD                                   |  |  |
|                        | LOCATION                                |                                                  |                                                    | LOCATION                        |                                         |  |  |
| P64                    | A3                                      | CHASSIS                                          | STATISTICS AND | 1940 - H VETOBORT - NO 700 MARK |                                         |  |  |
|                        | 2012 20200                              | 97.94.95% WY 54.04                               | I<br>Sanatan kanala makana                         |                                 | ON ROUTING OF THE OWNER                 |  |  |

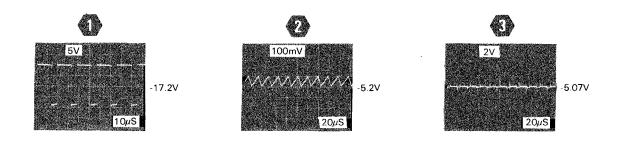
## AUX. REGULATOR DIAGRAM 38

## VOLTAGE AND WAVEFORM CONDITIONS

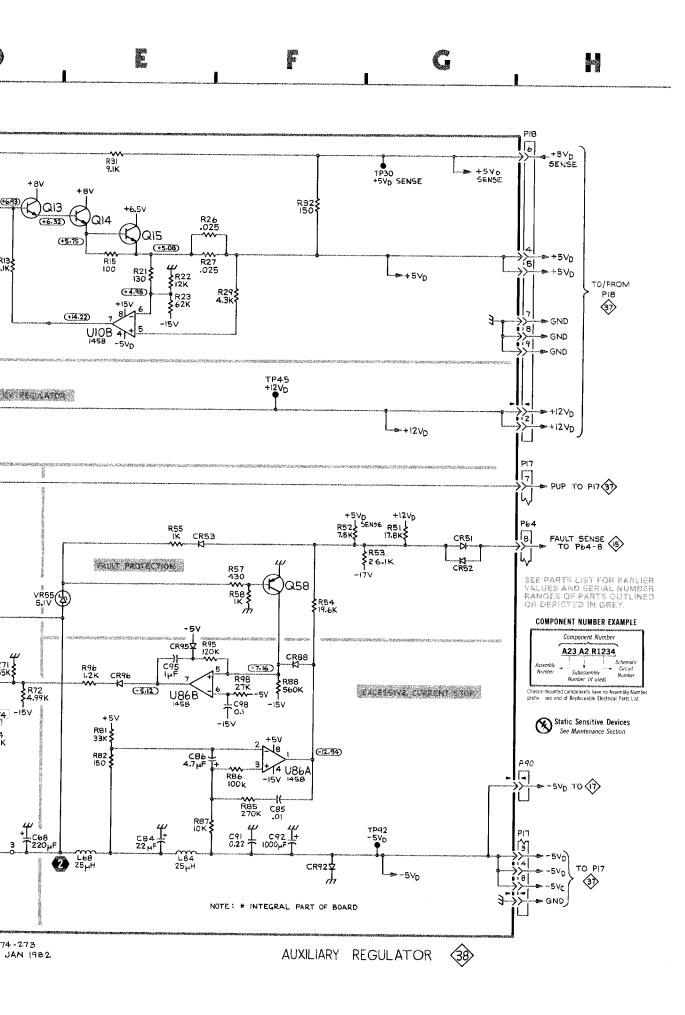
The voltages and waveforms shown were obtained with the 7854 front panel switches set as follows: CRT DISPLAY (SCOPE); TRIGGER SOURCE (VERT MODE); VERTICAL MODE (LEFT); HORIZONTAL MODE (B); READOUT INTENSITY (OFF).

Voltage Conditions. The voltages were taken with a digital multimeter with a  $10M\Omega$  input impedance (Tektronix DM501 Digital Multimeter installed in a TM501 Power Module or Tektronix 7D13 Digital Multimeter used with a readout-equipped 7000-Series Oscilloscope.

Waveform Conditions. The waveforms shown below were obtained using a test oscilloscope system with  $10M\Omega$  input impedance, at least  $60M\Omega$  bandwidth and 10X probe (Tektronix 7603 Oscilloscope, 7B92 Time Base, 7A13 Differential Comparator and P6063A Probe).



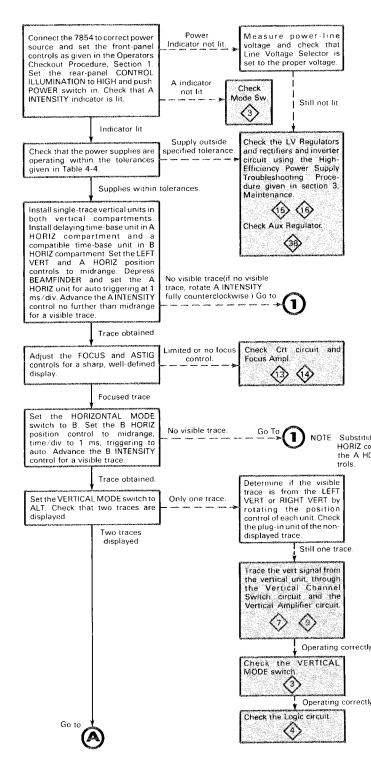
|                 | <b>A</b>  | B                                | C                               | D ,                                                                                                         |
|-----------------|-----------|----------------------------------|---------------------------------|-------------------------------------------------------------------------------------------------------------|
|                 |           |                                  |                                 |                                                                                                             |
| 1               |           | VOLTAGE & WAVEFORM<br>CONDITIONS | +15V<br>R2<br>CR3 22.00K<br>+5V | C(1)<br>470 (+6.31)<br>3 1 CRII (+6.43)<br>2 1 CRII (+6.43)<br>CRII (+6.43)<br>CRII (+6.43)<br>CRII (+6.43) |
|                 |           |                                  | <u></u>                         |                                                                                                             |
|                 |           |                                  |                                 |                                                                                                             |
|                 |           |                                  |                                 |                                                                                                             |
| I               | · · ·     |                                  |                                 |                                                                                                             |
|                 |           |                                  |                                 |                                                                                                             |
| •<br>           | -         |                                  |                                 |                                                                                                             |
|                 | <u>.</u>  |                                  |                                 |                                                                                                             |
| ·<br>· <u>·</u> |           |                                  |                                 |                                                                                                             |
| R               |           |                                  |                                 |                                                                                                             |
|                 |           |                                  |                                 |                                                                                                             |
| **<br>          |           |                                  |                                 |                                                                                                             |
|                 |           |                                  |                                 |                                                                                                             |
| ¢               |           |                                  |                                 |                                                                                                             |
|                 |           |                                  |                                 |                                                                                                             |
| ,               | <u>**</u> |                                  |                                 |                                                                                                             |
|                 |           |                                  |                                 |                                                                                                             |
| -               |           |                                  |                                 |                                                                                                             |



38 Auxiliary Regulator

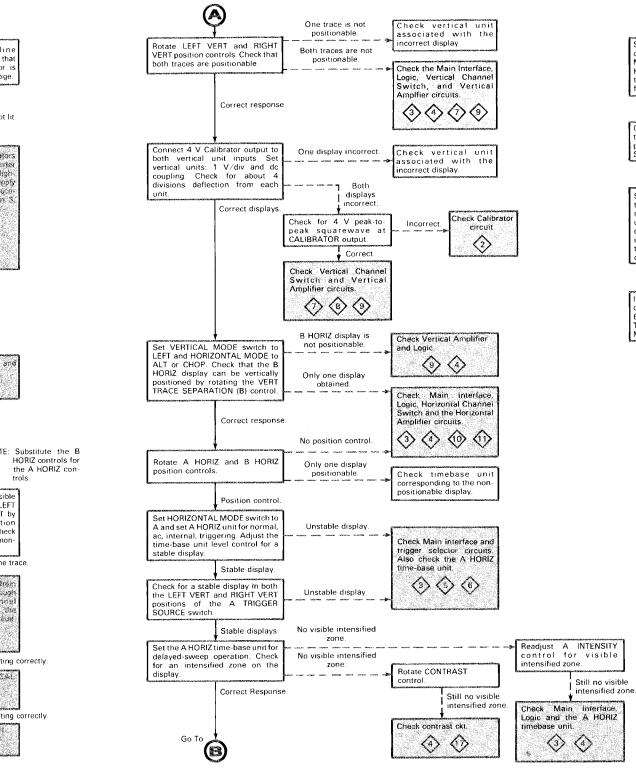
## TROUBLESHOOTING CHART INSTRUCTIONS

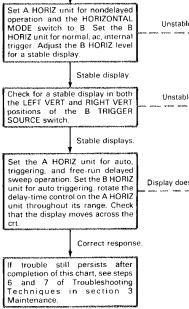
- 1. Follow the procedure for Analog Test Card (067-0912-00) installation in Section 3, Maintenance, then p with the following instructions.
- 2. Beginning at the top left block of the chart proceed downward until the 7854 does not perform as ind
- 3. Then follow the dashed lines as the symptom indicates. Each shaded block indicates a circuit which may cause of the malfunction. Refer to Section 3, Theory of Operation, for a detailed discussion of the circu Section 7, Diagrams and Circuit Board illustrations, for the circuit schematic.



## , then proceed

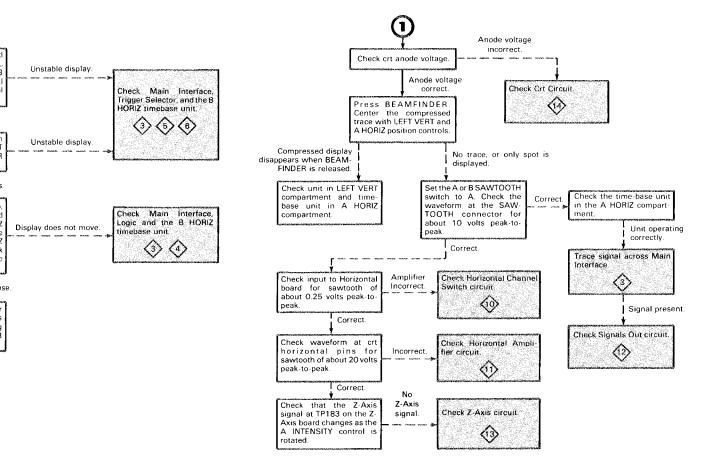
n as indicated. ch may be the the circuit, and



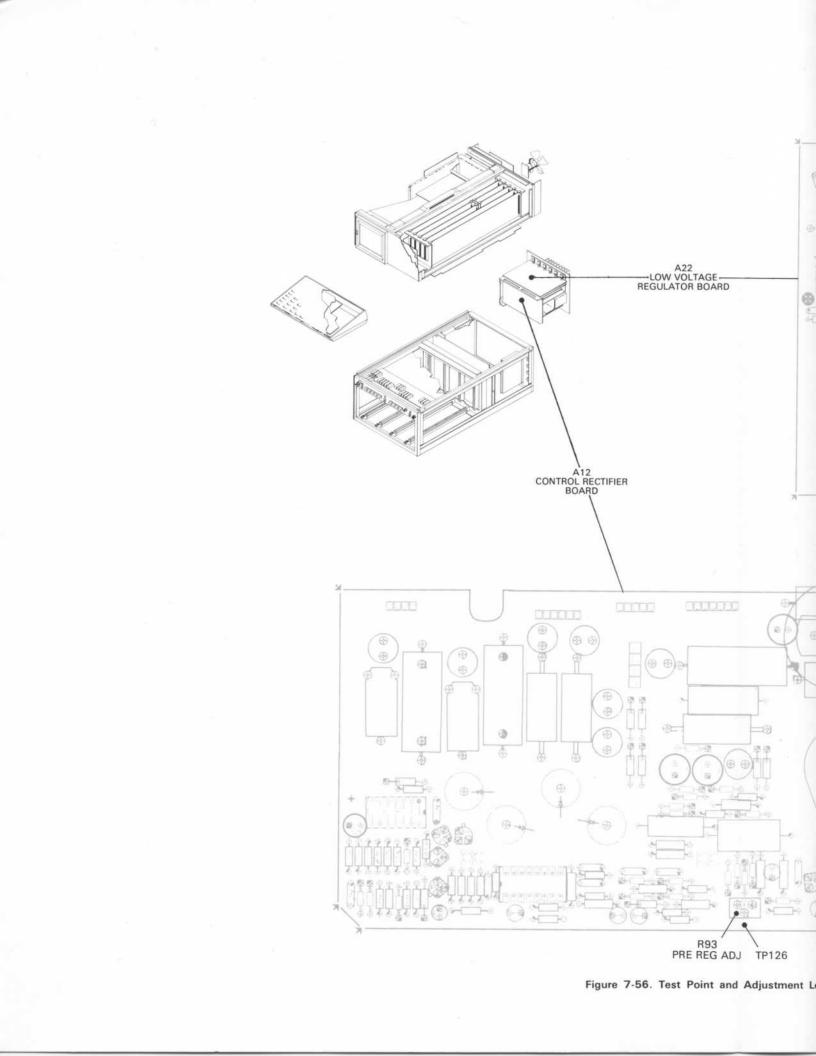


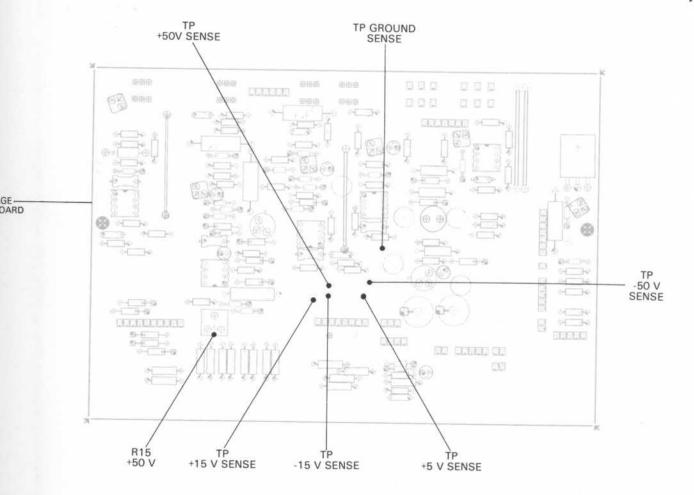
B

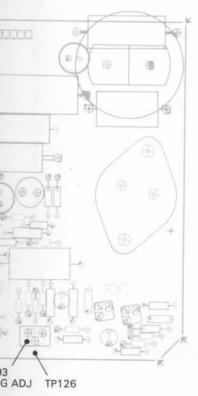
Figure 7-55. 7854 Troubleshooting Chart.



2874-751





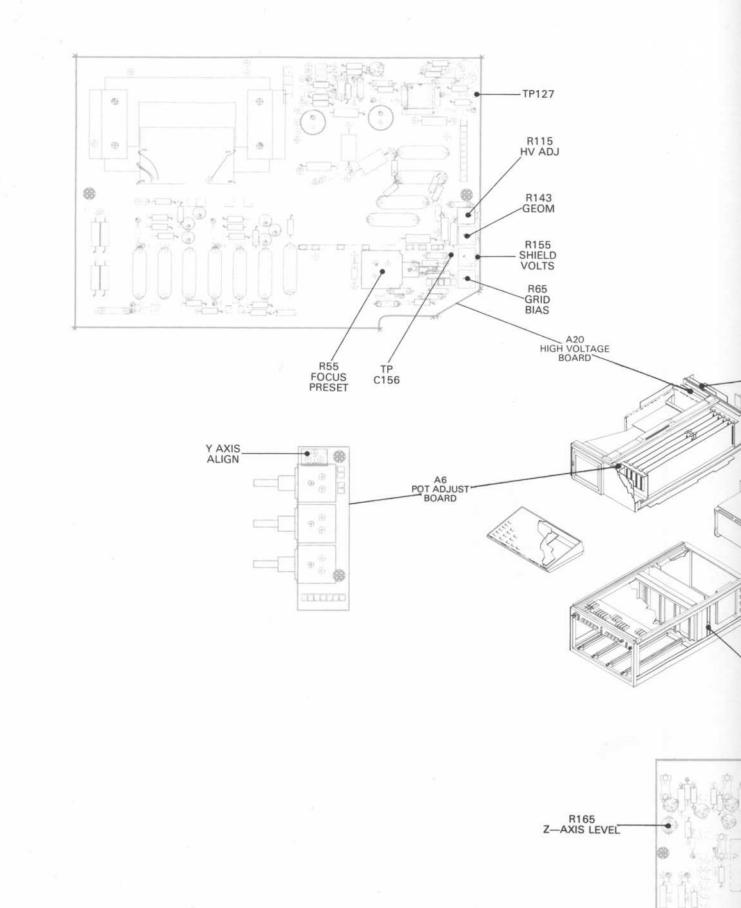


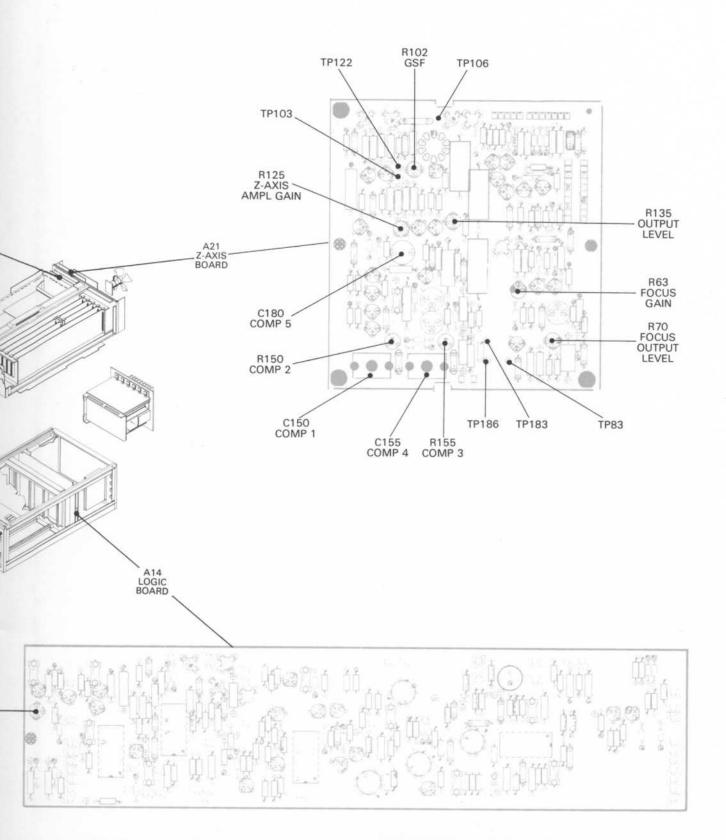
t and Adjustment Locations A.

2874-752

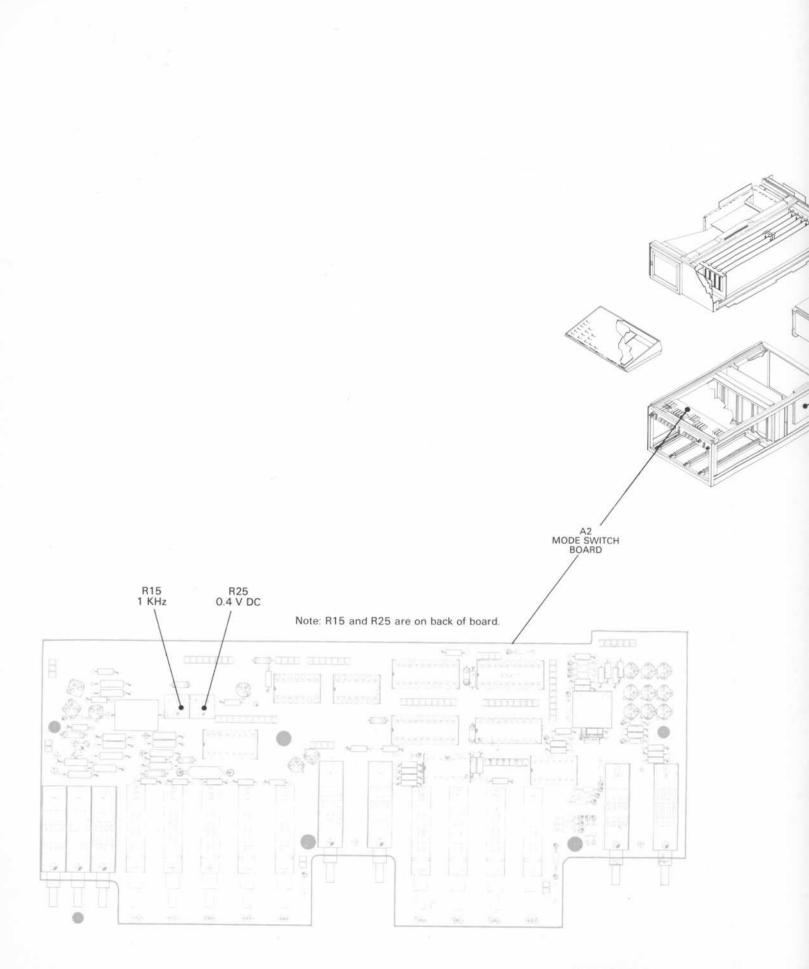
@

7854



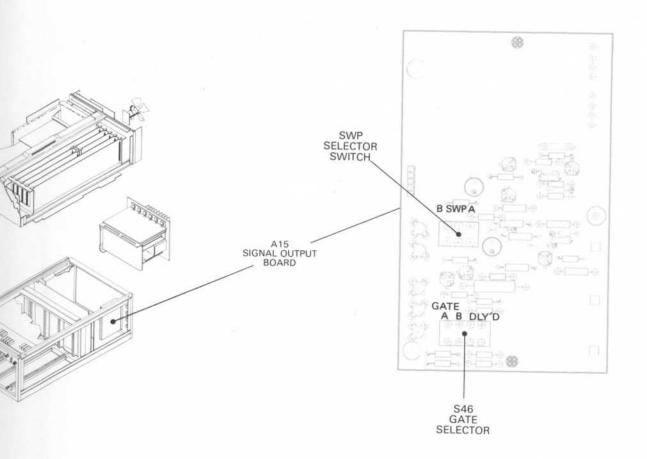


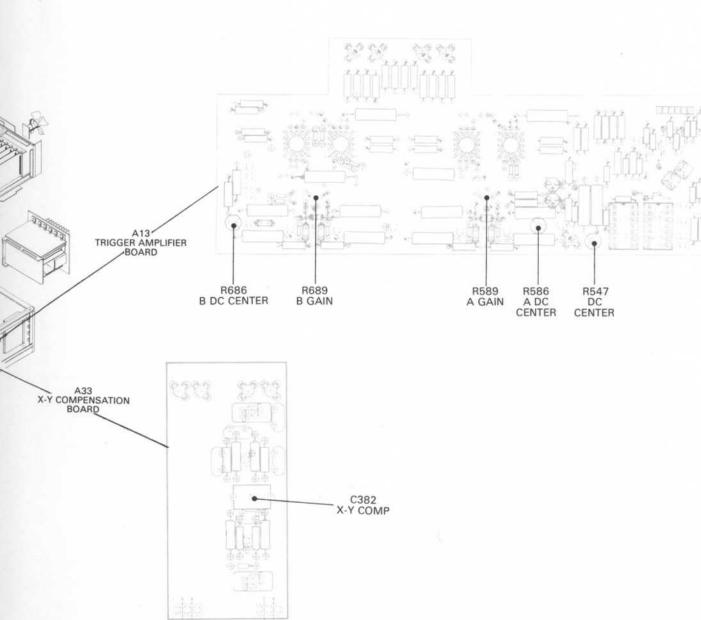
Test Point and Adjustment Locations B

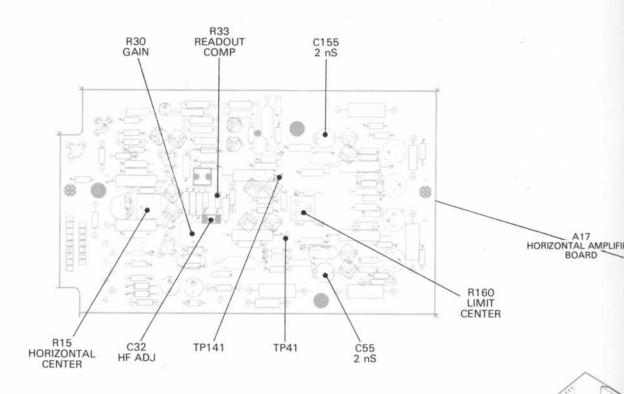


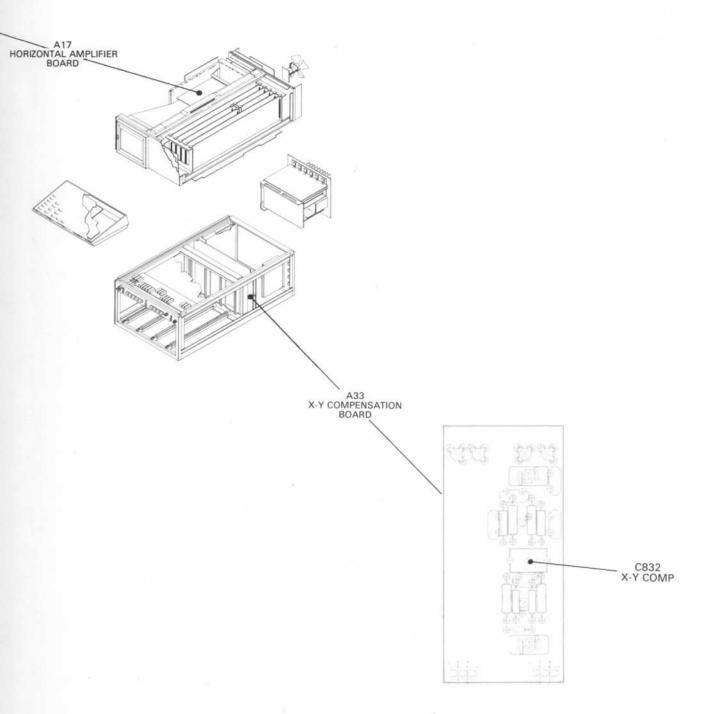
7854

Adjustment Locations C



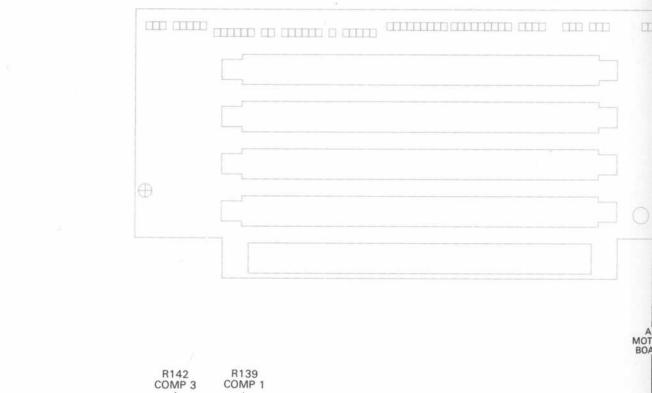


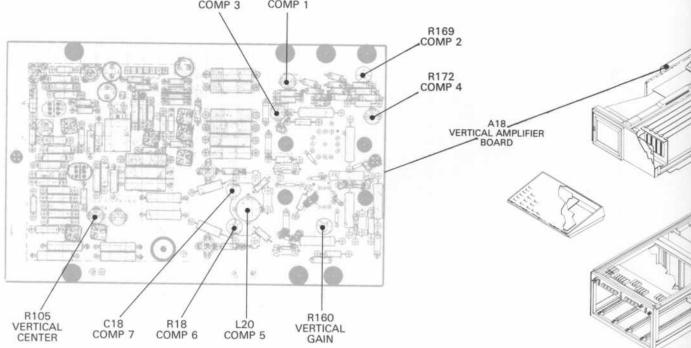


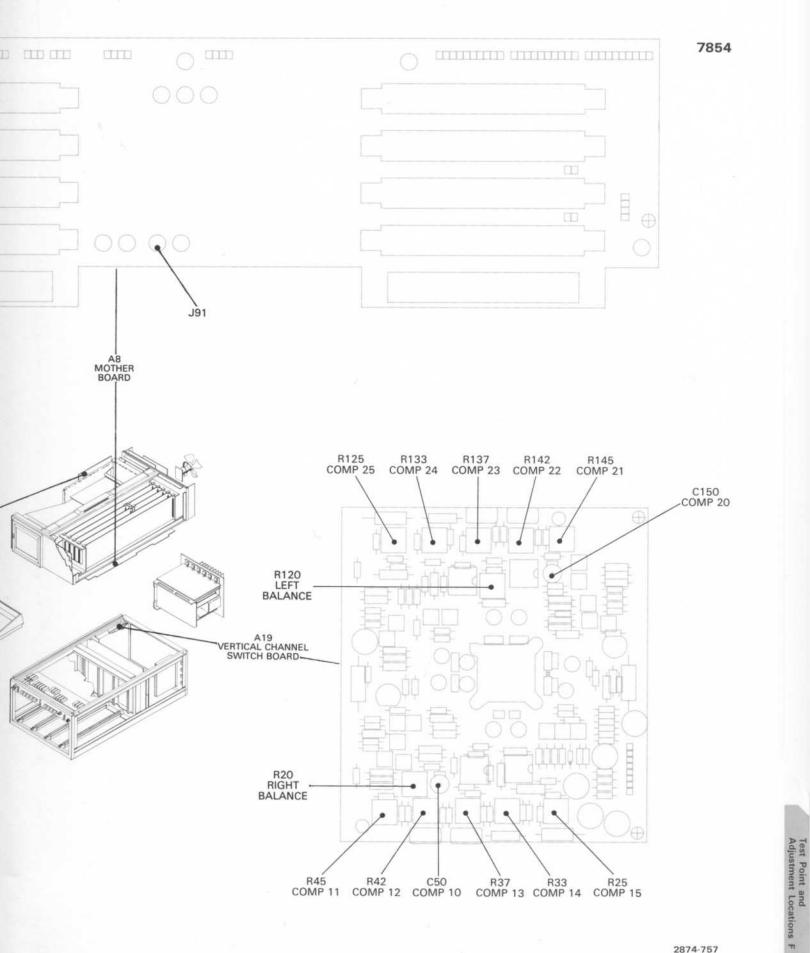


Test Point and Adjustment Locations E

2874-756







2874-757

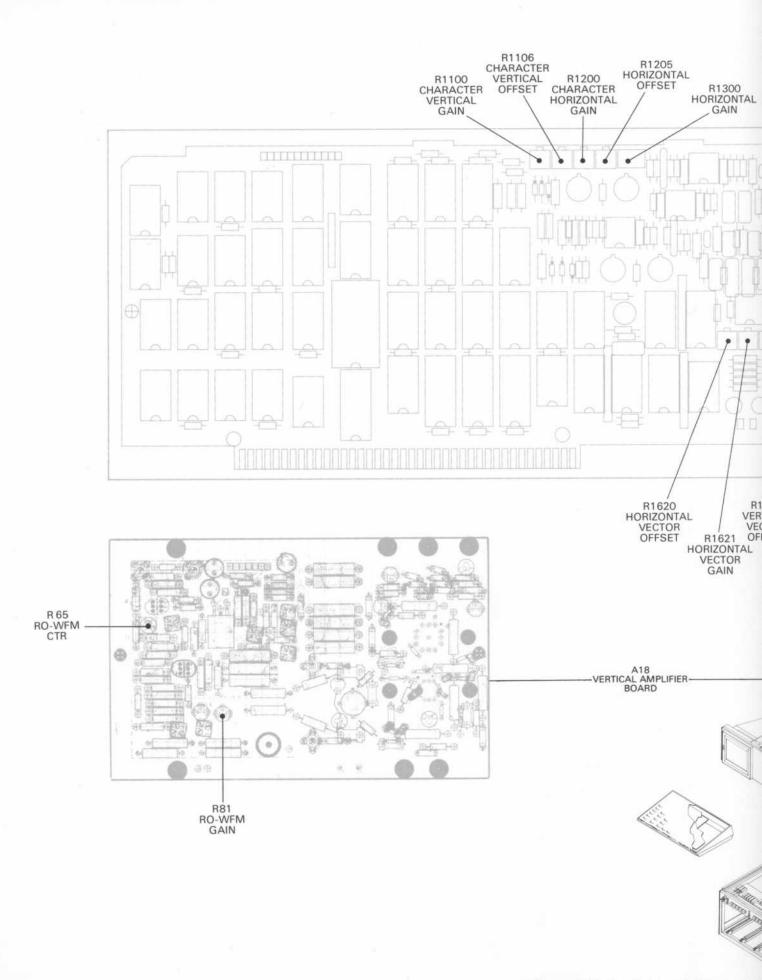
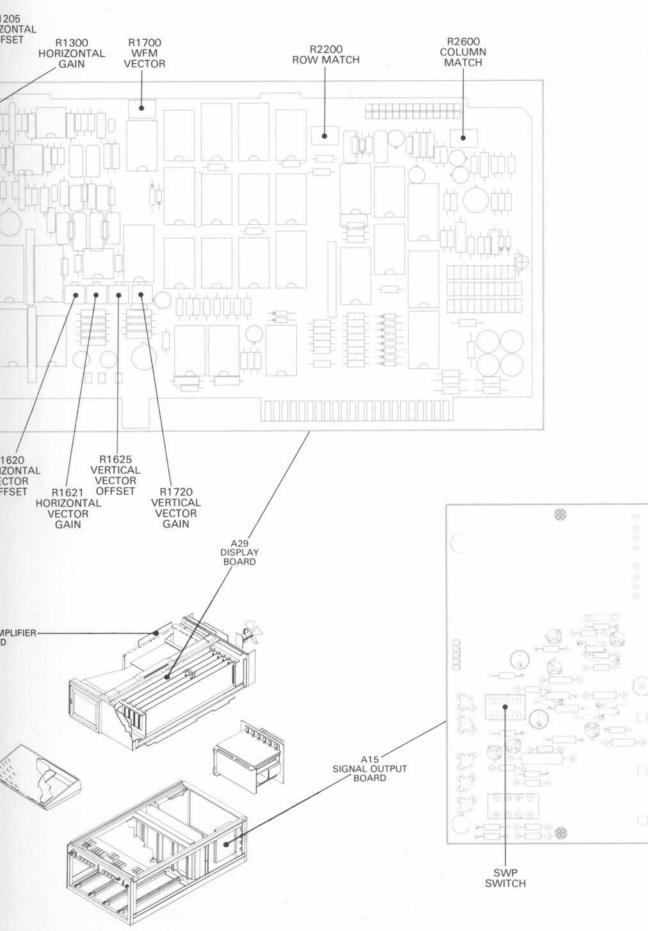


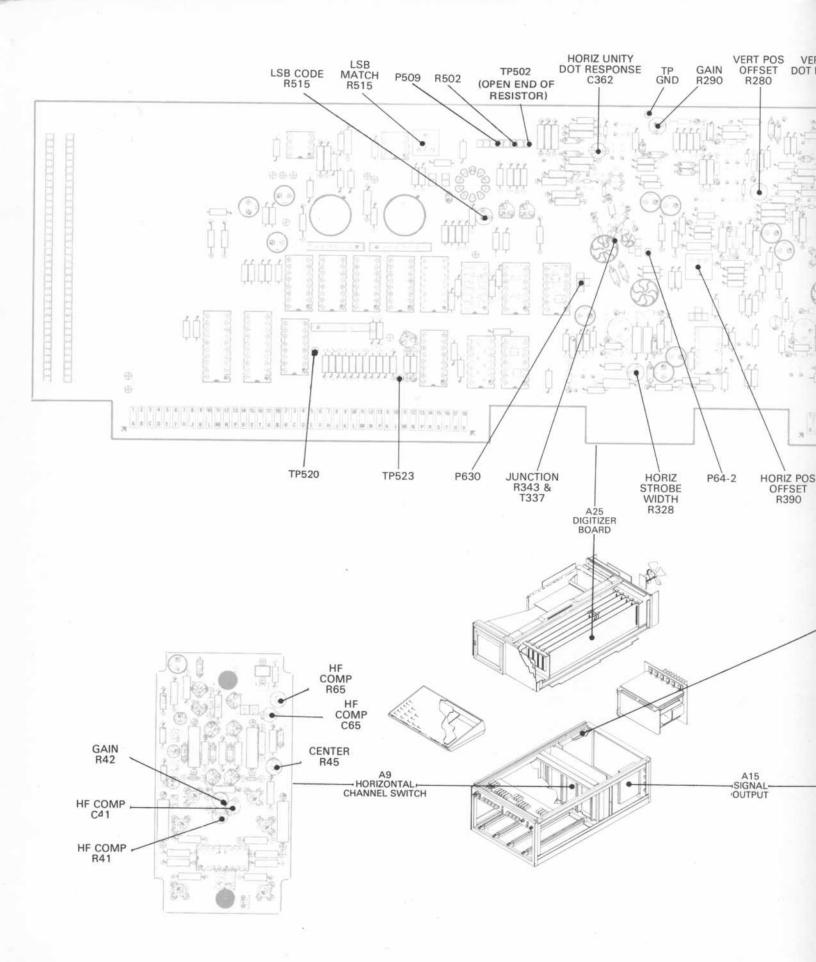
Figure 7-62. Test Point and Adjustment L

7854

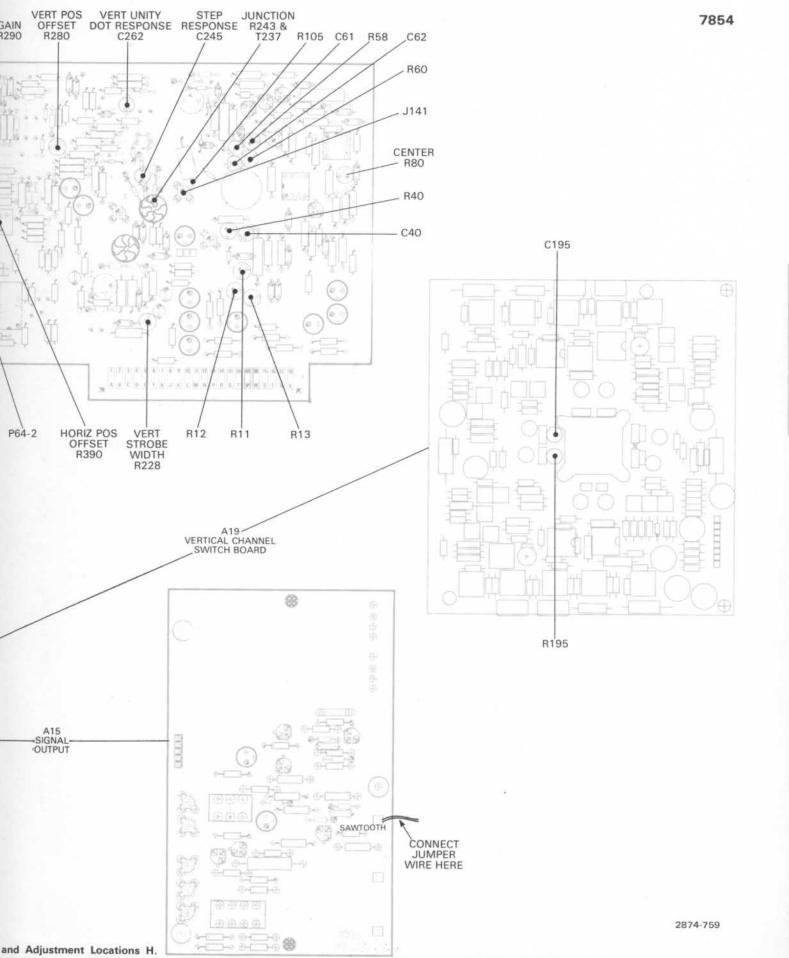
Test Point and Adjustment Locations G



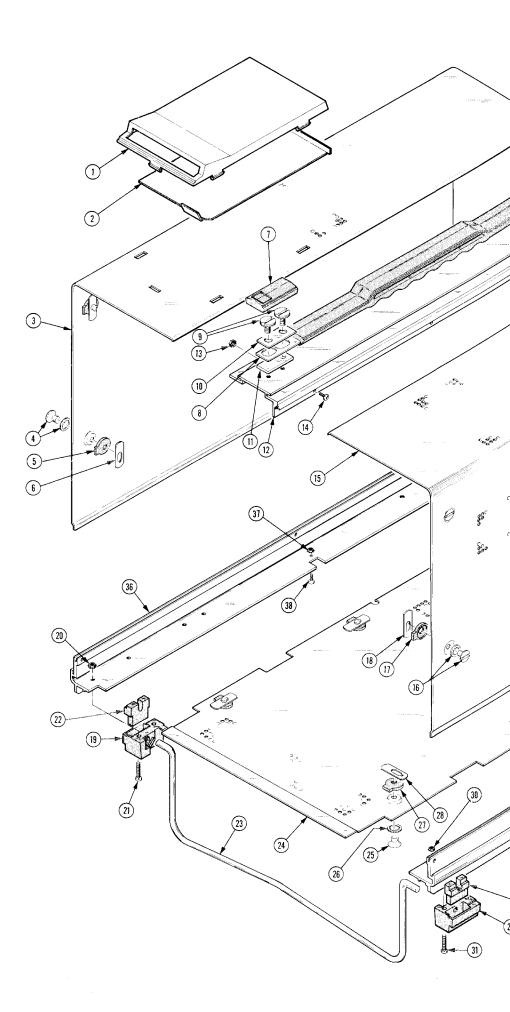
int and Adjustment Locations G.

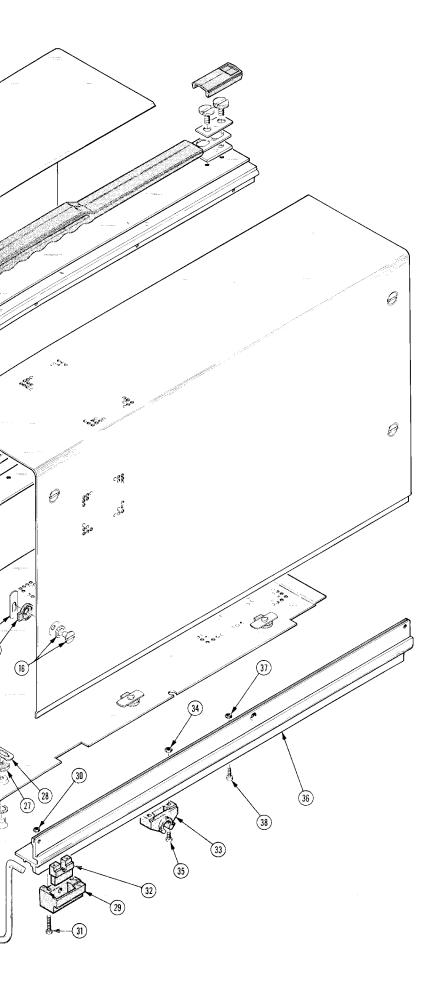


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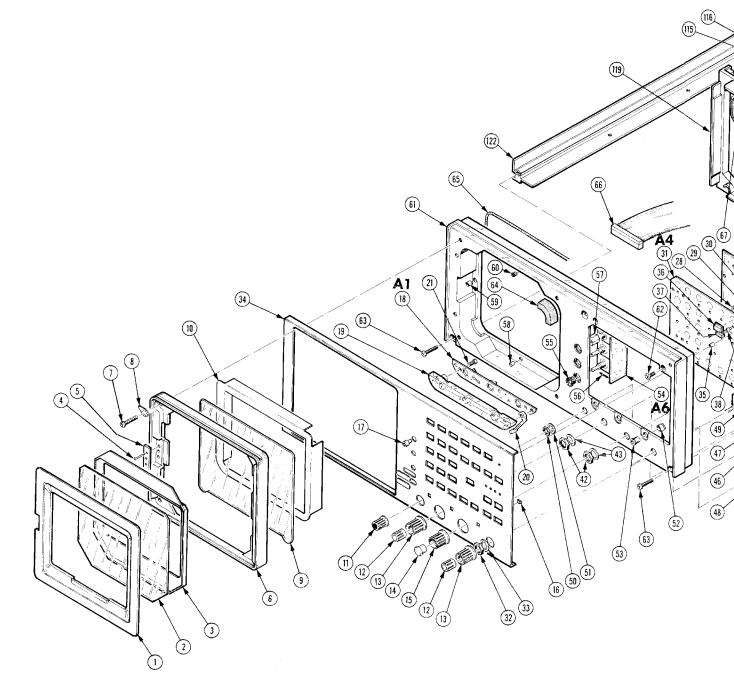
Test Point and Adjustment Locations H





7854 OSCILLOSCOPE

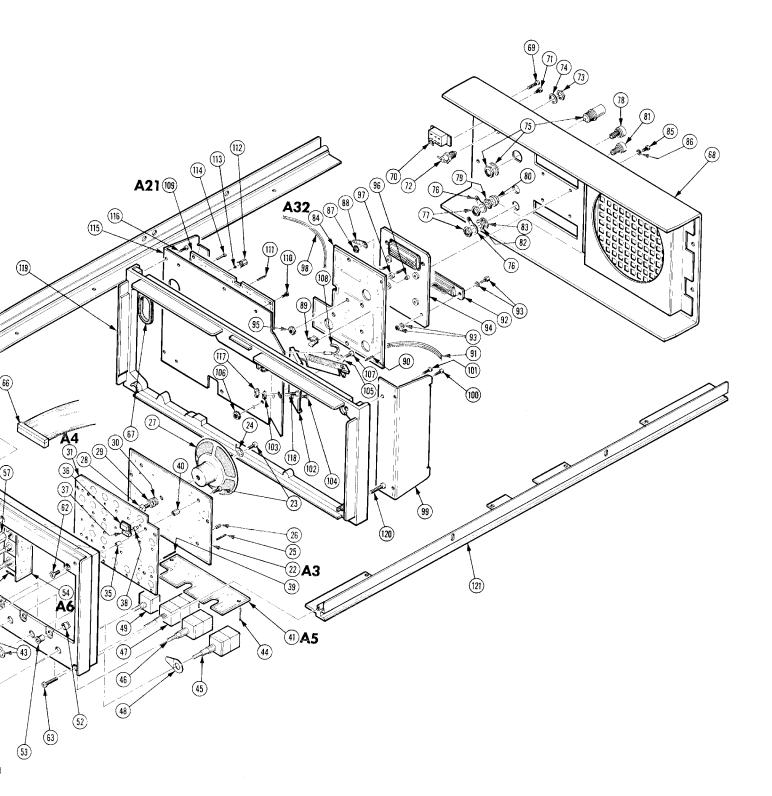
FIG. 1. CABINET

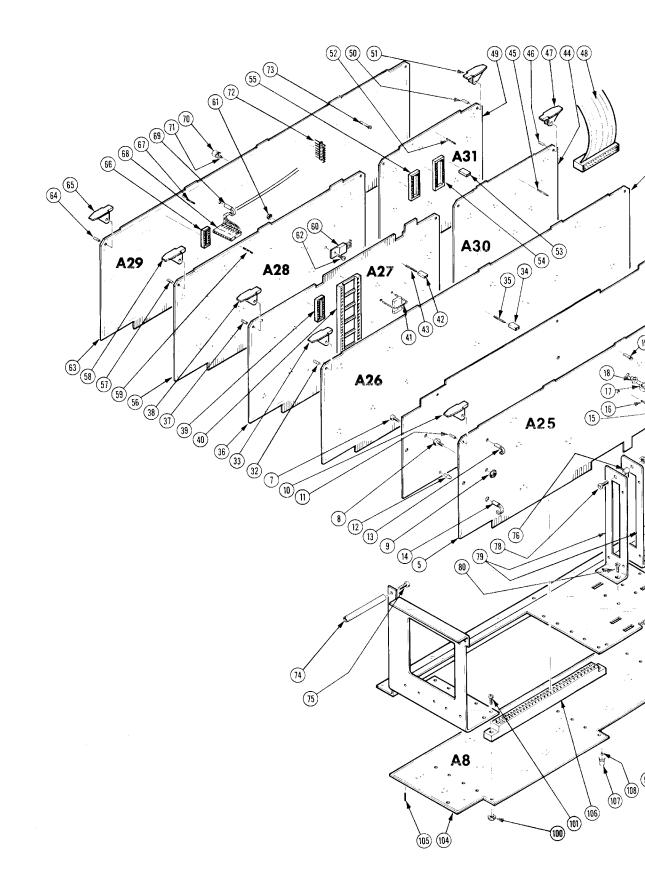


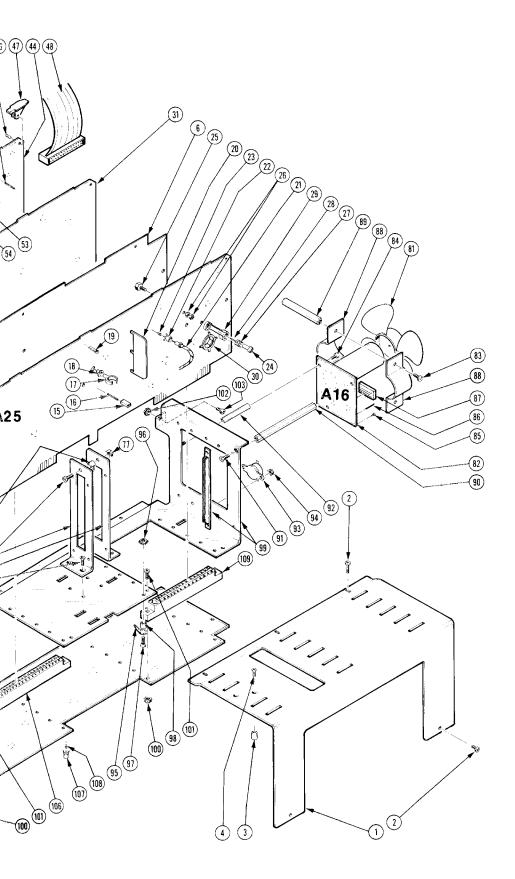
7854 OSCILLOSCOPE

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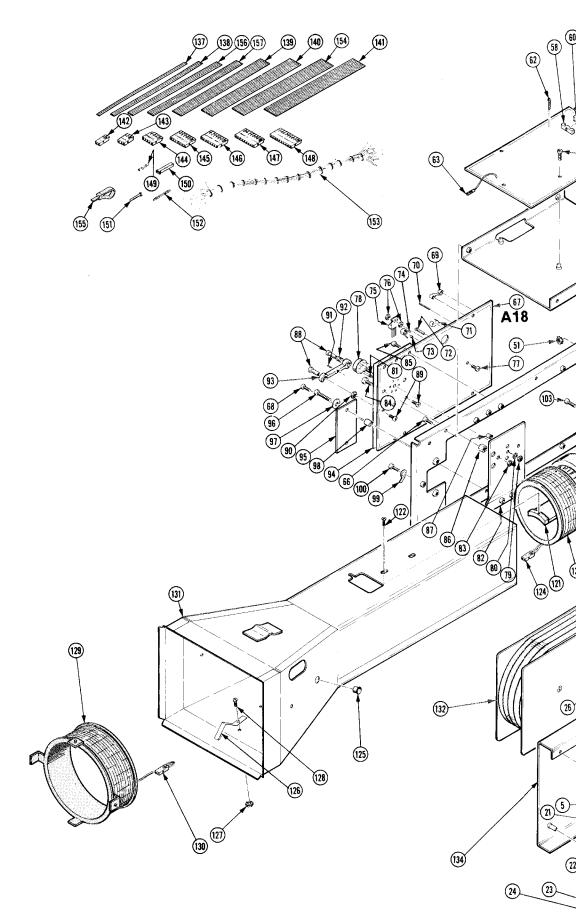
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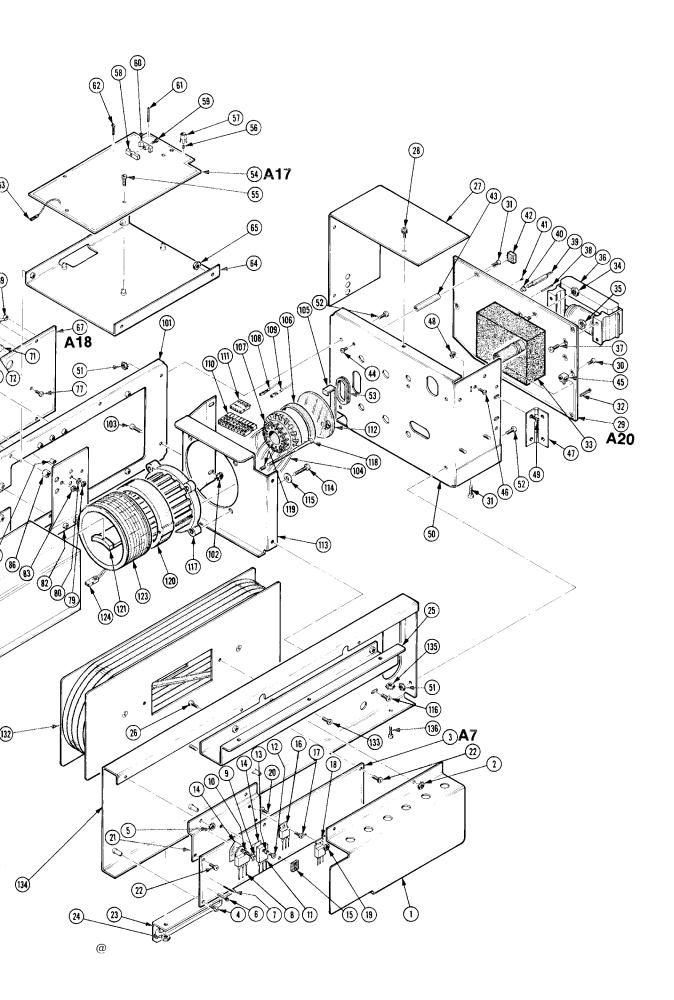


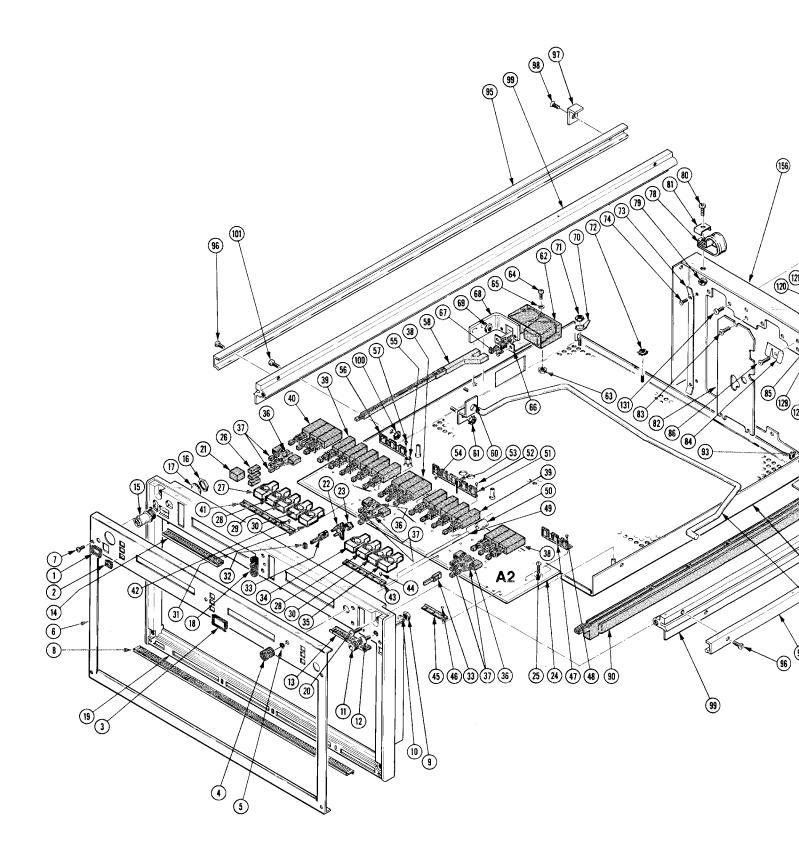
7854 OSCILLOSCOPE

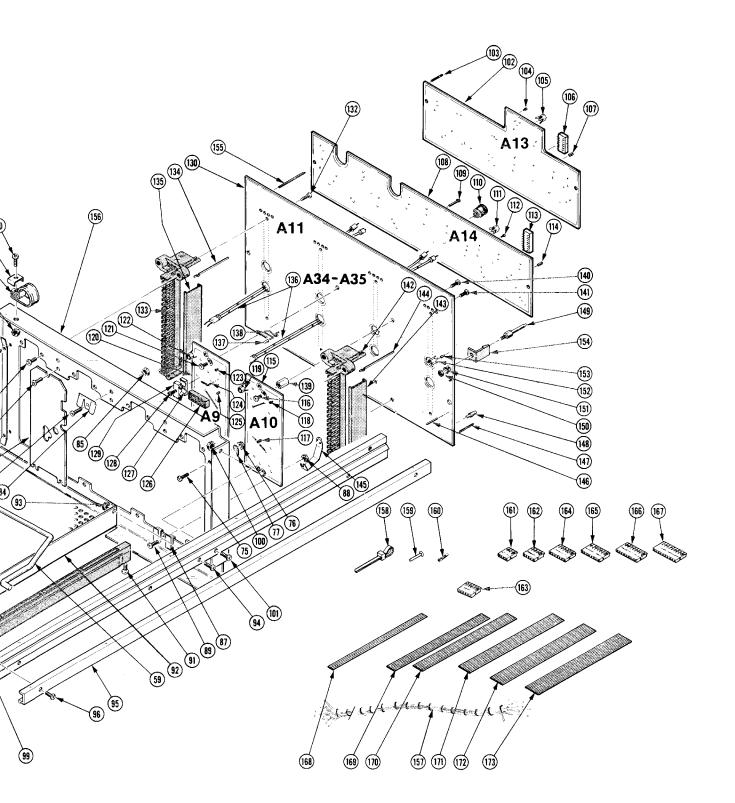


7854 OSCILLOSCOPE

FIG. 4. CRT & CHASSIS







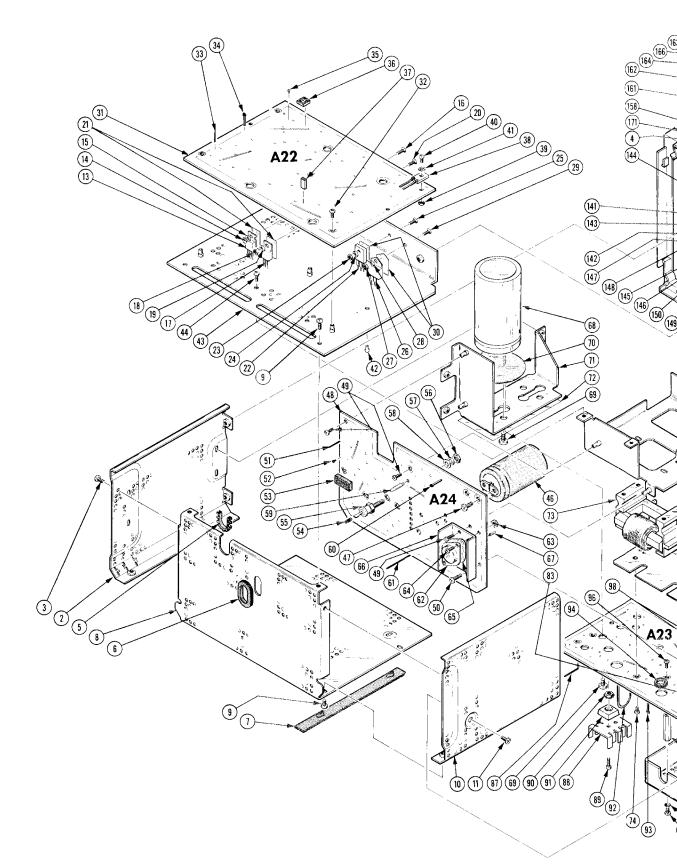
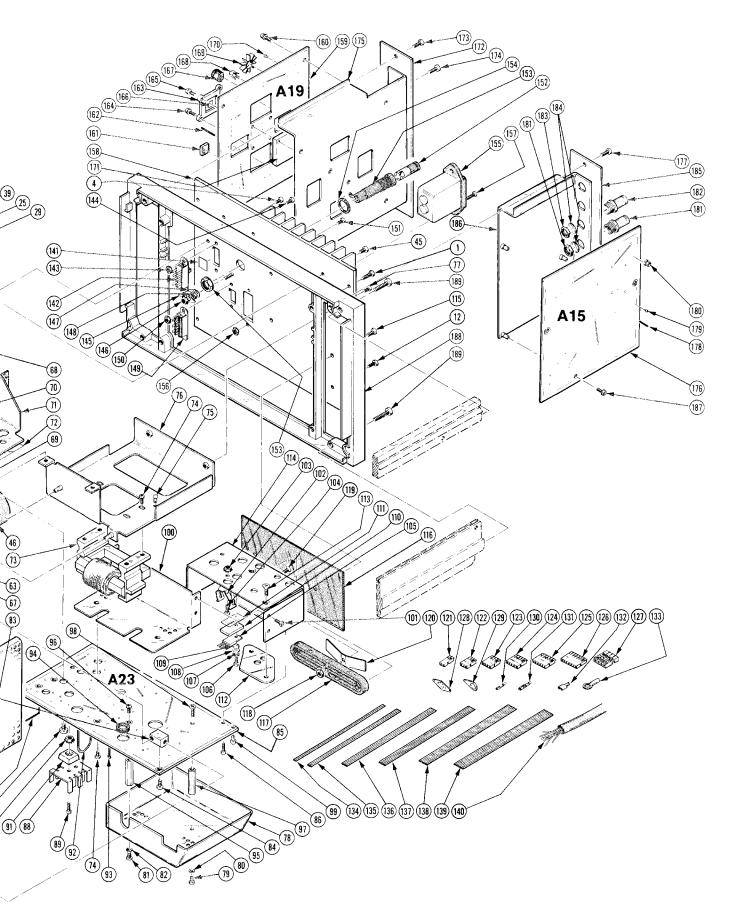
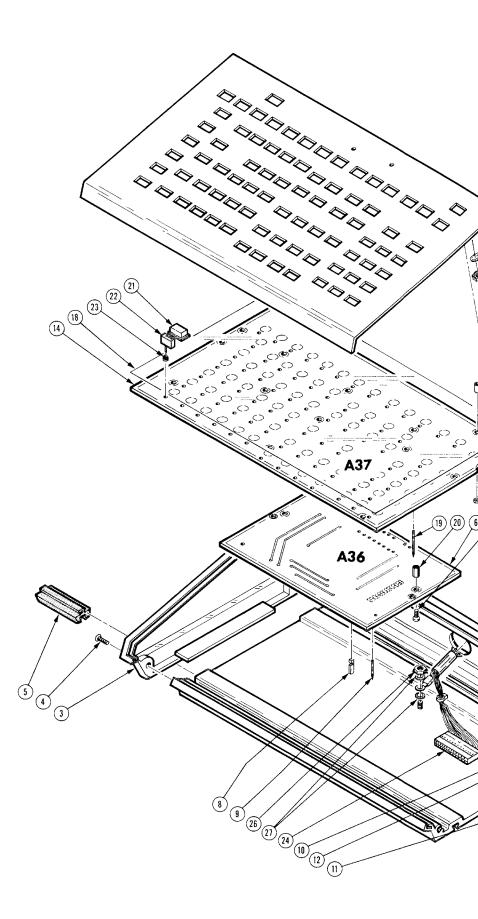


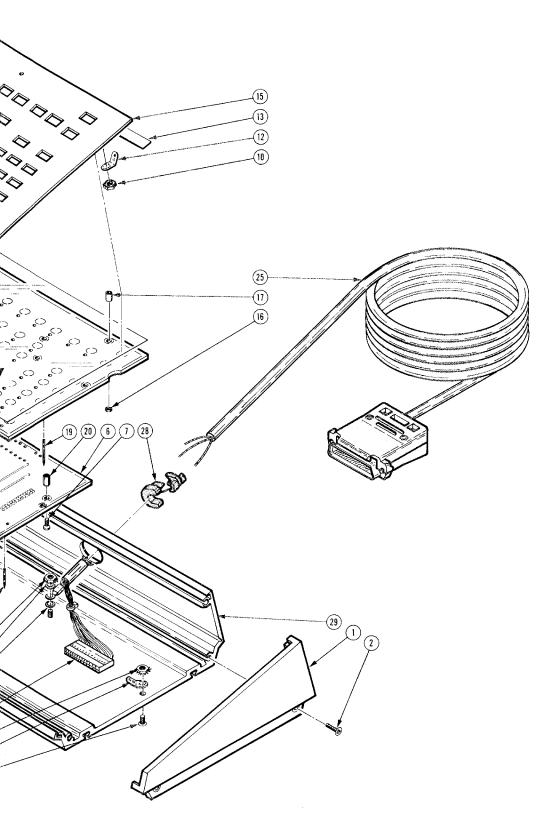
FIG. 6. POWER SUPPLY



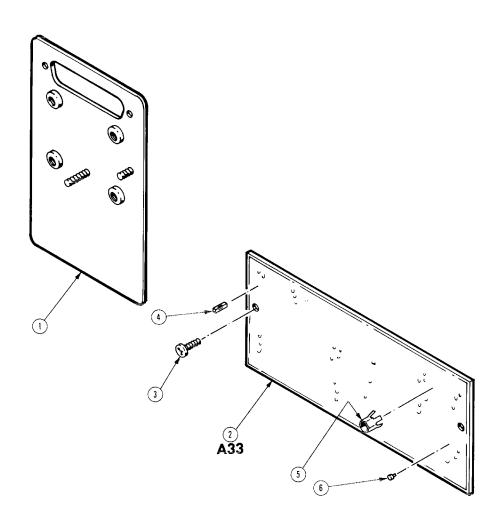
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7854 OSCILLOSCOPE

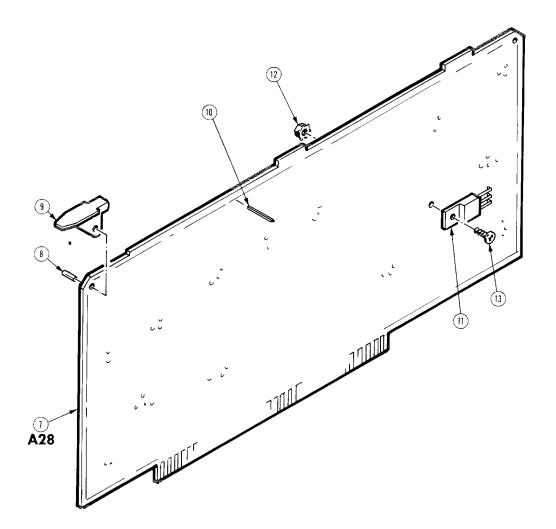


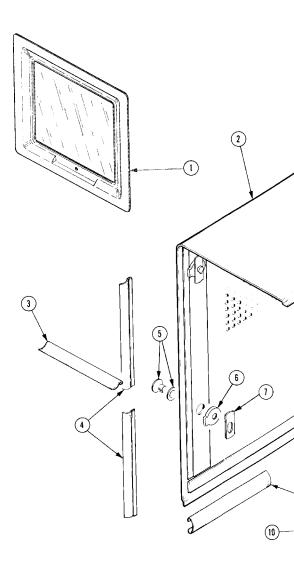
20.00

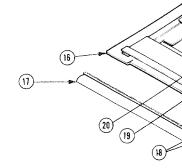
7854 OSCILLOSCOPE

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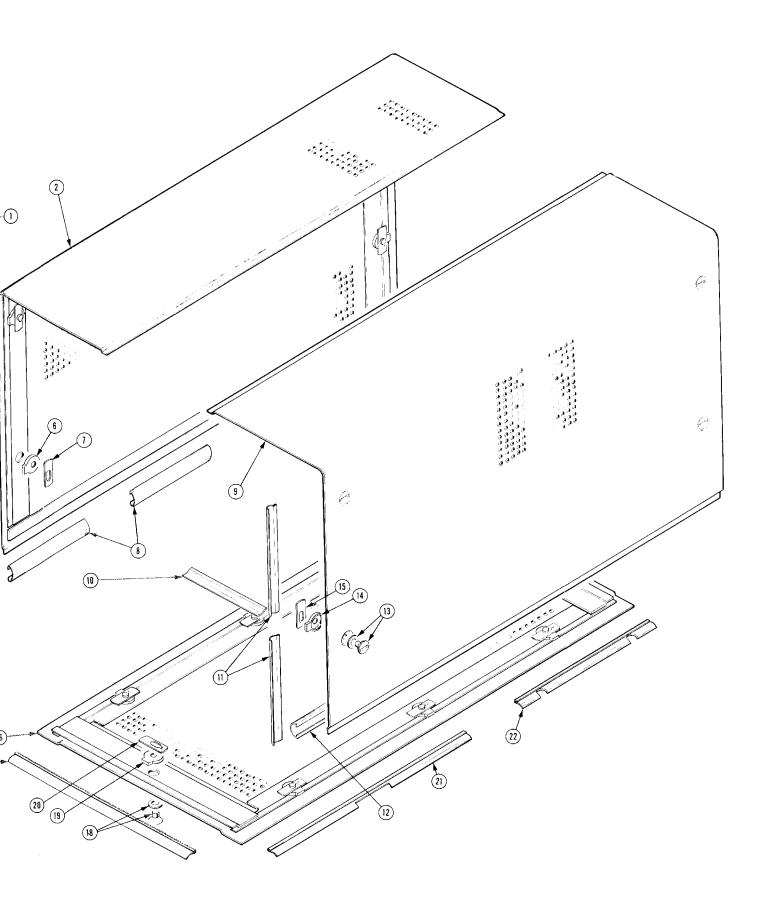
# OPTION 2D







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# REPLACEABLE **MECHANICAL PARTS**

### PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

### SPECIAL NOTES AND SYMBOLS

X000 Part first added at this serial number

Part removed after this serial number 00X

### FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

ELCTRN

EPL

EXT

FIL

FLH

FR

FΥ

FXD

HDL

HEX

нν

IC

ID

FLTR

#### INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

1 2 3 4 5

Name & Description

Assembly and/or Component Attaching parts for Assembly and/or Component . . . \* . . .

Detail Part of Assembly and/or Component Attaching parts for Detail Part ---\*---

Parts of Detail Part Attaching parts for Parts of Detail Part ---\*---

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation. The separation symbol - - - \* - - - indicates the end of attaching parts.

Attaching parts must be purchased separately, unless otherwise specified.

### **ITEM NAME**

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

ABBREVIATIONS

IN

INTL

MTG

OBD

OD

PL.

PN

PNH

PWR

RES

RLF

SCR

NIP

INCH NUMBER SIZE ACTR ACTUATOR ADPTR ADAPTER ALIGNMENT ALIGN AL ALUMINUM ASSEM ASSEMBLED ASSEMBLY ASSY ATTENUATOR ATTEN AWG AMERICAN WIRE GAGE BOARD BD BRKT BRACKET BRS BRASS BB7 **BBONZE** BSHG BUSHING CAB CABINET CAPACITOR CAP CER CERAMIC CHASSIS CHAS CKT СОМР COMPOSITION CONN CONNECTOR cov COVER CPLG COUPLING CRT CATHODE RAY TUBE DEG DEGREE

DRAWER

ELEC ELECTRICAL ELCTLT ELECTROLYTIC ELEM **ELEMENT** ELECTRICAL PARTS LIST EQPT EQUIPMENT EXTERNAL FILLISTER HEAD FLEX FLEXIBLE FLAT HEAD FILTER FRAME or FRONT FSTNR FASTENER FOOT FIXED GSKT GASKET HANDLE HEXAGON HEX HD HEXAGONAL HEAD HEXAGONAL SOCKET HELICAL COMPRESSION HEX SOC HLCPS HLEXT HELICAL EXTENSION HIGH VOLTAGE INTEGRATED CIRCUIT INSIDE DIAMETER IDENT **IDENTIFICATION** IMPLR IMPELLER

ELECTRON

INCH INCANDESCENT INCAND INSUL INSULATOR INTERNAL LAMPHOLDER масн MACHINE MECHANICAL MECH MOUNTING NIPPLE NOT WIRE WOUND NON WIRE ORDER BY DESCRIPTION OUTSIDE DIAMETER OVH PH BRZ OVAL HEAD PHOSPHOR BRONZE PLAIN or PLATE PLSTC PLASTIC PART NUMBER PAN HEAD POWER RCPT RECEPTACLE RESISTOR RGD RIGID RELIEF RETAINER RTNR SOCKET HEAD OSCILLOSCOPE SCH SCOPE SCREW

SINGLE END SE SECT SECTION SEMICOND SEMICONDUCTOR SHIELD SHLD SHOULDERED SHLDR SKT SOCKET SLIDE SL SLFLKG SELF-LOCKING SLVG SLEEVING SPRING SPR sq SQUARE STAINLESS STEEL SST STL STEEL SWITCH sw TURE TERMINAL TERM THREAD THD THICK тнк TENSION TNSN TAPPING TPG TRH TRUSS HEAD VOLTAGE VARIABLE VAR WITH w/ WASHER WSHR TRANSFORMER XEMB TRANSISTOR XSTR

v

@

DWR

# CROSS INDEX-MFR. CODE NUMBER TO MANUFACTURER

| Mfr. Code                               | Manufacturer                             | Address                          | City, State, Zip            |  |
|-----------------------------------------|------------------------------------------|----------------------------------|-----------------------------|--|
| NO ENTRY                                | FOR :::::                                |                                  |                             |  |
| \$3109                                  | C/O PANEL COMPONENTS CORP.               | P.O. BOX 6626                    | SANTA ROSA, CA 95406        |  |
| \$3629                                  | PANEL COMPONENTS CORP.                   | 2015 SECOND ST.                  | BERKELEY, CA 94170          |  |
|                                         | STANDARD PRESSED STEEL CO., UNBRAKO DIV. |                                  | SANTA FE SPRINGS, CA 90670  |  |
| 000AH                                   |                                          |                                  | PORTLAND, OR 97214          |  |
| 000BK                                   | STAUFFER SUPPLY                          | 105 SE TAYLOR                    |                             |  |
| 000CY                                   | NORTHWEST FASTENER SALES, INC.           | 7923 SW CIRRUS DRIVE             | BEAVERTON, OR 97005         |  |
| 000FU                                   | WRIGHT ENGINEERED PLASTICS               | 10350 OLD REDWOOD HIGHWAY        | WINDSOR, CA 95492           |  |
| 000FW                                   | WESTERN SINTERING CO INC.                | 2620 STEVENS DRIVE               | RICHLAND, WA 99352          |  |
| 00779                                   | AMP, INC.                                | P O BOX 3608                     | HARRISBURG, PA 17105        |  |
| 01295                                   | TEXAS INSTRUMENTS, INC., SEMICONDUCTOR   | P O BOX 5012, 13500 N CENTRAL    |                             |  |
| 01295                                   | GROUP                                    | EXPRESSWAY                       | DALLAS, TX 75222            |  |
| 007(0                                   |                                          | 195 ALGONQUIN ROAD               | DES PLAINES, IL 60016       |  |
| 02768                                   | ILLINOIS TOOL WORKS, INC., FASTEX DIV.   | •                                |                             |  |
| 05820                                   | WAKEFIELD ENGINEERING, INC.              | AUDUBON ROAD                     | WAKEFIELD, MA 01880         |  |
| 06383                                   | PANDUIT CORPORATION                      | 17301 RIDGELAND                  | TINLEY PARK, IL 60477       |  |
| 06776                                   | ROBINSON NUGENT INC.                     | 800 E. 8TH ST., BOX 470          | NEW ALBANY, IN 47150        |  |
| 07700                                   | TECHNICAL WIRE AND PRODUCTS, INC.        | 129 DERMODY ST.                  | CRANFORD, NJ 07016          |  |
| 07707                                   | USM CORP., USM FASTENER DIV.             | 510 RIVER RD.                    | SHELTON, CT 06484           |  |
| 08261                                   | SPECTRA-STRIP CORP.                      | 7100 LAMPSON AVE.                | GARDEN GROVE, CA 92642      |  |
|                                         |                                          | 2216 W. ARMITAGE AVE.            | CHICAGO, IL 60647           |  |
| 09422                                   | PLASTIC STAMPING CORPORATION             |                                  | NORWALK, CT 06852           |  |
| 09922                                   | BURNDY CORPORATION                       | RICHARDS AVENUE                  | · · · · · · · ·             |  |
| 11897                                   | PLASTIGLIDE MFG. CORPORATION             | P O BOX 867, 1757 STANFORD ST.   | SANTA MONICA, CA 90406      |  |
| 12327                                   | FREEWAY CORPORATION                      | 9301 ALLEN DRIVE                 | CLEVELAND, OH 44125         |  |
| 12360                                   | ALBANY PRODUCTS CO., DIV. OF PNEUMO      |                                  |                             |  |
|                                         | DYNAMICS CORPORATION                     | 145 WOODWARD AVENUE              | SOUTH NORWALK, CT 06586     |  |
| 16428                                   | BELDEN CORP.                             | P. O. BOX 1331                   | RICHMOND, IN 47374          |  |
| 22526                                   | BERG ELECTRONICS, INC.                   | YOUK EXPRESSWAY                  | NEW CUMBERLAND, PA 17070    |  |
| 24931                                   | SPECIALITY CONNECTOR CO., INC.           | 2620 ENDRESS PLACE               | GREENWOOD, IN 46142         |  |
|                                         | GREE REPROVIDED OF DIV OF COATE          | 2020 HADREDD I BACH              | Challennood, an order       |  |
| 26365                                   | GRIES REPRODUCER CO., DIV. OF COATS      |                                  | NEW ROCHELLE, NY 10802      |  |
|                                         | AND CLARK, INC.                          | 125 BEECHWOOD AVE.               | -                           |  |
| 28520                                   | HEYMAN MFG. CO.                          | 147 N. MICHIGAN AVE.             | KENILWORTH, NJ 07033        |  |
| 30817                                   | INSTRUMENT SPECIALTIES COMPANY, INC.     |                                  | LITTLE FALLS, NJ 07424      |  |
| 49671                                   | RCA CORPORATION                          | <b>30 ROCKEFELLER PLAZA</b>      | NEW YORK, NY 10020          |  |
| 52792                                   | THORGREN TOOL AND MOLDING CO., INC.      | 1100 EVANS AVENUE                | VALPARAISO, IN 46383        |  |
| 58474                                   | SUPERIOR ELECTRIC CO.                    | 383 MIDDLE ST.                   | BRISTOL, CT 06010           |  |
| 59730                                   | THOMAS AND BETTS COMPANY                 | 36 BUTLER ST.                    | ELIZABETH, NJ 07207         |  |
|                                         |                                          | 571 W. POLK ST.                  | CHICAGO, IL 60607           |  |
| 70485                                   | ATLANTIC INDIA RUBBER WORKS, INC.        |                                  | BEACON FALLS, CT 06403      |  |
| 71126                                   | BRONSON, HOMER D., CO.                   | 250 MAIN ST., P. O. BOX 98       | DEROON TREES, OI 00405      |  |
| 71159                                   | BRISTOL SOCKET SCREW, DIV. OF            |                                  |                             |  |
|                                         | AMERICAN CHAIN AND CABLE CO., INC.       | P O BOX 2244, 40 BRISTOL ST.     | WATERBURY, CT 06720         |  |
| 71468                                   | ITT CANNON ELECTRIC                      | 666 E. DYER RD.                  | SANTA ANA, CA 92702         |  |
| 71785                                   | TRW, CINCH CONNECTORS                    | 1501 MORSE AVENUE                | ELK GROVE VILLAGE, IL 60007 |  |
| 73743                                   | FISCHER SPECIAL MFG. CO.                 | 446 MORGAN ST.                   | CINCINNATI, OH 45206        |  |
| 73803                                   | TEXAS INSTRUMENTS, INC., METALLURGICAL   |                                  |                             |  |
| ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | MATERIALS DIV.                           | 34 FOREST STREET                 | ATTLEBORO, MA 02703         |  |
| 75015                                   |                                          | 800 E. NORTHWEST HWY             | DES PLAINES, IL 60016       |  |
| 75915                                   | LITTELFUSE, INC.                         | SOO E. NORTHWEST HWT             | DED THREAD, IN COOLS        |  |
| 77250                                   | PHEOLL MANUFACTURING CO., DIVISION       |                                  | 01110100 11 60650           |  |
|                                         | OF ALLIED PRODUCTS CORP.                 | 5700 W. ROOSEVELT RD.            | CHICAGO, IL 60650           |  |
| 78189                                   | ILLINOIS TOOL WORKS, INC.                |                                  |                             |  |
|                                         | SHAKEPROOF DIVISION                      | ST. CHARLES ROAD                 | ELGIN, IL 60120             |  |
| 79807                                   | WROUGHT WASHER MFG. CO.                  | 2100 S. O BAY ST.                | MILWAUKEE, WI 53207         |  |
| 80009                                   | TEKTRONIX, INC.                          | P O BOX 500                      | BEAVERTON, OR 97077         |  |
| 80033                                   | PRESTOLE EVERLOCK, INC.                  | P. O. BOX 278,1345 MIAMI ST.     | TOLEDO, OH 43605            |  |
| 80126                                   | PACIFIC ELECTRICORD CO.                  | 747 W. REDONDO BEACH, P O BOX 10 | GARDENA, CA 90247           |  |
|                                         |                                          | 2530 CRESCENT DR.                | BROADVIEW, IL 60153         |  |
| 83385                                   | CENTRAL SCREW CO.                        |                                  | GARDENA, CA 90249           |  |
| 86044                                   | CALIFORNIA GASKET COMPANY                | 1601 W. 134 STREET               |                             |  |
| 86928                                   | SEASTROM MFG. COMPANY, INC.              | 701 SONORA AVENUE                | GLENDALE, CA 91201          |  |
| 87308                                   | N. L. INDUSTRIES, INC., SOUTHERN SCREW   |                                  |                             |  |
|                                         | DIV.                                     | P. O. BOX 1360                   | STATESVILLE, NC 28677       |  |
| 93907                                   | TEXTRON INC. CAMCAR DIV                  | 600 18TH AVE                     | ROCKFORD, IL 61101          |  |
| 95987                                   | WECKESSER CO., INC.                      | 4444 WEST IRVING PARK RD.        | CHICAGO, IL 60641           |  |
| 98159                                   | RUBBER TECK, INC.                        | 19115 HAMILTON AVE., P O BOX 389 |                             |  |
| 98978                                   | INTERNATIONAL ELECTRONIC RESEARCH CORP.  | 135 W. MAGNOLIA BLVD.            | BURBANK, CA 91502           |  |
| 20270                                   | International Electronic Replaced Cont.  |                                  |                             |  |
|                                         |                                          |                                  |                             |  |

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| Fig. &<br>Index<br>No. | Tektronix<br>Part No. | Serial/Model No.<br>Eff Dscont | 04. | 12345            | Name & Description                             | Mfr<br>Code | Mfr Part Numb |
|------------------------|-----------------------|--------------------------------|-----|------------------|------------------------------------------------|-------------|---------------|
| INU.                   | Part NU.              | Eff Dscont                     | QLY | 12345            | Name & Description                             | Coue        |               |
| 1-1                    | 352-0573-0            | 0                              | 1   | HLDR, INSTR CAR  | RD:ABS                                         | 80009       | 352-0573-00   |
| -2                     | 070-2848-0            | 0                              | 1   | CARD, INSTR: OPE |                                                | 80009       | 070-2848-00   |
|                        | 070-2849-0            | 0                              | 1   | CARD, INSTR: OPE |                                                | 80009       | 070-2849-00   |
|                        | 070-2850-0            | 0                              | 1   |                  |                                                | 80009       | 070-2850-00   |
|                        | 070-2851-0            | 0                              | 1   | CARD, INSTR: OPH |                                                | 80009       | 070-2851-00   |
| -3                     | 390-0693-0            | 0                              | 1   | CAB.SIDE, SCOPE  | S:LEFT                                         | 80009       | 390-0693-00   |
| -4                     | 214-0603-0            |                                | 4   | . PIN ASSY,SEC   |                                                | 80009       | 214-0603-02   |
| -5                     | 386-0227-0            | 0                              | 4   | . STOP, CLP, RIN | 1 CL:ACETAL                                    | 80009       | 386-0227-00   |
| -6                     | 386-1151-0            | 0                              | 4   |                  | LENC:SPG STL CD PL                             | 80009       | 386-1151-00   |
| -7                     | 200-0728-0            |                                | 2   | COV, HANDLE END  | ):                                             | 80009       | 200-0728-00   |
| -8                     | 367-0108-0            |                                | 1   | HANDLE, CARRYIN  | NG:19.19 L,BLUE VINYL<br>(ATTACHING PARTS)     | 80009       | 367-0108-00   |
| -9                     | 212-0628-0            |                                | 4   | SCREW, SHOULDER  | R:10-32 X 0.4 LW/0.3 DIA                       | 93907       | OBD           |
| -10                    | 386-1624-0            | 0                              | 2   | PLATE, HDL RTNG  | G:STAINLESS STEEL                              | 80009       | 386-1624-00   |
| -11                    | 386-1283-0            | 1                              | 2   | PLATE, HDL MTG:  | FRONT                                          | 80009       | 386-1283-01   |
|                        | 426-0819-0            |                                | 1   | FRAME SECT, CAE  | 3.:TOP CENTER<br>(ATTACHING PARTS)             | 80009       | 426-0819-00   |
| -13                    |                       |                                | 4   | NUT, PL, ASSEM W | MA:6-32 X 0.312 INCH,STL                       | 83385       | OBD           |
| -14                    | 211-0507-0            | 0                              | 4   | SCREW, MACHINE:  | 6-32 X 0.312 INCH, PNH STL                     | 83385       | OBD           |
| -15                    | 390-0694-0            | 0                              | 1   | CAB.SIDE,SCOPE   |                                                | 80009       | 390-0694-00   |
| -16                    | 214-0603-0            | 2                              | 4   | . PIN ASSY,SEC   | CRG :                                          | 80009       | 214-0603-02   |
| -17                    | 386-0227-0            | 0                              | 4   | . STOP, CLP, RIM | CL:ACETAL                                      | 80009       | 386-0227-00   |
| -18                    | 386~1151-0            | 0                              | 4   |                  | ENC:SPG STL CD PL                              | 80009       | 386-1151-00   |
| -19                    | 348-0073-0            | 1                              | 2   | SPT PIVOT, FLIP  | LEFT FRONT AND RIGHT REAR<br>(ATTACHING PARTS) | 80009       | 348-0073-01   |
| -20                    | 210-0457-06           |                                | 4   | NUT, PL, ASSEM W | A:6-32 X 0.312 INCH.STL                        | 83385       | OBD           |
| -21                    | 211-0532-0            | 0                              | 4   | SCREW, MACHINE:  | 6-32 X 0.75 INCH, FILH STL                     | 83385       | OBD           |
| -22                    | 377-0119-00           | 0                              | 2   | INSERT.FOOT:0.   | 352 X 0.832X 0.934,PU                          | 80009       | 377-0119-00   |
| -23                    | 348-0193-0            |                                | 1   | FLIP-STAND, CAB  |                                                | 80009       | 348-0193-00   |
| -24                    | 390-0555-00           | 0 .                            | 1   | CABINET BOTTOM   |                                                | 80009       | 390-0555-00   |
| -25                    | 214-0603-0            | 1                              | 4   | PIN, SECURING:0  |                                                | 80009       | 214-0603-01   |
| -26                    | 214-0604-00           | 0                              | 4   |                  | :0.26 ID X 0.47 INCH OD                        | 80009       | 214-0604-00   |
| -27                    | 386-0227-00           |                                | 4   | STOP, CLP, RIM C | L:ACETAL                                       | 80009       | 386-0227-00   |
| -28                    |                       |                                | 4   |                  | C:SPG STL CD PL                                | 80009       | 386-1151-00   |
| -29                    | 348-0074-0            | 1                              | 2   | SPT PIVOT, FLIP  | RIGHT FRONT AND LEFT REAR (ATTACHING PARTS)    | 80009       | 348-0074-01   |
| -30                    | 210-0457-00           | 0                              | 4   |                  | A:6-32 X 0.312 INCH, STL                       | 83385       | OBD           |
| -31                    | 211-0532-00           | 0                              | 4   | SCREW, MACHINE:  | 6-32 X 0.75 INCH, FILH STL                     | 83385       | OBD           |
| -32                    |                       | )                              | 2   | INSERT, FOOT:0.  | 352 X 0.832X 0.934,PU                          | 80009       | 377-0119-00   |
| -33                    | 343-0256-00           | )                              | 2   | RTNR BLK, SCOPE  | :<br>(ATTACHING PARTS)                         | 80009       | 343-0256-00   |
| -34                    | 210-0457-00           |                                | 4   | NUT.PL.ASSEM W   | A:6-32 X 0.312 INCH,STL                        | 83385       | OBD           |
| -35                    |                       |                                | 4   | SCR, TPG, THD FO | R:6-32 X 0.50 INCH, PNH STL                    | 87308       | OBD<br>OBD    |
| -36                    | 426-0814-00           |                                | 2   | FRAME SECT, CAB  |                                                | 80009       | 426-0814-00   |
| -37                    | 210-0457-00           |                                | 2   | NUT, PL, ASSEM W | A:6-32 X 0.312 INCH,STL                        | 83385       | OBD           |
| -38                    | 211-0507-00           | )                              | 2   | SCREW, MACHINE:  | 6-32 X 0.312 INCH, PNH STL                     | 83385       | OBD           |

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|---|------------|---------------------------------------------|---------------------------|----------|----------------------------------------------------|-----------------------------------------------------|----------------|----------------------------|
|   | Index      | Tektronix<br>Bart No                        | Serial/Model No.          | 0+       | 10045 No.                                          | ma 9 Description                                    | Mfr            | Mfr. Dort Number           |
|   | No.        | Part No.                                    | Eff Dscont                | uty      | 12345 Na                                           | me & Description                                    | Code           | Mfr Part Number            |
|   | 2-1        | 426-0514-00                                 | )                         | 1        | FRAME, MASK: PLASTIC                               |                                                     | 80009          | 426-0514-00                |
|   | -2         | 378-0625-00                                 |                           | 1        | FILTER, LT, CRT: BLUE, 5.1                         | 15 x 4.4 x 0.03                                     | 80009          | 378-0625-00                |
|   | -3         | 331-0258-03                                 |                           | 1        | MASK, CRT SCALE:                                   |                                                     | 80009          | 331-0258-03                |
|   | -4<br>-5   | 131-0765-01                                 |                           | 3        | TERM, FEED THRU:0.584 I                            | X 0.625 OD BRS GOLD                                 | 80009          | 131-0765-01                |
|   | -6         | 204-0380-00<br>200-0939-01                  |                           | 1        | BODY, TERMINAL:                                    |                                                     | 80009          | 204-0380-00                |
|   | •          | 200 0999 01                                 |                           | 1        | RTNR, CRT SCALE: 5.55 X                            |                                                     | 80009          | 200-0939-01                |
|   | -7         | 212-0008-00                                 | )                         | 4        | SCREW, MACHINE: 8-32 X C                           | ING PARTS)                                          | 02205          | 070                        |
|   |            |                                             |                           |          |                                                    | *                                                   | 83385          | OBD                        |
|   | -8         | 131-1022-00                                 |                           | 2        | CONTACT, ELEC: CRT MASK                            |                                                     | 80009          | 131-1022-00                |
|   | -9         | 337-1159-03                                 |                           | 1        | SHLD, IMPLOSION: 4.75 X                            | 3.93 XO.7 THK, PLSTC                                | 80009          | 337-1159-03                |
|   | ~10        | 331-0245-00                                 |                           |          | MASK, CRT SCALE:                                   |                                                     | 80009          | 331-0245-00                |
|   | -11        | 366-1189-00<br>213-0246-00                  |                           | 1        | KNOB: GRAY                                         |                                                     | 80009          | 366-1189-00                |
|   | -12        | 366-1146-00                                 |                           | 1        | . SETSCREW:5-40 X 0.09<br>KNOB:GRAY,IF GAIN        | 3 ITL BK OXD, HEX SKT                               | 71159          | OBD                        |
|   |            | 213-0246-00                                 |                           | 2        | . SETSCREW:5-40 X 0.09                             | A TTU BY OVD URY OUT                                | 80009          | 366-1146-00                |
|   | -13        |                                             |                           | 2        | KNOB:GRAY                                          | J IIL BE OXD, HEX SEI                               | 71159<br>80009 | OBD<br>366-1164-00         |
|   |            | 213-0153-00                                 |                           | 4        | . SETSCREW:5-40 X 0.12                             | 25,STL BK OXD.HEX SKT                               | 000CY          | OBD                        |
|   | -14        | 366-1122-00                                 |                           | 1        | KNOB: GRAY                                         |                                                     | 80009          | 366-1122-00                |
|   | . 15       | 213-0246-00                                 |                           | 1        | . SETSCREW:5-40 X 0.09                             | 3 ITL BK OXD, HEX SKT                               | 71159          | OBD                        |
|   | -15        | 366-1120-00<br>213-0153-00                  |                           | 1        | KNOB:GRAY,0.600 INCH H                             |                                                     | 80009          | 366-1120-00                |
|   | -16        | 378-0635-01                                 |                           | 2<br>1   | . SETSCREW: 5-40 X 0.12                            | 5,STL BK OXD,HEX SKT                                | 000CY          | OBD                        |
|   | 10         | 378-0635-02                                 |                           | 1        | LENS,LIGHT:WHITE,MARKE<br>LENS,LIGHT:WHITE,MARKE   | D A, PLASTIC                                        | 80009<br>80009 | 378-0635-01<br>378-0635-02 |
|   |            | 378-0635-03                                 |                           |          | LENS, LIGHT: WHITE, PLAST                          | TC MARKED S                                         | 80009          | 378-0635-02                |
|   | -17        | 358-0301-02                                 |                           | 3        | BUSHING, SLEEVE: GRAY PL                           | ASTIC                                               | 80009          | 358-0301-02                |
|   |            | NAME AND DESCRIPTION OF AND AND AND AND AND |                           | 1        | CKT BOARD ASSY:GRATICU                             | JLE LAMPS(SEE A1 REPL)                              | 00007          | 550 0501 02                |
|   | -19        | 378-0614-01                                 |                           | 1        | . REFLECTOR, LIGHT: INT                            | SCALE ILLUMINATION                                  | 80009          | 378-0614-01                |
|   | -20<br>-21 | 344-0179-00<br>211-0162-00                  |                           | 2        | . CLIP, REFL RTNG: PLAST                           | IC                                                  | 80009          | 344-0179-00                |
|   | -22        |                                             |                           | 2        | . SCREW, MACHINE: 2-56 X                           | 0.188 INCH, SCH, SST                                | 000AH          | OBD                        |
|   |            |                                             |                           | 1        | CKT BOARD ASSY: FRONT P                            | ANEL(SEE A3 REPL)<br>ING PARTS)                     |                |                            |
|   | -23        | 211-0008-00                                 |                           | 4        | SCREW, MACHINE: 4-40 X 0                           | 25 INCH. PNH STL                                    | 83385          | OBD                        |
|   | -24        | 210-0201-00                                 |                           | 2        | TERMINAL, LUG:0.12 ID, L                           | OCKING, BRZ TIN PL                                  | 86928          | OBD                        |
|   |            |                                             |                           |          |                                                    | * - ~ -                                             |                | 5.00                       |
|   | -25        | 131-0608-00                                 |                           | -        | CKT BOARD ASSY INCLUDE                             |                                                     |                |                            |
|   | -26        |                                             |                           | 27<br>18 | . TERMINAL, PIN:0.365 L                            | X 0.025 PH BRZ GOLD                                 | 22526          |                            |
|   | -27        |                                             |                           | 10       | . SOCKET, PIN TERM: FOR<br>. LOUDSPEAKER, PM: (SEE | U.U25 INCH SQUARE PIN<br>DS520 PEDI)                | 22526          | 75377-001                  |
|   |            |                                             |                           | •        | (ATTACHT                                           | NG PARTS)                                           |                |                            |
|   | -28        | 212-0001-00                                 |                           | 1        | . SCREW, MACHINE: 8-32 X                           | 0.250 INCH.PNH STL                                  | 77250          | OBD                        |
|   | -29        | 210-0864-00                                 |                           | 1        | . WASHER, FLAT: 0.188 ID                           | X 0.05 THK, STL                                     | 12327          | OBD                        |
|   | -30        | 210-0008-00                                 |                           | 1        | . WASHER, LOCK: INTL, 0.1                          |                                                     | 78189          | 1208-00-00-0541C           |
|   | -31        |                                             |                           | 1        | CKT BOARD ASSY: FR PANE                            |                                                     |                |                            |
|   |            |                                             |                           | T        |                                                    | NG PARTS)                                           |                |                            |
|   |            | 210-0590-00                                 |                           | 1        | NUT, PLAIN, HEX.: 0.375 X                          | 0.438 INCH STL                                      | 73743          | 2X28269-402                |
|   | -33        | 210-0046-00                                 |                           | 1        | WASHER, LOCK: 0.261 ID, II                         | NTL,0.018 THK, BRS                                  | 78189          | 1214-05-00-0541C           |
|   |            |                                             |                           |          |                                                    | *                                                   |                |                            |
|   | - 34       | 333-2479-00                                 |                           | -        | CKT BOARD ASSY INCLUDES                            | S :                                                 |                |                            |
|   |            | 210-1304-00                                 |                           | 1<br>4   | . PANEL, FRONT: UPPER                              |                                                     | 80009          | 333-2479-00                |
|   | -36        | 366-1770-00                                 |                           | 8        | . SPACER, SLEEVE:0.112<br>. PUSH BUTTON:GY,0.225   | $1D \times 0.18 \text{ OD } \times 0.2 \text{ THK}$ | 80009          | 210-1304-00                |
|   |            | 366-1783-00                                 |                           | 1        | . PUSH BUTTON:0.4 X 0.2                            | 225 X 0.21, BLUE                                    | 000FU<br>000FU | OBD<br>OBD                 |
|   |            | 366-1784-00                                 |                           | 1        | . PUSH BUTTON: GRAY, 0.4                           | X 0.225 X 0.21                                      | 000FU          | OBD                        |
|   |            | 366-1785-00                                 |                           | 19       | . PUSH BUTTON: TV GRAY,                            | 1 SILVER GRAY LEGEND                                | 000FU          | OBD                        |
|   |            | 352-0553-00                                 |                           | 29       | . HOLDER, PB: NATURAL PL                           | ASTIC                                               | 22526          |                            |
|   | -38<br>-39 | 105-0814-00<br>131-0590-00                  |                           | 29       | . ACTUATOR, SWITCH:                                |                                                     | 8000 <b>9</b>  | 105-0814-00                |
|   |            | 129-0285-00                                 |                           | 17<br>4  | . CONTACT, ELEC: 0.71 INC                          | CH LONG                                             | -              | 47351                      |
|   | -41        |                                             |                           | 1        | POST, ELEC-MECH: 0.281 L                           | X U.188 HEX BRS<br>TY CONTROL(SEE A5 REPL)          | 80009          | 129-0285-00                |
|   |            |                                             |                           | 1        |                                                    | IY CONTROL(SEE A5 REPL)<br>NG PARTS)                |                |                            |
|   |            | 210-0590-00                                 |                           | 2        | NUT, PLAIN, HEX.: 0.375 X                          | 0.438 INCH, STL                                     | 73743          | 2X28269-402                |
|   | -43        | 210-0046-00                                 |                           | 2        | WASHER, LOCK: 0.261 ID, IN                         | NTL,0.018 THK,BRS                                   |                | 1214-05-00-0541C           |
|   |            |                                             |                           |          |                                                    | <b>A</b>                                            |                |                            |

2 WASHER,LOCK:0.261 ID,INTL,0.018 THK,BRS 78189 1214-05-00-0541C

Fig. & Taktronix Sarial/Model No.

| 2-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Fig. &<br>Index<br>No. | Tektronix<br>Part No.                                       | Serial/Model No.<br>Eff Dscont | Qty | 1 2 3 4 5 Name & Description               | Mfr<br>Code | Mfr Part Number     |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------|--------------------------------|-----|--------------------------------------------|-------------|---------------------|---|
| -44       131-6668-00       28       . TERNINAL, FLNO. 365 L. X. 0.025 PE REZ. COLD       22326       47357         -45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2-                     |                                                             |                                | _   | CKT BOARD ASSY INCLUDES:                   |             |                     |   |
| -45       1       AESISTOR, VAR: (SEE K50, R70 REPL)         -46       1       RESISTOR, VAR: (SEE K50, R50 REPL)         -47       1       RESISTOR, VAR: (SEE K50, R50 REPL)         -47       1       RESISTOR, VAR: (SEE K50, R50 REPL)         -47       1       RESISTOR, VAR: (SEE K50, R50 REPL)         -48       1       RESISTOR, VAR: (SEE K50, R50 REPL)         -49       1       RESISTOR, VAR: (SEE K50, R50 REPL)         -50       210-0583-00       1       NUT, PLAIN, NUT, 0.255-12 X.012 NOR, BSK       717A3 2X20317-402         -51       210-0940-00       1       RASELER, FLAT: 0.25 10 X 0.372 NO. 18 0.000 93000       200-0935-00         -52       210-0940-00       1       RASELER, FLAT: 0.25 12 N 0.24       80009 32-005-00         -53       358-0409-00       3       SED, (AARC) NO. 25-22 X 0.159 LD X 0.24       80009 340-003-00         -53       340-0031-00       1       CATE MOREN ASSY INC. 20.159 LD X 0.24       80009 342-0031-00         -54       131-0698-00       1       CATE MOREN ASSY INC. 20.159 LD X 0.254       80009 342-0031-00         -54       34-0053-00       1       CATE MOREN ASSY INC. 20.159 LD X 0.24       80009 342-0031-00         -55       310-0690-00       1       CLANNET REANT       80009 342-00                                                                                                                                                                             | -44                    | 131-0608-0                                                  | 0                              |     |                                            | 22526       | 47357               |   |
| -4.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -45                    |                                                             |                                |     |                                            |             |                     |   |
| -48       210-0255-00       1       1       TERMINAL, LUG (0.3) [* 10] [*10] [*10] [*10] [*10]       80009       210-0255-00         -49                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                        |                                                             |                                | 1   | . RESISTOR, VAR: (SEE R75, S69 REPL)       |             |                     |   |
| -49       1       RESISTOR, VAR: (SEE N55 REP.)       1000000000000000000000000000000000000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                        |                                                             |                                |     |                                            |             |                     |   |
| 100         110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         1110         11100         11100         11100 <t< td=""><td></td><td></td><td></td><td>1</td><td></td><td>80009</td><td>210-0255-00</td><td></td></t<>                                                                                                                     |                        |                                                             |                                | 1   |                                            | 80009       | 210-0255-00         |   |
| -50         210-0583-00         1         NUT, PLAIN, HEX:0.25-32         X 0.312         TROEL, BAS         7274.3         22200-0935-00           -51         220-0935-00         3         NASE, LAMPROLDER: 0.25 00 X 0.15         60009         200-0935-00           -53         352-0157-00         3         LAMPHOLDER: MHITE PLASTIC         80009         352-0157-00           -54                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -49                    |                                                             | •••                            | 1   |                                            |             |                     |   |
| -51       210-0940-00       1       VASHER, TLAT: 0.25: ID X 0.375: IDCK 00.571.       79807       0807         -52       200-0993-00       3       RASE, LAMPROLDER: 0.29: OX X 0.19 CASE       80009       320-0157-00         -54       332-0157-00       1       CATTORING FARTS)       80009       352-0157-00         -55       335-0409-00       1       CATTORING FARTS)       80009       358-0409-00         -55       310-0608-00       1       .TERMINAL, PIN: 0.355: LX 0.025 PN RRZ COLD       22526       47357         -57       210-06071-00       3       NUT, SLEWY, RIKK, 0.312X 0.354       NUT, SLEWY, RIKK, 0.312X 0.354       80009       380-0031-00         -53       332-0035-00       1       GLAMFILODER ASSY INCLUDER:       80009       383-0031-00         -54       210-053-00       1       GLAMFILODER ASSY INCLUDER:       80009       383-0031-00         -54       210-053-00       2       SCEEM, MACHINE: 64 X 0.312*/100 DEC, FLH STL       83385       0800         -64       134-0119-00       1       PLUE, FLASTIC: 0.17: 0 X 0.144       NCH LANK       80009       33-0248-00         -64       134-0119-00       1       SHLD, FLASTIC: 0.17: 0 X 0.144       NCH LANK       80009       333-2480-00                                                                                                                                                                                                              | -50                    | 210-0583-0                                                  | ٥                              | 1   |                                            | 727/2       | <b>0</b> ¥00217 (00 |   |
| -52         200-0935-00         3         BASE, LAPPROLDER: 0.29 OX 0.19 CASE         B0009         200-0935-00           -54                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                        |                                                             |                                |     |                                            |             |                     |   |
| -52         200-0935-00         3         BASE, LAMPROLER:0.29 DD X 0.19 CASE         60009         200-0935-00           -53                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 71                     | 210-0940-0                                                  | 0                              | 1   | -                                          | /980/       | ORD                 |   |
| -53         352-0157-00         3         LAMPHOLDER: MILTE FLASTIC         80009         552-0157-00           -54                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -52                    | 200-0935-0                                                  | 0                              | 3   |                                            | 80009       | 200-0935-00         |   |
| -54                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -53                    | 352-0157-0                                                  | 0                              | 3   |                                            |             |                     |   |
| -55       358-0409-00       3       BBG, MACH. THE 0.2.5-32 X 0.155 ID X 0.24       80009       358-0409-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | -54                    | and and one set over and set yes set over                   | <b>M</b>                       | 1   |                                            |             |                     |   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |                                                             |                                |     |                                            |             |                     |   |
| -55         131-669-00         CAT BOARDARS         1.0025.0025         22246         67357           -57         121-6741-00         3.         NITHAL PINO.355 L X 0.055 PH BR2 COLD         22326         67357           -57         121-671-00         3.         NITHAL PINO.355 L X 0.055 PH BR2 COLD         22326         67357           -59         134-003-00         3.         CROMENT, PLASTEX, 0.51 Z X 0.055 PH BR2 COLD         22326         67357           -50         386-1517-00         4.         SUPPORT, CRITERONT         80009         32-055-00           -61         226-0808-06         1.         FRAME PRL, CASHUPPER FRONT         80009         326-1517-00           -62         211-0538-00         2.         SCREW MACHINE -6422 X 0.375 INCH FILH STL         83385         0BD           -64         134-0119-00         1.         FRAME SH TYPE, RINGS, 5.25 ID         07700 30-9042           -65         1.524-00         1.         SCREW MACHINE: 6.52 X 0.375'' ID         28202 SE-500-6           -66         1.57-2263-00         1.         CAASSY, SP, ELEC: 40.0 INCH LONG         80009         33-2480-00           -70                                                                                                                                                                                                                                                                                 | -55                    | 358-0409-0                                                  | 0                              | 3   | BSHG, MACH. THD: 0.25-32 X 0.159 ID X 0.24 | 80009       | 358-0409-00         |   |
| -55         131-669-00         CAT BOARDARS         1.0025.0025         22246         67357           -57         121-6741-00         3.         NITHAL PINO.355 L X 0.055 PH BR2 COLD         22326         67357           -57         121-671-00         3.         NITHAL PINO.355 L X 0.055 PH BR2 COLD         22326         67357           -59         134-003-00         3.         CROMENT, PLASTEX, 0.51 Z X 0.055 PH BR2 COLD         22326         67357           -50         386-1517-00         4.         SUPPORT, CRITERONT         80009         32-055-00           -61         226-0808-06         1.         FRAME PRL, CASHUPPER FRONT         80009         326-1517-00           -62         211-0538-00         2.         SCREW MACHINE -6422 X 0.375 INCH FILH STL         83385         0BD           -64         134-0119-00         1.         FRAME SH TYPE, RINGS, 5.25 ID         07700 30-9042           -65         1.524-00         1.         SCREW MACHINE: 6.52 X 0.375'' ID         28202 SE-500-6           -66         1.57-2263-00         1.         CAASSY, SP, ELEC: 40.0 INCH LONG         80009         33-2480-00           -70                                                                                                                                                                                                                                                                                 |                        |                                                             |                                |     |                                            |             |                     |   |
| -57       210-0471-00       3       . NUT, SLEEVE: HEX., 0, 312 X 0, 594 INCH LONG       80009       210-0471-00         -58       343-0053-00       1       CLAMP, LOOP: 1.5 ID, SST       80009       343-0055-00         -60       38-1517-00       4       SUPPER FRONT       80009       343-0055-00         -61       38-1517-00       4       SUPPER FRONT       80009       364-051-00         -62       211-0538-00       2       SCRRM, MACHINE: 6-32 X 0, 312"100 DEG, FLH STL       83385 OBD         -62       211-0538-00       1       SKR, TPG, THD FOR, 100 X 0, 144 INCH LONG       80009       134-0119-00         -64       134-0119-00       1       PLUC, PLASTIC: 0.1 XO X 0, 144 INCH LONG       80009       134-0119-00         -65       348-0422-00       1       SKLD GSKT, SP, SELCH 40.0 INCH LONG       80009       134-0119-00         -66       332-2480-00       1       ARAMER, PLASTIC: 0.1 XOR LONG       80009       134-0119-00         -67       348-0422-00       1       CARDARY, SP, ELECK-40.0 INCH LONG       80009       134-0119-00         -66       333-2480-00       1       CARTAGUNO, 0.375" ID       8335       0BD         -70       -71       211-0504-00       1       RATAGUNO, PARTS)                                                                                                                                                                                                                   |                        |                                                             |                                |     |                                            | 00501       | 1 7 2 5 7           |   |
| -58       348-0031-00       1       GROMMET, PLASTIC: 0.156 TINCH DIA       B0009       348-0031-00         -59       343-0055-00       1       CLAMP, LOOPELS, DL NST       B0009       348-0051-00         -60       386-1517-00       4       SUPPORT, CRIFTERONT       B0009       346-1517-00         -61       426-0808-06       1       FKAME PRL, CAS. UPPER FRONT       B0009       346-1517-00         -62       211-0538-00       2       SCREP, THO FOR. 10-32 X 0.312 1000 BGC, FLH STL       B3385 0BD         -64       136-0119-00       1       FLUC, PLASTIC: 0.17 OD X 0.144 INCH LONG       B0009       134-0119-00         -65       348-0216-00       1       SKLEW HACHINE (-64.0.1 NICH LONG       B0009       134-0119-00         -66       175-2263-00       1       CA ASSY, SP, ELEC: 40.0 INCH LONG       B0009       135-2263-00         -66       175-2263-00       1       CA ASSY, SP, ELEC: 40.0 INCH LONG       B0009       333-2480-00         -67       346-0422-00       2       GOROMMET, PLASTIC: 0.25 INCH MOR. STL       B3385 0BD         -70        1       SWITCH, SULERIAK, RUPPER       B3385 0BD         -71       211-0504-00       4       SCREW, MACHINE (-6.32 X 0.312 INCH, PH STL       B3385 0BD                                                                                                                                                                                                           |                        |                                                             |                                |     | NUT SITEVE, UN O 212 N O 504 THOM AND      |             |                     |   |
| -59       343-0055-00       1       CLAMP_LOOP:1.5 ID_SST       80009       343-0055-00         -60       386-1517-00       4       SUPPERT, CR: FERNIT       80009       346-1517-00         -61       426-0808-06       1       FRAME PRINT, CAB: UPPER FRONT       80009       326-1517-00         -62       211-0538-00       2       SCREM_MACHINE:6-32 & 0.312 "100 DBC FLH STL       83385       OBD         -64       134-0119-00       1       PLIG, PLASTIC:0.17 OD X 0.174 INOH LONG       80009       133-0119-00         -64       134-0216-00       1       SHLD GKT ELEK-MESH TYPE, RINC, 5.25 ID       80009       133-0119-00         -65       348-0216-00       1       CATACHING PARTIC:1ALAT NOH LONG       80009       133-2480-00         -66       175-2263-00       1       CATACHING PARTSI       83385       OBD         -69       211-0504-00       4       SCREW, MACHINE:6-32 X 0.25 INCH, PARTSI       83385       OBD         -70        1       SWITCH, SLIDE: (SEE 615 REPL)       (ATTACHING PARTS)       83385       OBD         -71       213-0138-00       2       SCR.TPG, TFI 4-24 X 0.312 INCH, PARTSI       83385       OBD         -72        1       SWITCH, SLIDE: SL                                                                                                                                                                                                                                                |                        |                                                             |                                |     |                                            |             |                     |   |
| -60       386-1517-00       4       SUPPORT_CRT:FRONT       80009       386-1517-00         -61       426-0808-06       ATTACHINO PARTS)       80009       326-068-06         -62       211-0538-00       2       SCR, TPG, THD FOR.10-32 X 0.75 INCH FILH STL       83385       OBD         -64       134-0119-00       1       PLUG, PLASTIC: 0.17 OD X 0.144 INCH INLENTL       83385       OBD         -64       134-0119-00       1       PLUG, PLASTIC: 0.17 OD X 0.144 INCH LONG       80009       134-0119-00         -65       348-0216-00       1       SKR.FKE, MESH TYER, RING, 5.25 1D       07700       30-90042         -66       175-2263-00       1       CA ASSY, SP, FLEC:40.0 INCH LONG       80009       133-22480-00         -67       348-0442-00       2       GREW, MACHINE: 6-32 X 0.25 INCH, PNH STL       83385       OBD         -70        1       SWITCH, SLIDE: (SEE SIG REPL)       KITTACHINO PARTS)       83385       OBD         -71       213-0138-00       2       SCR, TPG, TF:4-24 X 025 INCH, PNH STL       83385       OBD         -72        1       SWITCH, FUSH: (SEE SIS REPL)       GRTATCHINO PARTS)       73743       2X20317-402         -73       210-0583-00       1                                                                                                                                                                                                                                          |                        |                                                             |                                |     | ,                                          |             |                     |   |
| -61       426-0808-06       1       FRAME PRINC CAS:UPPER FRONT<br>(ATTACHINO PARTS)       80009       426-0808-06         -62       211-0538-00       2       SCREW, MACHINE: 6-32 X 0.312"100 DEC, FLE STL<br>83385       83385       OBD         -63       213-0270-00       3       SCREW, MACHINE: 6-32 X 0.312"100 DEC, FLE STL<br>83385       83385       OBD         -64       134-0119-00       1       PLUG, PLASTIC: 01-02 X 0.75 INCH FLE STL<br>8348-042-00       80009       133-0119-00         -65       348-0216-00       1       SHLD, GSKT ELEK.MESH TYPE, RING, 5.25 1D       80009       333-2480-00         -66       333-2480-00       1       PANEL, REAR:UPPER       80009       333-2480-00         -69       211-0504-00       4       SCREW, MACHINE: 6-32 X 0.25 INCH, PHI STL       83385       OBD         -70        1       SWITCH, SLIDE: (SEE SIG REPL)       KITACHING PARTS)       83385       OBD         -71       213-0138-00       2       SCR.TPG, TF: 4-2 X 0.25 INCH, PHI STL       83385       OBD         -72        1       SWITCH, SLIDE: (SIE SIE STEPL)       KITTACHING PARTS)       73743       2X20317-402         -73       210-0583-00       1       NUT, PLAIN, REX:0.25-32 X 0.312 INCH, OR, STL       78007       0BD<                                                                                                                                                                                  |                        |                                                             |                                |     |                                            |             |                     |   |
| (ATTACHING PARTS)          62         211-0538-00         2 SCR, YAC, THO FOR: 10-32 X 0.75 INCH FILH STL.         83385 0BD          64         134-0119-00         1 PLUG, PLASTIC: 0.17 OD X 0.144 INCH LNG         80009         134-0119-00          64         134-0119-00         1 PLUG, PLASTIC: 0.17 OD X 0.144 INCH LNG         80009         137-2263-00          65         348-0216-00         1 SHLD GSKT ELKK. MSH TYPER, RING, 5.2 S ID         07700 30-90042          64         136-042-00         2 GROMMET, PLASTIC: BLACK, ROUND, 0.375" ID         28502         SB-500-6          63         333-2480-00         1 PANEL, REAR: UPPER         80009         333-2480-00          70          1 SWITCH, SLIDE: (SEE SIG REPL)         83385 OBD           -71         211-0504-00         4 SCREW, MACHINE SC-32 X 0.2 SI INCH, PIN STL         83385 OBD           -71         213-0138-00         2 SCR, TPC, TF1-42 X 0.118 INCH, PIN STL         83385 OBD           -72          1 SWITCH, SUBSTICE, 255-01 X 0.312 INCH, BS         73743 2X20317-402           -74         210-0583-00         1 NUT, PLAIN, BEX: 0.25-32 X 0.312 INCH, BS         73743 2X20317-402           -75         131-0955-01         1 CONN, RCPT, ELC: BNC, FEMALE, MODIFIED         80009 136-0139-00                                                                                                                                                  | -61                    | 426-0808-0                                                  | 6                              | 1   |                                            |             |                     |   |
| -63       213-0270-00       3       SCR_TFG,THD FOR:10-32 X 0.75 INCH FILE STL       83385 085         -64       134-0119-00       1       PLUG_PLASTIC:0.17 00 X 0.144 INCH LONG       80009       134-0119-00         -65       346-0216-00       1       SKHLD GSKT ELEK:MESH TYPE, RING, 5.25 ID       07000       30-90042         -66       175-2263-00       1       CA ASSY, SP, FLEC:40.0 INCH LONG       80009       135-2263-00         -67       346-0442-00       2       GROMET, FLASTIC:BLACK, ROURD, 0.375" ID       28520       88-500-6         -68       333-2480-00       1       PARL, REAR:UPPER       80009       333-2480-00         -69       211-0504-00       4       SCREW, MACHTRE:6-32 X 0.25 INCH, PNH STL       83385 0BD         -70        1       SWITCH, SLIDE:(SEE SI5 REPL)       (ATTACHING PARTS)         -71       213-0138-00       2       SCR,TPC,TF:4-24 X 0.188 INCH, PNH STL       83385 0BD         -72        1       SWITCH, SUIDE:(SEE SI5 REPL)       (ATTACHING PARTS)         -73       210-0583-00       1       NUT, PLAIN, HEX:0.25-31 X 0.312 INCH, BRS       73743 2X20317-402         -74       210-0583-00       1       NUT, PLAIN, HEX:0.25-32 X 0.312 INCH, BRS       73743 2X20317-402 <tr< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr<>                                                                                                                 |                        |                                                             |                                |     |                                            |             |                     |   |
| -64       134-0119-00       1       PLUG, PLASTIC: 0.17. OD X 0.144 INCH LONC       80009       134-0119-00         -65       348-0216-00       1       SHLD GSKT ELEX.MESH TYPE, RING, 5.25 ID       07700       30-90042         -66       175-2263-00       1       CA ASSY, SP, ELEC: 40.0 INCH LONG       80009       134-0119-00         -67       348-0242-00       2       GKOMMET, FLASTIC: BLACK, ROUND, 0.375''       1D       28520       SS-500-6         -68       333-2480-00       1       PANEL, REAR: UPPER       80009       333-2480-00         -69       211-0504-00       4       SCREW, MACHINE: 6-32 X 0.25 INCH, PNH STL       83385       OBD         -70        1       SWITCH, SLIDE: (SEE SI6 RFPL)       (ATTACHING PARTS)       83385       OBD         -71       213-0138-00       2       SCR, TFG, TF: 4-24 X 0.188 INCH, PNH STL       83385       OBD         -72        1       SWITCH, PUSH: (SEE SI5 REPL)       (ATTACHING PARTS)       7343       2X20317-402         -73       210-0583-00       1       NUT, PLAIN, MEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -75       131-0955-01       1       CONN, RCPT, FLEC: BNC, FMALE, MORID O, STL       78607       OBD                                                                                                                                                                                                                          |                        |                                                             |                                |     |                                            |             |                     |   |
| -64       134-0119-00       1       PLUG.PLASTIC:0.17 OD X 0.144 INGL LONG       80009       134-0119-00         -65       348-0216-00       1       SHLD GSK ELEK.MESH TYPE, RING, 5.25 ID       07700       30-90042         -66       175-2263-00       1       CA ASSY, SP, ELEC:40.0 INCH LONG       80009       115-2263-00         -67       348-0424-00       2       GROMMET, PLASTIC: BLACK, ROURD, 0.375" ID       28520       SH-500-6         -68       333-2480-00       1       PARL, REAK.IUPPER       80309       33-2480-00         -69       211-0504-00       4       SCRW, MACHINE '6-32 X 0.25 INCH, PNH STL       83385       OBD         -70        1       SWITCH, SLIDE: (SEE SIG REPL)       KITACHING 'PARTS)       83385       OBD         -71       213-0138-00       2       SCR, TPG, TF: 4-24 X 0.188       INCH, PNH STL       83385       OBD         -72        1       SWITCH, PLAN, REX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -74       210-0583-00       1       NUT, PLAIN, REX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -75       131-0955-01       1       CONN, RCPT, ELEC: BNC, FEMALE, MODE FIED       80009       131-0955-01         -7                                                                                                                                                                                                                         | -63                    | 213-0270-0                                                  | 0                              | 3   |                                            | 83385       | OBD                 |   |
| -65       348-0216-00       1       SRLD'GSKT ELEK.'MESH TYPE, RUNG, 5, 25 'ID       07700       30-90042''         -66       157-2263-00       1       CA ASSY, SP, ELEC:40.0       10 CA ASSY, SP, ELEC:40.0, 375'' ID       28520       58-500-6         -67       348-0242-00       2       GROMMET, PLASTIC: ELLACK, ROUND, 0.375'' ID       28520       58-500-6         -68       333-2480-00       1       PANEL, REAR: UPPER       80009       333-2480-00         -69       211-0504-00       4       SCREW, MACHINE: 6-32 X 0.25 INCH, PNH STL       83385       OBD         -70        1       SWITCH, SLIDE: (SEE SI 6 REPL)       83385       OBD         -71       213-0138-00       2       SCR, TFG, TF: 4-24 X 0.188       INCH, PNH STL       83385       OBD         -72        1       SWITCH, PUSH: (SEE SI 5 REPL)       (ATTACHING PARTS)       73743       2X20317-402         -74       210-0583-00       1       NUT, PLAIN, REX: 0.25-32 X 0.312       INCH, BRS       73743       2X20317-402         -75       131-0955-01       1       CONN, RCPT, FLEC: BNC, FEMALE, MOIFIED       80009       136-0139-00         -77       210-0583-00       2       NUT, PLAIN, HEX: 0.25-32 X 0.312       INCH, BRS       737                                                                                                                                                                                                                | -64                    | 134-0119-0                                                  | 0                              | 1   |                                            | 00000       | 10/ 0110 00         |   |
| -66       175-2263-00       1       CA ASSY, SP, ELEC: 40.0 INCH LONG       80009       175-2263-00         -67       348-0442-00       2       GROMMET, PLASTIC: BLACK, ROUND, 0.375" ID       28520       SB-500-5         -68       333-2480-00       1       PANEL, REA. UPPER       80009       135-2280-00         -69       211-0504-00       4       SCREW, MACHINE: 6-32 X 0.25       INCH, PNN STL       83385       OBD         -70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                        |                                                             |                                |     |                                            |             |                     |   |
| -67       348-0442-00       2       GROMET PLASTIC.BLACK, ROUND, 0.375" ID       28520       s5-500-6         -68       333-2480-00       1       PANEL, REAR: UPPER       80009       333-2480-00         -69       211-0504-00       4       SCREW, MACHINE: 6-32 X 0.25 INCH, PNN STL       83385       0BD         -70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                        |                                                             |                                |     |                                            |             |                     | ~ |
| -68       333-2480-00       1       PAREL, REAR: UPPER       80009       333-2480-00         -69       211-0504-00       4       SCREW, MACHINE: $(5-32 \times 0.25 \text{ INCH, PNH STL})$ 83385       0BD         -70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                        |                                                             |                                |     |                                            |             |                     |   |
| -69 $211-0504-00$ 4       SCREW, MACHINE: 6-32 X 0.25 INCH, PNH STL       83385 OBD         -70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | -68                    | 333-2480-0                                                  | 0                              |     |                                            |             |                     |   |
| -70        1       SWITCH, SLIDE: (SEE SIG REPL.)<br>(ATTACHING PARTS)         -71       213-0138-00       2       SCR, TPG, TF: 4-24 X 0.188 INCH, PNH STL       83385       OBD         -72        1       SWITCH, PUSH: (SEE SIS REPL.)       (ATTACHING PARTS)         -73       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743 2X20317-402         -74       210-0940-00       1       WASHER, FLAT: 0.25 ID X 0.375 INCH 0D, STL       79807 08D         -75       131-0955-01       1       CONN, RCPT, ELEC: BNC, FFMALE, MODIFIED       80009       131-0955-01         -76       210-0223-00       2       TERMINAL, LUG: 0.25 INCH DIA, SE       86928 A313-136         -77       210-0583-00       2       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743 2X20317-402         -78       136-0139-00       1       JACK, TIP: BANANA STYLE, W/RED CAP       80009 136-0139-00         -79       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743 2X20317-402         -79       210-0583-00       1       INSULATOR, BSHG: RED       58474 BB10166C2         -81       136-0138-00       1       JACK, TIP: BANANA, BLACK       80009 136-0138-00         -84                                                                                                                                                                                                                 |                        |                                                             |                                |     | (ATTACHING PARTS)                          |             |                     |   |
| -70        1       SWITCH, SLIDE: (SEE S16 REPL)<br>(ATTACHING PARTS)         -71       213-0138-00       2       SCR, TFG, TF: 4-24 X 0.188 INCH, PNH STL       83385 OBD         -72        1       SWITCH, PUSH: (SEE S15 REPL)<br>(ATTACHING PARTS)       73743 2X20317-402         -73       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743 2X20317-402         -74       210-0940-00       1       WASHER, FLAT: 0.25 ID X 0.375 INCH 0D, STL       79807 OBD         -75       131-0955-01       1       CONN, RCPT, ELEC: BNC, FEMALE, MODIFIED       80009 131-0955-01         -76       210-023-00       2       TERMINAL, LUC: 0.25 INCH DIA, SE       86928 A313-136         -77       210-0583-00       2       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743 2X20317-402         -78       136-0139-00       1       JACK, TIP: BANANA STYLE, WRED CAP       80009 136-0139-00         -79       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743 2X20317-402         -81       136-0138-00       1       INSULATOR, BSRG: RED       58474 BB10166C2         -81       136-0138-00       1       JACK, TIP: BANANA, BLACK       80009 136-0138-00         -83       210-0583-00       1 <t< td=""><td>-69</td><td>211-0504-0</td><td>0</td><td>4</td><td></td><td>83385</td><td>OBD</td><td></td></t<>                                                                   | -69                    | 211-0504-0                                                  | 0                              | 4   |                                            | 83385       | OBD                 |   |
| -71       213-0138-00       2       SCR, TPG, TF: 4-24 X 0.188 INCH, PH STL       B3385 OBD         -72                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | - 70                   |                                                             |                                | ,   |                                            |             |                     |   |
| -71 213-0138-00 2 SCR, TFG, TF: 4-24 X 0.188 INCH, PNH STL 83385 OBD<br>-72 1 SWITCH, PUSH: (SEE S15 RFPL)<br>(ATTACHINC PARTS)<br>-73 210-0583-00 1 NUT, PLAIN, HEX: 0.25 J2 X 0.312 INCH, BRS 73743 2X20317-402<br>-74 210-0940-00 1 WASHER, FLAT: 0.25 ID X 0.375 INCH OD, STL 79807 OBD<br>-75 131-0955-01 1 CONN, RCPT, ELEC: BNC, FFMALE, MODIFIED 80009 131-0955-01<br>-76 210-0223-00 2 TERMINAL, LUG: 0.25 INCH DIA, SE 86928 A313-136<br>(ATTACHINC PARTS)<br>-77 210-0583-00 2 NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS 73743 2X20317-402<br>-78 136-0139-00 1 JACK, TIP: BANANA STYLE, W/RBC CAP 80009 136-0139-00<br>(ATTACHINC PARTS)<br>-79 210-0583-00 1 NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS 73743 2X20317-402<br>-80 358-0181-01 1 INSULATOR, BSHG: RED 58474 BB10166C2<br>-81 136-0138-00 1 JACK, TIP: BANANA, SLACK 80009 136-0138-00<br>(ATTACHINC PARTS)<br>-82 210-0583-00 1 NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS 73743 2X20317-402<br>-83 210-0046-00 1 JACK, TIP: BANANA, SLACK 80009 136-0138-00<br>(ATTACHINC PARTS)<br>-82 210-0583-00 1 NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS 73743 2X20317-402<br>-84                                                                                                                                                                                                                                                                                                            | -70                    |                                                             |                                | 1   |                                            |             |                     |   |
| -72        1       SWITCH, PUSH: (SE SIS REPL)<br>(ATTACHING PARTS)         -73       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -74       210-0940-00       1       WASHER, FLAT: 0.25 INCH OD, STL       79807 OBD         -75       131-0955-01       1       CONN, RCPT, ELEC: BNC, FFMALE, MODIFIED       80009       131-0955-01         -76       210-0223-00       2       TERMINAL, LUG: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -77       210-0583-00       2       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -78       136-0139-00       1       JACK, TIP: BANANA STUC, WRED CAP       80009       136-0139-00         -79       210-0583-00       1       JACK, TIP: BANANA STUCH, PRTS)       73743       2X20317-402         -79       210-0583-00       1       JACK, TIP: BANANA STUCH, PRTS)       73743       2X20317-402         -79       210-0583-00       1       INSULATOR, BSHG: RED       58474       BB10166C2         -81       136-0138-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00         -82       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS                                                                                                                                                                                                | -71                    | 213-0138-0                                                  | 0                              | 2   | SCR. TPG. TF: 4-24 X 0.188 INCH. PNH STL   | 83385       | OBD                 |   |
| -73       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -74       210-0940-00       1       WASHER, FLAT: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -74       210-0940-00       1       WASHER, FLAT: 0.25-32 X 0.375 INCH 0D, STL       79807       0BD         -75       131-0955-01       1       CONN, RCPT, ELEC: BNC, FEMALE, MODIFIED       80009       131-0955-01         -76       210-0223-00       2       TERMINAL, LUG: 0.25 INCH DIA, SE       86928       A313-136         -77       210-0583-00       2       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -78       136-0139-00       1       JACK, TIP: BANANA STYLE, W/RED CAP       80009       136-0139-00         -79       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -79       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -80       358-0181-01       1       INSULATOR, BSHC: RED       58474       B1016662         -81       136-0138-00       (ATTACHING PARTS)       58474       B1016662         -81       136-0138-00       (ATTAC                                                                                                                                                                                         |                        |                                                             | -                              | -   |                                            | 05505       | 000                 |   |
| (ATACHING PARTS)         -73       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -74       210-0940-00       1       WASHER, FLAT: 0.25 ID X 0.375 INCH 0D, STL       79807       0BD         -75       131-0955-01       1       CONN, RCPT, ELEC: BNC, FEMALE, MODIFIED       80009       131-0955-01         -76       210-0223-00       2       TERMINAL, LUG: 0.25 INCH DIA, SE       86928       A313-136         -77       210-0583-00       2       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -78       136-0139-00       1       JACK, TIP: BANANA STYLE, W/RED CAP       80009       136-0139-00         -79       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -79       210-0583-00       1       JACK, TIP: BANANA STYLE, W/RED CAP       80009       136-0139-00         -81       136-0138-00       1       INUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -81       136-0138-00       1       INUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -81       136-0138-00       1       JACK, TIP: BANANA, BLACK       80009 <t< td=""><td>-72</td><td>and the state of the state of the state of the state of the</td><td>-</td><td>1</td><td>SWITCH, PUSH: (SEE S15 REPL)</td><td></td><td></td><td></td></t<> | -72                    | and the state of the state of the state of the state of the | -                              | 1   | SWITCH, PUSH: (SEE S15 REPL)               |             |                     |   |
| -74       210-0940-00       1       WASHER, FLAT: 0.25 ID X 0.375 INCH OD, STL<br>*       79807 OBD         -75       131-0955-01       1       CONN, RCPT, ELEC: BNC, FEMALE, MODIFIED       80009       131-0955-01         -76       210-0223-00       2       TERMINAL, LUG: 0.25 INCH DIA, SE<br>(ATTACHING PARTS)       86928       A313-136         -77       210-0583-00       2       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS<br>*       73743       2X20317-402         -78       136-0139-00       1       JACK, TIP: BANANA STYLE, W/ RED CAP<br>O(ATTACHING PARTS)       80009       136-0139-00         -79       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS<br>O(ATTACHING PARTS)       73743       2X20317-402         -79       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS<br>O(ATTACHING PARTS)       58474       BB10166C2         -81       136-0138-00       1       JACK, TIP: BANANA, BLACK<br>O(ATTACHING PARTS)       80009       136-0138-00         -82       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS<br>O(ATTACHING PARTS)       73743       2X20317-402         -83       210-0046-00       1       JACK, TIP: BANANA, BLACK<br>O(ATTACHING PARTS)       73743       2X20317-402         -84 <td></td> <td></td> <td></td> <td></td> <td>(ATTACHING PARTS)</td> <td></td> <td></td> <td></td>                                                    |                        |                                                             |                                |     | (ATTACHING PARTS)                          |             |                     |   |
| -75       131-0955-01       1       CONN, RCPT, ELEC: BNC, FEMALE, MODIFIED       80009       131-0955-01         -76       210-0223-00       2       TERMINAL, LUG: 0.25       INCH DIA, SE       86928       A313-136         -77       210-0583-00       2       NUT, PLAIN, HEX: 0.25-32 X 0.312       INCH, BRS       73743       2X20317-402         -78       136-0139-00       1       JACK, TIP: BANANA STYLE, W/RED       CAP       80009       136-0139-00         -79       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312       INCH, BRS       73743       2X20317-402         -79       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312       INCH, BRS       73743       2X20317-402         -80       358-0181-01       1       INSULATOR, BSHG: RED       58474       BB1016662         -81       136-0138-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00         -82       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312       INCH, BRS       73743       2X20317-402         -83       210-0046-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00       (ATTACHING PARTS)         -84                                                                                                                                                                                                                                                                     |                        |                                                             |                                |     |                                            | 73743       | 2X20317-402         |   |
| -75       131-0955-01       1       CONN, RCPT, ELEC: BNC, FEMALE, MODIFIED       80009       131-0955-01         -76       210-0223-00       2       TERMINAL, LUG:0.25       INCH DIA, SE       86928       A313-136         -77       210-0583-00       2       NUT, PLAIN, HEX:0.25-32       X 0.312       INCH, BRS       73743       2X20317-402         -78       136-0139-00       1       JACK, TIP: BANANA STYLE, W/RED CAP       80009       136-0139-00         -79       210-0583-00       1       NUT, PLAIN, HEX:0.25-32       X 0.312       INCH, BRS       73743       2X20317-402         -79       210-0583-00       1       NUT, PLAIN, HEX:0.25-32       X 0.312       INCH, BRS       73743       2X20317-402         -80       358-0181-01       1       INSULATOR, BSHG: RED       58474       BB1016662         -81       136-0138-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00         -82       210-0583-00       1       NUT, PLAIN, HEX:0.25-32       X 0.312       INCH, BRS       73743       2X20317-402         -83       210-0046-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00       (ATTACHING PARTS)         -84                                                                                                                                                                                                                                                        | -/4                    | 210-0940-0                                                  | 0                              | 1   |                                            | 79807       | OBD                 |   |
| -76       210-0223-00       2       TERMINAL, LUG: 0.25       INCH DIA, SE       86928       A313-136         -77       210-0583-00       2       NUT, PLAIN, HEX: 0.25-32       X       0.312       INCH, BRS       73743       2X20317-402         -78       136-0139-00       1       JACK, TIP: BANANA STYLE, W/RED CAP       80009       136-0139-00         -79       210-0583-00       1       JACK, TIP: BANANA STYLE, W/RED CAP       80009       136-0139-00         -79       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32       X       0.312       INCH, BRS       73743       2X20317-402         -80       358-0181-01       1       INSULATOR, BSHG: RED       58474       BB1016662         -81       136-0138-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00         -82       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32       X       0.312       INCH, BRS       73743       2X20317-402         -83       210-0046-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00       (ATTACHING PARTS)         -84        -       1       INUT, PLAIN, HEX: 0.25-32       X       0.312       INCH, BRS       73743       2X20317-402                                                                                                                                                                                                                                                    | -75                    | 131-0955-0                                                  | 1                              | 1   |                                            | 90000       | 131-0055-01         |   |
| -77       210-0583-00       2       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -78       136-0139-00       1       JACK, TIP: BANANA STYLE, W/ RED CAP       80009       136-0139-00         -79       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -79       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -80       358-0181-01       1       INSULATOR, BSHG: RED       58474       BB10166C2         -81       136-0138-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00         -82       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -83       210-0046-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00         -84        1       CKT BOARD ASSY: REAR PAREL CONN(SEE A32 REPL)       (ATTACHING PARTS)         -84        1       CKT BOARD ASSY: REAR PANEL CONN(SEE A32 REPL)       (ATTACHING PARTS)         -85       211-0008-00       4       SCREW, MACHINE: 4-40 X 0.25 INCH, PNH STL       83385 OBD         -86       210-0054-00       4       WASHER, LOC                                                                                                                                                                                                      |                        |                                                             |                                |     |                                            |             |                     |   |
| -77       210-0583-00       2       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -78       136-0139-00       1       JACK, TIP: BANANA STYLE, W/RED CAP       80009       136-0139-00         -79       210-0583-00       1       JACK, TIP: BANANA STYLE, W/RED CAP       80009       136-0139-00         -79       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -80       358-0181-01       1       INSULATOR, BSHG: RED       58474       BB1016662         -81       136-0138-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00         -82       210-0583-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00         -83       210-0046-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00         -84        1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -84        1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -85       211-0046-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -84                                                                                                                                                                                                                                                        |                        | 0                                                           |                                | -   |                                            | 00720       |                     |   |
| -78       136-0139-00       1       JACK,TIP:BANANA STYLE,W/RED CAP       80009       136-0139-00         -79       210-0583-00       1       NUT,PLAIN,HEX:0.25-32 X 0.312 INCH,BRS       73743       2X20317-402         -80       358-0181-01       1       INSULATOR,BSHG:RED       58474       BB10166C2         -81       136-0138-00       1       JACK,TIP:BANANA,BLACK       80009       136-0138-00         -82       210-0583-00       1       JACK,TIP:BANANA,BLACK       80009       136-0138-00         -82       210-0583-00       1       JACK,TIP:BANAN,BLACK       80009       136-0138-00         -83       210-0046-00       1       JACK,TIP:BANAN,BLACK       80009       136-0138-00         -84        1       CKT BOARD ASSY:REAR PAREL       73743       2X20317-402         -84        1       CKT BOARD ASSY:REAR PANEL CONN(SEE A32 REPL)       63189       1214-05-00-0541C         -85       211-0008-00       4       SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL       83385       0BD         -86       210-0054-00       4       SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL       83385       0BD         -87       210-0586-00       1       NUT,PLASSEM WA:4-40 X 0.25,STL CD PL       83385                                                                                                                                                                                                                                          | -77                    | 210-0583-0                                                  | 0                              | 2   |                                            | 73743       | 2X20317-402         |   |
| -79       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -80       358-0181-01       1       INSULATOR, BSHG: RED       58474       BB10166G2         -81       136-0138-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00         -82       210-0583-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00         -82       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -83       210-0046-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -84        1       CKT BOARD ASSY: REAR PANEL CONN(SEE A32 REPL)       (ATTACHING PARTS)         -85       211-0008-00       4       SCREW, MACHINE:4-40 X 0.25 INCH, PNH STL       83385       OBD         -86       210-0054-00       4       SCREW, MACHINE:4-40 X 0.25 STL CD PL       83385       OBD         -87       210-0586-00       1       NUT, PL, ASSEM WA:4-40 X 0.25, STL CD PL       83385       OBD         -88       210-0201-00       1       TERMINAL, LUG:0.12 ID, LOCKING, BRZ TIN PL       86928       OBD                                                                                                                                                                                                                                                              |                        |                                                             |                                |     |                                            |             |                     |   |
| -79       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -80       358-0181-01       1       INSULATOR, BSHG: RED       58474       BB10166C2         -81       136-0138-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00         -82       210-0583-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00         -82       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -83       210-0046-00       1       WASHER, LOCK: 0.261 ID, INTL, 0.018 THK, BRS       78189       1214-05-00-0541C         -84        1       CKT BOARD ASSY: REAR PANEL CONN(SEE A32 REPL)       (ATTACHING PARTS)         -85       211-0008-00       4       SCREW, MACHINE: 4-40 X 0.25 INCH, PNH STL       83385       OBD         -86       210-0054-00       4       WASHER, LOCK: SPLIT, 0.118 ID X 0.212"OD STL       83385       OBD         -87       210-0586-00       1       NUT, PL, ASSEM WA: 4-40 X 0.25, STL CD PL       83385       OBD         -88       210-0201-00       1       TERMINAL, LUG: 0.12 ID, LOCKING, BRZ TIN PL       86928       OBD <td>-78</td> <td>136-0139-0</td> <td>0</td> <td>1</td> <td></td> <td>80009</td> <td>136-0139-00</td> <td></td>                                                                                                                             | -78                    | 136-0139-0                                                  | 0                              | 1   |                                            | 80009       | 136-0139-00         |   |
| -80       358-0181-01       1       INSULATOR, BSHG: RED       58474       BB10166C2         -81       136-0138-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00         -82       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312       INCH, BRS       73743       2X20317-402         -83       210-0046-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312       INCH, BRS       73743       2X20317-402         -84        -       KATTACHING PARTS)       73743       2X20317-402         -84        1       CKT BOARD ASSY: REAR PANEL CONN(SEE A32 REPL)       7149       214-05-00-0541C         -84        1       CKT BOARD ASSY: REAR PANEL CONN(SEE A32 REPL)       1214-05-00-0541C         -85       211-0008-00       4       SCREW, MACHINE: 4-40 X 0.25       10.212"0D       STL         -86       210-0054-00       4       WASHER, LOCK: SPLIT, 0.118       D X 0.212"0D       STL         -87       210-0586-00       1       NUT, PL, ASSEM WA:4-40 X 0.25, STL CD PL       83385       OBD         -88       210-0201-00       1       TERMINAL, LUG: 0.12       ID, LOCKING, BRZ TIN PL       86928       OBD <td>_70</td> <td>210 0592 0</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td>                                                                                                                                                                                             | _70                    | 210 0592 0                                                  | 0                              |     |                                            |             |                     |   |
| -81       136-0138-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00         -82       210-0583-00       1       NUT, PLAIN, HEX:0.25-32       X       0.312       INCH, BRS       73743       2X20317-402         -83       210-0046-00       1       WASHER, LOCK:0.261       ID, INTL, 0.018       THK, BRS       78189       1214-05-00-0541C         -84        1       CKT BOARD ASSY:REAR PANEL CONN(SEE A32 REPL)       (ATTACHING PARTS)         -85       211-0008-00       4       SCREW, MACHINE:4-40 X 0.25       INCH, PNH STL       83385       OBD         -86       210-0054-00       4       WASHER, LOCK:SPLIT, 0.118       ID X       0.212"OD STL       83385       OBD         -87       210-0586-00       1       NUT, PL, ASSEM WA:4-40 X 0.25, STL CD PL       83385       OBD         -88       210-0201-00       1       TERMINAL, LUG:0.12       ID, LOCKING, BRZ TIN PL       86928       OBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | -/9                    | 210-0583-0                                                  | 0                              | 1   | NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS | 73743       | 2X20317-402         |   |
| -81       136-0138-00       1       JACK, TIP: BANANA, BLACK       80009       136-0138-00         -82       210-0583-00       1       NUT, PLAIN, HEX:0.25-32       X       0.312       INCH, BRS       73743       2X20317-402         -83       210-0046-00       1       WASHER, LOCK:0.261       ID, INTL, 0.018       THK, BRS       78189       1214-05-00-0541C         -84        1       CKT BOARD ASSY:REAR PANEL CONN(SEE A32 REPL)       (ATTACHING PARTS)         -85       211-0008-00       4       SCREW, MACHINE:4-40 X 0.25       INCH, PNH STL       83385       OBD         -86       210-0054-00       4       WASHER, LOCK:SPLIT, 0.118       ID X       0.212"OD STL       83385       OBD         -87       210-0586-00       1       NUT, PL, ASSEM WA:4-40 X 0.25, STL CD PL       83385       OBD         -88       210-0201-00       1       TERMINAL, LUG:0.12       ID, LOCKING, BRZ TIN PL       86928       OBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | -80                    | 358-0181-0                                                  | 1                              | 1   |                                            | 50171       | BB1016402           |   |
| -82       210-0583-00       1       NUT,PLAIN,HEX:0.25-32 X 0.312 INCH,BRS       73743       2X20317-402         -83       210-0046-00       1       WASHER,LOCK:0.261 ID,INTL,0.018 THK,BRS       78189       1214-05-00-0541C         -84        1       CKT BOARD ASSY:REAR PANEL CONN(SEE A32 REPL)<br>(ATTACHING PARTS)       83385       0BD         -85       211-0008-00       4       SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL       83385       0BD         -86       210-0054-00       4       WASHER,LOCK:SPLIT,0.118 ID X 0.212"OD STL       83385       0BD         -87       210-0586-00       1       NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL       83385       0BD         -88       210-0201-00       1       TERMINAL,LUG:0.12 ID,LOCKING,BRZ TIN PL       86928       0BD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                        |                                                             |                                |     |                                            |             |                     |   |
| -82       210-0583-00       1       NUT, PLAIN, HEX: 0.25-32 X 0.312 INCH, BRS       73743       2X20317-402         -83       210-0046-00       1       WASHER, LOCK: 0.261 ID, INTL, 0.018 THK, BRS       78189       1214-05-00-0541C         -84        1       CKT BOARD ASSY: REAR PANEL CONN(SEE A32 REPL)<br>(ATTACHING PARTS)       83385       0BD         -85       211-0008-00       4       SCREW, MACHINE: 4-40 X 0.25 INCH, PNH STL       83385       0BD         -86       210-0054-00       4       WASHER, LOCK: SPLIT, 0.118 ID X 0.212"OD STL       83385       0BD         -87       210-0586-00       1       NUT, FL, ASSEM WA: 4-40 X 0.25, STL CD PL       83385       0BD         -88       210-0201-00       1       TERMINAL, LUG: 0.12 ID, LOCKING, BRZ TIN PL       86928       0BD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                        |                                                             | -                              | 1   |                                            | 00009       | 100 0100-00         |   |
| -83       210-0046-00       1       WASHER, LOCK: 0.261 ID, INTL, 0.018 THK, BRS       78189       1214-05-00-0541C         -84        1       CKT BOARD ASSY:REAR PANEL CONN(SEE A32 REPL)<br>(ATTACHING PARTS)       83385       0BD         -85       211-0008-00       4       SCREW, MACHINE:4-40 X 0.25 INCH, PNH STL       83385       0BD         -86       210-0054-00       4       WASHER, LOCK:SPLIT, 0.118 ID X 0.212"OD STL       83385       0BD         -87       210-0586-00       1       NUT, FL, ASSEM WA:4-40 X 0.25, STL CD PL       83385       0BD         -88       210-0201-00       1       TERMINAL, LUG:0.12 ID, LOCKING, BRZ TIN PL       86928       0BD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | -82                    | 210-0583-0                                                  | 0                              | 1   |                                            | 73743       | 2x20317-402         |   |
| -84        1       CKT BOARD ASSY:REAR PANEL CONN(SEE A32 REPL)<br>(ATTACHING PARTS)         -85       211-0008-00       4       SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL       83385 OBD         -86       210-0054-00       4       WASHER,LOCK:SPLIT,0.118 ID X 0.212"OD STL       83385 OBD         -87       210-0586-00       1       NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL       83385 OBD         -88       210-0201-00       1       TERMINAL,LUG:0.12 ID,LOCKING,BRZ TIN PL       86928 OBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -83                    | 210-0046-0                                                  | 0                              |     | WASHER,LOCK:0.261 ID,INTL,0.018 THK,BRS    |             |                     |   |
| -85       211-0008-00       4       SCREW, MACHINE:4-40 X 0.25       INCH, PNH STL       83385       OBD         -86       210-0054-00       4       WASHER, LOCK: SPLIT, 0.118       ID X 0.212"OD STL       83385       OBD         -87       210-0586-00       1       NUT, PL, ASSEM WA:4-40 X 0.25, STL CD PL       83385       OBD         -88       210-0201-00       1       TERMINAL, LUG:0.12       ID, LOCKING, BRZ       TIN PL       86928       OBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>A</b> :             |                                                             |                                |     | *                                          |             |                     |   |
| -85       211-0008-00       4       SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL       83385       OBD         -86       210-0054-00       4       WASHER,LOCK:SPLIT,0.118 ID X 0.212"OD STL       83385       OBD         -87       210-0586-00       1       NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL       83385       OBD         -88       210-0201-00       1       TERMINAL,LUG:0.12 ID,LOCKING,BRZ TIN PL       86928       OBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -84                    |                                                             | unk                            | 1   |                                            |             |                     |   |
| -86       210-0054-00       4       WASHER, LOCK: SPLIT, 0.118 ID X 0.212"OD STL       83385 OBD         -87       210-0586-00       1       NUT, PL, ASSEM WA:4-40 X 0.25, STL CD PL       83385 OBD         -88       210-0201-00       1       TERMINAL, LUG:0.12 ID, LOCKING, BRZ TIN PL       86928 OBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -85                    | 211-0008-0                                                  | ٥                              | 1.  |                                            | 02205       | 010                 |   |
| -87       210-0586-00       1       NUT, PL, ASSEM WA:4-40 X 0.25, STL CD PL       8385       0BD         -88       210-0201-00       1       TERMINAL, LUG:0.12       ID, LOCKING, BRZ TIN PL       86928       OBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                        |                                                             |                                |     |                                            |             |                     |   |
| -88 210-0201-00 1 TERMINAL, LUG: 0.12 ID, LOCKING, BRZ TIN PL 86928 OBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                        |                                                             |                                |     |                                            |             |                     |   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |                                                             |                                |     |                                            |             |                     |   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |                                                             |                                |     |                                            |             |                     |   |

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| Fig. &<br>Index<br>No. | Tektronix<br>Part No.        | Serial/Model No.<br>Eff Dscont | ٥tv    | 12345                               | Name & Description                                       | Mfr<br>Code    | Mfr Part Number           |
|------------------------|------------------------------|--------------------------------|--------|-------------------------------------|----------------------------------------------------------|----------------|---------------------------|
|                        |                              |                                |        |                                     |                                                          | 0000           |                           |
| 2-                     | and any time of a state of a |                                | -      | CKT BOARD ASSY I                    | NCLUDES:                                                 |                |                           |
| -89                    | 344-0326-0                   | 0                              | 2      | . CLIP, ELECTRICA                   | L: FUSE, BRASS                                           | 75915          | 102071                    |
| -90                    | 131-0608-00                  | 0                              | 69     | . TERMINAL PIN:0                    | .365 L X 0.025 PH BRZ GOLD                               |                | 47357                     |
| -91                    | 175-2719-0                   | 0                              | 1      | . CA ASSY, SP, ELE                  | C:11 O INCH LONG                                         |                |                           |
| -92                    | 131-1437-00                  | 0                              | 1      | . CONN, RCPT, ELEC                  | :25 FEMALE CONTACT<br>ITACHING PARTS)                    | 80009<br>71468 | 175-2719-00<br>DB25S-F179 |
| -93                    | 131-0890-00                  | 0                              | 2      | . LOCK, CONNECTOR                   | $:4-40 \times 0.312 L$                                   | 71468          | D 20418-2                 |
| -94                    | 386-4233-00                  | 0 B010100 B031244              | 1      | . PLATE, CONN MTG                   |                                                          | 00000          | 201 1000 00               |
|                        | 386-4233-0                   |                                |        | PLATE, CONN MIG                     | •                                                        | 80009          | 386-4233-00               |
|                        | 500 4255~0                   | 1 8031243                      | 1      | . PLATE, CONN MTG                   |                                                          | 80009          | 386-4233-01               |
| -95                    | 210-0586-00                  | D                              | 1      | . NUT, PL, ASSEM W                  | TTACHING PARTS)<br>A:4-40 X 0.25,STL CD PL<br>*          | 83385          | OBD                       |
|                        |                              | ~                              |        |                                     |                                                          |                |                           |
|                        | 131-2203-0                   |                                | 1      | . MOUNTING PLATE<br>CONN, RCPT, ELI | INCLUDES:<br>SC:CKT BD,24 CONT,FEMALE<br>TTACHING PARTS) | 71785          | 57-20240-11               |
|                        | 129-0922-00                  | ) XB031245                     | 2      | SPACER POST (                       | 0.71, W/6-32 THD ONE END                                 | 80009          | 129-0922-00               |
|                        | 210-0008-00                  | 0 XB031245                     | 2      | WASHER,LOCK:                        | INTL,0.172 ID X 0.331"OD,STL                             | 78189          | 1208-00-00-0541           |
| -96                    | 386-1635-00                  | )                              | 1      | . SUPPORT, CKT BD:                  | CHASSIS MT, ACETAL                                       | 80009          | 386-1635-00               |
|                        | 361-0122-00                  |                                | 1      | . SPACER, SLEEVE:(                  | ).125 L X 0.12 ID BRS                                    | 80009          |                           |
| -98                    | 175-2718-00                  | )                              | 1      | . CA ASSY, SP, ELEC                 |                                                          | 80009          | 175-2718-00               |
| -99                    |                              |                                | 1      | SPRT, REAR PANEL: I                 | LEFT<br>TTACHING PARTS)                                  | 80009          | 386-4065-00               |
| -100                   | 211-0232-00                  | )                              | 2      |                                     | 0 X 0.25 INCH, FIL STL                                   | 83385          | OBD                       |
|                        | 211-0504-00                  |                                | 1      | SCREW, MACHINE: 6-3                 | 2 X 0.25 INCH, PNH STL                                   | 83385          | OBD                       |
|                        | 343-0858-00                  |                                | 1      |                                     | TACHING PARTS)                                           | 06383          | FCM2-S6-D14               |
|                        | 210-0457-00                  |                                | 2      | NUT, PL, ASSEM WA: 6                | 5-32 X 0.312 INCH,STL                                    | 83385          | OBD                       |
|                        | 211-0541-00                  |                                | 2      | -                                   | 2 X 0.25"100 DEG,FLH STL                                 | 83385          | OBD                       |
|                        | 210-0202-00                  |                                | 1      | ( A1                                | 6 ID,LOCKING,BRZ TINNED<br>TACHING PARTS)                | 78189          | 2104-06-00-2520           |
|                        | 211-0504-00                  |                                | 1      | NUT, PL, ASSEM WA:6                 | -32 X 0.312 INCH, STL                                    | 83385          |                           |
|                        | 343-0089-00                  |                                | 1      | -                                   | 2 X 0.25 INCH, PNH STL                                   | 83385          |                           |
|                        |                              |                                | 1<br>1 | CKT BOARD ASSY: Z-                  | AXIS(SEE A21 REPL)<br>TACHING PARTS)                     | 80009          | 343-0089-00               |
| -110                   | 211-0008-00                  |                                | 4      | SCREW, MACHINE: 4-4                 | 0 X 0.25 INCH, PNH STL                                   | 83385          | OBD                       |
|                        |                              |                                | -      | the point incor in                  |                                                          |                |                           |
|                        | 131-0608-00                  |                                | 34     | . TERMINAL, PIN:0.                  | 365 L X 0.025 PH BRZ GOLD                                | 22526          | 47357                     |
|                        | 131-1003-00                  |                                | 5      | . CONN, RCPT, ELEC:                 | CKT BD MT, 3 PRONG                                       |                | 131-1003-00               |
|                        | 136-0252-07                  |                                | 15     | . SOCKET, PIN CONN                  | W/O DIMPLE                                               |                | 75060-012                 |
| -114                   | 214-0579-00                  | )                              | 8      | . TERM, TEST POINT                  | BRS CD PL                                                | 80009          | 214-0579-00               |
|                        | 441-1464-00                  |                                | 1      | CHASSIS,SCOPE:Z A                   | XIS<br>TACHING PARTS)                                    | 80009<br>80009 | 441-1464-00               |
|                        | 211-0232-00                  |                                | 4      | SCREW, MACHINE: 4-4                 | 0 X 0.25 INCH, FIL STL                                   | 83385          | OBD                       |
|                        | 210-0586-00                  |                                | 2      | NUT, PL, ASSEM WA:4                 | -40 X 0.25, STL CD PL                                    | 83385          |                           |
|                        | 211-0008-00                  |                                | 2      | SCREW, MACHINE: 4-4                 | 0 X 0.25 INCH, PNH STL                                   | 83385          |                           |
|                        | 426-0809-05                  |                                | 1      | ······                              | PER REAR<br>TACHING PARTS)                               | 80009          | 426-0809-05               |
|                        | 213-0270-00                  |                                | 3      | SCR, TPG, THD FOR:1                 | 0-32 X 0.75 INCH FILH STL                                | 83385          | OBD                       |
|                        | 426-1584-00                  |                                | 1      | FRAME SECT, CAB: BO                 | TTOM RIGHT                                               | 80009          | 426-1584-00               |
| -122                   | 426-1583-00                  |                                |        | FRAME SECT, CAB: BO                 |                                                          |                | 426-1583-00               |

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### Replaceable Mechanical Parts-7854 Service

Fig. &

32/9/2K

#### Serial/Model No Talifaania

| Fig. &<br>Index<br>No. | Tektronix<br>Part No.    | Serial/Model No.<br>Eff Dscont | Qty     | 1 2 3 4 5 Name & Description                                                                 | Mfr<br>Code    | Mfr Part Number          |
|------------------------|--------------------------|--------------------------------|---------|----------------------------------------------------------------------------------------------|----------------|--------------------------|
| 3-1                    | 386-4067-0               | 0                              | 1       | SUPPORT, CKT BD:                                                                             | 80009          | 386-4067-00              |
| -2                     | 211-0008-0               | 0                              | 5       | (ATTACHING PARTS)<br>SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL                                  | 83385          | OBD                      |
| -3                     | 129-0222-0               | 0                              | 2       | SPACER, POST:0.27 L, W/4-40THD THRU, PLSTC<br>(ATTACHING PARTS)                              | 80009          | 129-0222-00              |
| -4                     | 211-0101-0               | 0                              | 2       | SCREW, MACHINE: 4-40 X 0.25, 100 DEG, FLH STL                                                | 83385          | OBD                      |
| -5<br>-6               | 388-7156-0               |                                | 1<br>1  | CKT BOARD ASSY:DIGITIZER(SEE A25 REPL)<br>. CIRCUIT BOARD:DIGITIZER                          | 80009          | 388-7156-01              |
| -7                     | 211-0005-0               | 0                              | 3       | (ATTACHING PARTS)<br>. SCREW,MACHINE:4-40 X 0.125 INCH,PNH STL                               | 83385          | OBD                      |
| -8                     | 129-0260-0               | 0                              | 2       | . POST,ELEC-MECH:0.255 HEX X 0.500 INCH L<br>(ATTACHING PARTS)                               | 80009          | 129-0260-00              |
| -9                     | 210-0586-0               | 00                             | 2       | . NUT, PL, ASSEM WA:4-40 X 0.25, STL CD PL                                                   | 83385          | OBD                      |
| -10                    | 105-0160-0               | 0                              | 2       | . EJECTOR, CKT BD: WHITE PLASTIC                                                             | 80009          | 105-0160-00              |
| -11                    | 214-1337-0               | 0                              | 2       | . PIN, SPRING:0.10 OD X 0.25 INCH L, STL                                                     | 80009          | 214-1337-00              |
| -12                    |                          | -                              | 6       | . SUPPORT,CKT BD:0.215 H,ACETAL                                                              | 80009          | 386-1556-00              |
| -13                    |                          |                                | 1       | . CLAMP,LOOP:0.2 ID,PLASTIC                                                                  | 80009          | 343-0213-00              |
| -14                    | 343-0089-0               | 0                              | 1       | . CLAMP, LOOP: LARGE                                                                         | 80009          | 343-0089-00              |
|                        | 131-0993-0               |                                | 3       | . BUS, CONDUCTOR: 2 WIRE BLACK                                                               | 00779          | 530153-2                 |
|                        | 352-0166-0               |                                | 1       | CONN BODY, PL, EL:8 WIRE BLACK                                                               | 80009          | 352-0166-00              |
|                        | 131-0707-0               |                                | 5       | . CONNECTOR, TERM: 22-26 AWG, BRS& CU BE GOLD                                                | 22526          | 47439                    |
| -16                    | 131-0608-0               |                                | 19      | . TERMINAL, PIN: 0.365 L X 0.025 PH BRZ GOLD                                                 | 22526          | 47357                    |
| 10                     | 131-0589-0               |                                | 2       | . TERMINAL, PIN:0.365 L X 0.025 PH BRZ GOLD<br>. TERMINAL, PIN:0.46 L X 0.025 SQ             | 80009          | 131-0589-00              |
| -17                    | 426-0121-0               |                                | 4       |                                                                                              | 80009          |                          |
| -18                    |                          |                                | 4       | . MOUNT, COMPONENT: DELRIN                                                                   |                | 426-0121-00              |
|                        | 214-0579-0               |                                |         | . SPACER, SLEEVE: 0.250 INCH DIA, PLASTIC                                                    | 80009          | 361-0007-00              |
| -20                    |                          |                                | 11      | . TERM, TEST POINT: BRS CD PL                                                                | 80009          | 214-0579-00              |
| -21                    |                          |                                | 1       | . SHIELD, ELEC: BRASS                                                                        | 80009          | 337-2738-00              |
|                        | 175-3141-0<br>131-1003-0 |                                | 1<br>4  | CABLE ASSY, RF:50 OHM COAX, 55.0 INCH LONG                                                   | 80009          | 175-3141-00              |
| -23                    |                          |                                |         | . CONN, RCPT, ELEC: CKT BD MT, 3 PRONG                                                       | 80009          | 131-1003-00              |
| -24                    |                          |                                | 24<br>2 | . SOCKET, PIN CONN: W/O DIMPLE<br>. NUT, SLEEVE: 4-40 X 0.391 INCH LONG<br>(ATTACHING PARTS) | 22526<br>80009 | 75060-012<br>210-0599-00 |
| -25                    | 129-0260-0               | 00                             | 2       | . POST,ELEC-MECH:0.255 HEX X 0.500 INCH L                                                    | 80009          | 129-0260-00              |
| -26                    |                          |                                | 4       | . NUT, PLAIN, HEX.: 4-40 X 0.188 INCH, BRS                                                   | 73743          | 12161-50                 |
| -27                    | 214-0368-0               | 00                             | 2       | . SPRING, HLCPS: 0.24 DIA X 0.438 INCH LONG                                                  | 80009          | 214-0368-00              |
| -28                    |                          |                                | 1       | . RIVET, SOLID:0.042 DIA X 0.25 INCH, RDH                                                    | 80009          | 210-0627-00              |
| -29                    |                          |                                | 1       | . RTNR, TRANSISTOR: HEAT SINK                                                                | 80009          | 343-0097-00              |
| -30                    | 361-0942-0               | 00                             | 1       | . SPACER, MICROCKT: COPPER                                                                   | 80009          | 361-0942-00              |
| -31                    |                          | 6 APR                          | 1       | CKT BOARD ASSY: CONTROL LOGIC (SEE A26 REPL)                                                 |                |                          |
| -32                    | 214-1337-0               | 00                             | 2       | . PIN, SPRING:0.10 OD X 0.25 INCH L, STL                                                     | 80009          | 214-1337-00              |
| -33                    | 105-0160-0               | 00                             | 2       | . EJECTOR, CKT BD: WHITE PLASTIC                                                             | 80009          | 105-0160-00              |
| -34                    | 131-0993-0               | 00                             | 3       | . BUS, CONDUCTOR: 2 WIRE BLACK                                                               | 00779          | 530153-2                 |
| -35                    | 131-0608-0               | 00                             | 36      | . TERMINAL, PIN: 0.365 L X 0.025 PH BRZ GOLD                                                 | 22526          | 47357 .                  |
| -36                    |                          |                                | 1       | CKT BOARD ASSY:M.P.U.(SEE A27 REPL)                                                          |                |                          |
| -37                    |                          |                                | 2       | . PIN, SPRING: 0.10 OD X 0.25 INCH L, STL                                                    | 80009          | 214-1337-00              |
| -38                    |                          | 00                             | 2       | . EJECTOR, CKT BD: WHITE PLASTIC                                                             | 80009          | 105-0160-00              |
| -39                    |                          | )0                             | 4       | . SOCKET, PLUG-IN: 20 LEAD DIP, CKT BD MTG                                                   | 73803          | CS9002-20                |
| -40                    |                          |                                | 1       | . SKT, PL-IN ELEK: MICROCKT, 64 CONT                                                         | 06776          | 1CN649-S5-G30            |
| -41                    | 346-0032-0               | 00                             | 1       | . STRAP, RETAINING: 0.075 DIA X 4.0 L, MLD RBR                                               | 98159          | 2859-75-4                |
| -42                    | 131-0993-0               | 00                             | 1       | . BUS, CONDUCTOR: 2 WIRE BLACK                                                               | 00779          | 530153-2                 |
|                        | 131-0993-0               |                                | 2       | . LINK, TERM. CONNE: 2 WIRE RED                                                              | 00779          | 530153-0                 |
|                        | 131-0993-0               | )3                             | 1       | . LINK, TERM. CONNE: 2 WIRE ORANGE                                                           | 00779          | 530153-3                 |
|                        | 131-0993-0               |                                | 1       | . LINK, TERM. CONNE: 2 WIRE YELLOW                                                           | 0077 <b>9</b>  | 530153-4                 |
|                        | 131-0993-0               |                                | 6       | . LINK, TERM. CONNE: 2 WIRE VIOLET                                                           | 00779          | 530153-7                 |
|                        | 131-0993-0               |                                | 1       | . LINK, TERM. CONNE: 2 WIRE BLUE                                                             | 00779          | 530153-6                 |
|                        | 131-0993-0               | )9                             | 2       | . LINK, TERM. CONNE: 2 WIRE WHITE                                                            | 00779          | 530153-1                 |
| -43<br>-44             |                          |                                | 90<br>1 | . TERMINAL, PIN:0.365 L X 0.025 PH BRZ GOLD<br>CKT BOARD ASSY:G.P.I.B. (SEE A30 REPL)        | 22526          | 47357                    |
| -45                    | 131-0608-0               | 00                             | 34      | . TERMINAL, PIN: 0.365 L X 0.025 PH BRZ GOLD                                                 | 22526          | 47357                    |
| -46                    |                          |                                | 2       | . PIN, SPRING:0.10 OD X 0.25 INCH L, STL                                                     | 80009          | 214-1337-00              |
| -47                    | 105-0160-0               | 00                             | 2       | . EJECTOR, CKT BD: WHITE PLASTIC                                                             | 80009          | 105-0160-00              |
|                        |                          |                                |         |                                                                                              |                |                          |

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| Fig. &<br>Index<br>No. | Tektronix<br>Part No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Serial/Model No.<br>Eff Dscont | 0+     | . 1 0 0 4 5                        |                                                        | Mfr            |                            |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------|------------------------------------|--------------------------------------------------------|----------------|----------------------------|
| NU.                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                | uty    | 12345                              | Name & Description                                     | Code           | Mfr Part Number            |
| 3-48                   | 175-2429-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 1      | CA ASSY,SP,ELEC                    | :15.0 INCH LONG                                        | 80009          | 175-2429-00                |
| -49                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                | 1      | CKT BOARD ASSY:                    | ROM(SEE A31 REPL)                                      | 00009          | 175-2429-00                |
| -50                    | 214-1337-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 2      | . PIN, SPRING:0.                   | 10 OD X 0.25 INCH L,STL                                | 80009          | 214-1337-00                |
| -51                    | 105-0160-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 2      | . EJECTOR,CKT B                    | D:WHITE PLASTIC                                        | 80009          |                            |
| -52                    | 131-0608-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 9      | . TERMINAL, PIN:                   | 0.365 L X 0.025 PH BRZ COLD                            | 22526          |                            |
| 50                     | 131-0608-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 6      | . TERMINAL, PIN:                   | 0.365 L X 0.025 PH BRZ GOLD                            | 22526          |                            |
|                        | 131-0993-00<br>136-0694-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                | 1      | <ul> <li>BUS, CONDUCTOR</li> </ul> | :2 WIRE BLACK                                          | 00779          |                            |
| -55                    | 136-0578-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 1      | . SKT, PL-IN ELE                   | K:MICROCIRCUIT,28 CONTACT                              | 73803          |                            |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                | 8      | . SKT, PL-IN ELE                   | K:MICROCKT, 24 PIN, LOW PROFILE                        | 73803          |                            |
| -57                    | 214-1337-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 1<br>2 | CKT BUARD ASSY:                    | RAM(SEE A28 REPL)                                      |                |                            |
| -58                    | 105-0160-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 2      | • EJECTOR,CKT B                    | 10 OD X 0.25 INCH L,STL                                | 80009          | 214-1337-00                |
| -59                    | 131-0608-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 13     | TERMINAL DIN.                      | 0.365 L X 0.025 PH BRZ GOLD                            | 80009          |                            |
| -60                    | The set of |                                | 2      | . TRANSISTOR:(S                    | EE Q760,Q860 REPL)<br>ATTACHING PARTS)                 | 22526          | 47357                      |
| -61                    | 210-0206-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 2      | . TERMINAL, LUG:                   |                                                        | 06000          | 1070 1/7 1                 |
| -62                    | 211-0008-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 2      | . SCREW, MACHINE                   | :4-40 X 0.25 INCH, PNH STL                             | 86928<br>83385 | A373-147-1<br>OBD          |
| ( )                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |        |                                    |                                                        | 05505          | 000                        |
| -63<br>-64             | 214 1327 00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 1      | CKT BOARD ASSY:                    | DISPLAY(SEE A29 REPL)                                  |                | ,                          |
| -65                    | 214-1337-00<br>105-0160-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                | 2      | . PIN, SPRING:0.                   | 10 OD X 0.25 INCH L,STL                                | 80009          | 214-1337-00                |
|                        | 136-0260-02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                |        | . EJECTOR,CKT B                    | D:WHITE PLASTIC                                        | 80009          | 105-0160-00                |
| -67                    | 131-0608-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 7      | . SKT, PL-IN ELE                   | K:MICROCIRCUIT, 16 DIP, LOW CLE                        | 71785          | 133-51-92-008              |
|                        | 175-2716-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 40     | . TERMINAL, PIN:(                  | 0.365 L X 0.025 PH BRZ GOLD                            | 22526          | 47357                      |
| ~69                    | 352-0213-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 2      | . CA ASSY, SP, ELI                 | SC:8.0 INCH LONG                                       | 80009          | 175-2716-00                |
| -70                    | 131-1003-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 2      | CONN PODT FIE                      | FOR 0.16 X 0.08"CABLE, PLASTIC<br>C:CKT BD MT, 3 PRONG | 80009          | 352-0213-00                |
| -71                    | 136-0252-07                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                |        | . SOCKET, PIN CON                  | JICKI BD MT, 3 PRONG                                   | 80009          | 131-1003-00                |
|                        | 131-1426-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 1      | . CONTACT SET.EI                   | LE:R ANGLE,0.250L,STRIP OF 36                          | 22526<br>22526 | 75060-012                  |
| -73                    | 214-0579-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 3      | . TERM, TEST POIN                  | T:BRS CD PL                                            | 80009          | 65524-136<br>214-0579-00   |
| -74                    | 385-0124-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 2      | SPACER, POST: 2.0                  | L W/6-32 THD EA END,AL<br>ATTACHING PARTS)             | 80009          | 385-0124-00                |
| -75<br>-76             | 211-0504-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 2      | SCREW, MACHINE: 6-                 | 32 X 0.25 INCH, PNH STL                                | 83385          | OBD                        |
| <del>-</del> 77        | 166-0031-00<br>210-0457-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                | 1      | (A                                 | 18 ID X 0.25 INCH LONG<br>TTACHING PARTS)              | 80009          | 166-0031-00                |
| -78                    | 211-0014-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 1      | NUT, PL, ASSEM WA:                 | 6-32 X 0.312 INCH, STL                                 | 83385          | OBD                        |
| -79                    | 386-4066-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 1<br>2 |                                    | 40 X 0.50 INCH, PNH STL                                | 83385          | OBD                        |
|                        | 000 1000 00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 2      | SUPPORT, CKT BD:                   | TTACULING DARMAN                                       | 80009          | 386-4066-00                |
| -80                    | 211-0541-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 4      | SCREW, MACHINE: 6-                 | TTACHING PARTS)<br>32 X 0.25"100 DEG,FLH STL           | 83385          | OBD                        |
| -81                    | 369-0035-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 1      | IMPLR, FAN AXIAL:                  |                                                        | 52792          | 3500-CCW.080N              |
| -82                    | Non the address of the second                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                | 1      | CKT BOARD ASSY:F                   | AN(SEE A16 REPL)<br>TTACHING PARTS)                    | 52792          | 3300-CCW.080N              |
|                        | 211-0507-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 4      | SCREW, MACHINE: 6-                 | 32 X 0.312 INCH. PNH STL                               | 83385          | OBD                        |
| 04                     | 211-0008-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 1      |                                    | 40 X 0.25 INCH, PNH STL                                | 83385          | OBD                        |
| -85                    | 136-0252-07                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | -3     | CKT BOARD ASSY I                   |                                                        |                |                            |
|                        | 131-0608-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                |        | . SOCKET, PIN CON                  | N:W/O DIMPLE<br>.365 L X 0.025 PH BRZ GOLD             | 22526          | 75060-012                  |
| -                      | 136-0269-02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 1      | SKT DI IN FIRE                     | MICROCIRCUIT, 14 DIP, LOW CLE                          | 22526          |                            |
|                        | 343-0411-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                |        | STRAP, RETAINING                   | 2.494 X 0.8,STL TIN PL                                 | 73803          | CS9002-14                  |
|                        | 166-0099-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 2      | POST, ELEC-MECH:0                  | .25 OD X 1.719 INCHES L                                | 80009<br>80009 | 343-0411-00<br>166-0099-00 |
|                        | 129-0748-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 1      | SPACER POST: 3.04                  | 8 LONG X 0.25 INCH HEX<br>TTACHING PARTS)              | 80009          | 129-0748-00                |
|                        | 211-0538-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                |        | SCREW, MACHINE:6-                  | 32 X 0.312"100 DEG,FLH STL                             | 83385          | OBD                        |
|                        | 129-0349-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 1<br>1 | SWITCH, THRMSTC: (                 |                                                        | 80009          | 129-0349-00                |
| -94                    | 210-0586-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 2      | NUT, PL, ASSEM WA:4                | TTACHING PARTS)<br>4-40 X 0.25,STL CD PL<br>*          | 83385          | OBD                        |
|                        | 210-0201-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 1      | TERMINAL, LUG:0.1                  | 2 ID,LOCKING,BRZ TIN PL<br>TACHING PARTS)              | 86928          | OBD                        |
| -                      | 210-0457-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 1      | NUT, PL, ASSEM WA:                 | 5-32 X 0.312 INCH,STL                                  | 83385          | OBD                        |
| -97                    | 211-0578-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | 4      | SCREW, MACHINE: 6-                 | 32 X 0.438 1NCH, PNH STL                               | 83385          | OBD                        |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |        |                                    |                                                        |                |                            |

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| Fig. &<br>Index<br>No. | Tektronix<br>Part No. | Serial/Model N<br>Eff Dsco |     | 12345           | Name & Description            | Mfr<br>Code | Mfr Part Number |
|------------------------|-----------------------|----------------------------|-----|-----------------|-------------------------------|-------------|-----------------|
| 3-98                   | 166-0029-0            | 0                          | 4   | SPACER, SLEEVE  | :0.125 L X 0.18 ID,AL         | 80009       | 166-0029-00     |
| -99                    | 441-1262-0            | 0                          | 1   | CHAS, TDR UNIT  | :MAIN<br>(ATTACHING PARTS)    | 80009       | 441-1262-00     |
| -100                   | 210-0586-0            | 0                          | 20  | NUT, PL, ASSEM  | WA:4-40 X 0.25,STL CD PL      | 83385       | OBD             |
| -101                   | 211-0014-0            | 0                          | 20  | SCREW, MACHINE  | :4-40 X 0.50 INCH, PNH STL    | 83385       | OBD             |
| -102                   | 210-0457-0            | 0                          | 4   | NUT, PL, ASSEM  | WA:6-32 X 0.312 INCH,STL      | 83385       | OBD             |
| -103                   | 211-0507-0            | 0                          | 1   | SCREW, MACHINE  | :6-32 X 0.312 INCH, PNH STL   | 83385       | OBD             |
|                        |                       |                            |     |                 | *                             |             |                 |
| -104                   |                       |                            | 1   | CKT BOARD ASS   | Y:MOTHER(SEE A8 REPL)         |             |                 |
| -105                   | 131-0608-0            | 0                          | 98  | . TERMINAL, PI  | N:0.365 L X 0.025 PH BRZ GOLD | 22526       | 47357           |
| -106                   | 131-2279-0            | 0                          | - 5 | . CONN, RCPT, E | LEC:CKT BD,40/80,FEMALE       | 00779       | 3-530662-0      |
| -107                   | 131-1003-0            | 0                          | 11  | . CONN, RCPT, E | LEC:CKT BD MT, 3 PRONG        | 80009       | 131-1003-00     |
| -108                   | 136-0252-0            | 7                          | 11  | . SOCKET, PIN   | CONN:W/O DIMPLE               | 22526       | 75060-012       |
| -109                   | 131-2282-0            | 0                          | 5   | . CONN, RCPT, E | LEC:EDGE CARD,22/44 CONT      | 00779       | 2-530662-5      |

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| Fig. &<br>Index<br>No. | Tektronix<br>Part No.      | Serial/Model No.<br>Eff Dscont | Qty     | 12345                               | Name & Description                                                 | Mfr<br>Code    | Mfr Part Number         |
|------------------------|----------------------------|--------------------------------|---------|-------------------------------------|--------------------------------------------------------------------|----------------|-------------------------|
| 4-1                    | 337-2617-00                |                                | 1       | SHIELD,ELEC:C                       | IRCUIT BOARD<br>(ATTACHING PARTS)                                  | 80009          | 337-2617-00             |
| -2                     | 210-0457-00                | 1                              | 2       | NUT, PL, ASSEM                      | WA:6-32 X 0.312 INCH, STL                                          | 83385          | OBD                     |
| -3                     |                            |                                | 1       | CKT BOARD ASS                       | Y:AUX REGULATOR(SEE A7 REPL)<br>(ATTACHING PARTS)                  |                |                         |
| -4                     | 211-0008-00                |                                | 6       | SCREW.MACHINE                       | :4-40 X 0.25 INCH, PNH STL                                         | 83385          | OBD                     |
| -5                     | 210-0457-00                |                                | 2       | NUT, PL, ASSEM                      | WA:6-32 X 0.312 INCH,STL                                           | 83385          |                         |
| ,                      |                            |                                | -       | CKT BOARD ASS                       | Y INCLUDES:                                                        |                |                         |
| ~6                     | 214-0579-00                |                                | 4       | . TERM, TEST P                      | OINT:BRS CD PL                                                     | 80009          | 214-0579-00             |
| -7<br>-8               | 131-0608-00                |                                | 31<br>1 | . TERMINAL, PI<br>. TRANSISTOR:     | N:0.365 L X 0.025 PH BRZ GOLD<br>(SEE Q15 REPL)                    |                | 47357                   |
| -9                     | 211-0008-00                |                                |         |                                     | (ATTACHING PARTS)                                                  |                |                         |
| -10                    |                            |                                | 1       | . SCREW, MACHI                      | NE:4-40 X 0.25 INCH, PNH STL                                       | 83385          | OBD                     |
|                        | 210-1178-00                |                                |         |                                     | R:U/W T0-220 TRANSISTOR                                            | 49671          | DF137A                  |
|                        |                            |                                |         |                                     | (SEE Q14 REPL)<br>(ATTACHING PARTS)                                |                |                         |
|                        | 211-0012-00<br>210-1178-00 |                                | 1<br>1  | . SCREW, MACHI<br>. WASHER, SHLD    | NE:4-40 X 0.375, PNH STL CD PL<br>R:U/W TO-220 TRANSISTOR          | 83385<br>49671 |                         |
| -14                    | 343-0202-00                |                                | 2       | CLAND CADAO                         |                                                                    |                |                         |
|                        | 136-0514-00                |                                | 2       | . CLAMP, CAPAC                      | LIUR:<br>LEC.MICROGIDCUID & DID                                    | 80009          | 343-0202-00             |
|                        |                            |                                | 1       | . MICROCIRCUI                       | LEC:MICROCIRCUIT,8 DIP<br>T,LI:(SEE U40 REPL)<br>(ATTACHING PARTS) | 73803          | CS9002-8                |
| -17                    | 211-0008-00                |                                | 1       | . SCREW, MACHI                      | (ATTACHING PARTS) NE:4-40 X 0.25 INCH, PNH STL                     | 83385          | OBD                     |
| -18                    |                            |                                | 1       | . TRANSISTOR:                       |                                                                    |                |                         |
| -19                    | 210-0586~00                |                                | 1       | . NUT.PL.ASSE                       | M WA:4-40 X 0.25,STL CD PL                                         | 83385          | OBD                     |
| -20                    | 211-0008-00                |                                | 1       | . SCREW, MACHIN                     | NE:4-40 X 0.25 INCH, PNH STL                                       | 83385          | OBD                     |
|                        | 214-2824-00                |                                | 1       |                                     | LEC:AUXILIARY REGULATOR<br>(ATTACHING PARTS)                       | 80009          | 214-2824-00             |
|                        | 211-0008-00                |                                | 2       |                                     | NE:4-40 X 0.25 INCH, PNH STL                                       | 83385          | OBD                     |
|                        | 351-0581-00                |                                |         | GUIDE, FLIPSTAN                     | (ATTACHING PARTS)                                                  | 80009          | 351-0581-00             |
|                        | 210-0457-00                |                                |         |                                     | WA:6-32 X 0.312 INCH, STL                                          | 83385          | OBD                     |
|                        | 407-2249-00                |                                |         | BRKT,CKT BD SU                      | (ATTACHING PARTS)                                                  | 80009          | 407-2249-00             |
|                        | 211-0507-00                |                                |         |                                     | :6-32 X 0.312 INCH, PNH STL                                        | 83385          | OBD                     |
|                        | 200-2289-00                |                                |         | COV, HV PWR SPI                     | (ATTACHING PARTS)                                                  | 80009          | 200-2289-00             |
|                        | 211-0008-00                |                                | 3       |                                     | :4-40 X 0.25 INCH, PNH STL                                         | 83385          | OBD                     |
|                        |                            |                                |         |                                     | (HIGH VOLTAGE(SEE A20 REPL)<br>(ATTACHING PARTS)                   |                |                         |
|                        | 211-0007-00<br>211-0008-00 |                                | 3       | SCREW, MACHINE:<br>SCREW, MACHINE:  | 4-40 X 0.188 INCH, PNH STL<br>4-40 X 0.25 INCH, PNH STL            | 83385<br>83385 |                         |
|                        |                            |                                | _       | CKT BOARD ASSY                      |                                                                    |                |                         |
|                        | 214-0579-00                |                                | 5<br>1  | . TERM, TEST PC                     | JINT:BRS CD PL<br>VICE:(SEE U21 REPL)                              | 80009          | 214-0579-00             |
| _3/                    | 210 0/15 55                |                                | -       |                                     | (ATTACHING PARTS)                                                  |                |                         |
| -34<br>-35             | 210-0415-00<br>220-0835-00 |                                | 1<br>1  | . NUT, PLAIN, HE<br>. NUT, PLAIN HE | XX.:10-24 X 1.25 INCH,BRS<br>XX:10-24,0.375 DIA,NYLON              |                | 210-0415-00<br>N-1024-X |
| -36                    | nan ann ann ann ann        |                                | 1       | . TRANSFORMER:                      | *<br>(SEE T14 REPL)<br>(ATTACHING DARTS)                           |                |                         |
| -37                    | 211-0008-00                |                                | 4       |                                     | (ATTACHING PARTS)<br>E:4-40 X 0.25 INCH,PNH STL                    | 83385          | OBD                     |

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### Replaceable Mechanical Parts-7854 Service

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| Index<br>No. | Tektronix<br>Part No.            | Serial/N<br>Eff     | Aodel No.<br>Dscont | Qty      | 12345                   | Name & Description                                                    | Mfr<br>Code    | Mfr Part Number            |           |
|--------------|----------------------------------|---------------------|---------------------|----------|-------------------------|-----------------------------------------------------------------------|----------------|----------------------------|-----------|
| 4-38         | 131-0608-00                      | n                   |                     | 17       | TEDMINAL DIN.O          | 245 I V O OOS DU DDZ GOVD                                             |                | (                          |           |
|              | 131-0589-00                      | 0 .                 |                     | 9        | . TERMINAL, PIN:0       | .365 L X 0.025 PH BRZ GOLD<br>.46 L X 0.025 SQ                        | 22526<br>80009 | 47357<br>131-0589-00       |           |
|              | 129-0072-00                      |                     |                     | 1        | . INSULATOR, STDF       |                                                                       | 80009          | 129-0072-00                |           |
|              | 361-0007-0                       |                     |                     | 1        | . SPACER, SLEEVE:       | 0.250 INCH DIA, PLASTIC                                               | 80009          | 361-0007-00                |           |
| -41          |                                  |                     |                     | 6        | . SOCKET, PIN CON       | N:W/O DIMPLE                                                          | 22526          | 75060-012                  |           |
|              | 136-0514-0                       |                     |                     | 6        | . SKT,PL-IN ELEC        | MICROCIRCUIT,8 DIP                                                    | 73803          |                            |           |
| -43          | 129-0203-0                       |                     |                     | 1        | (A'                     | l LONG X 05 INCH HEX<br>TTACHING PARTS)                               | 80009          | 129-0203-00                |           |
| -44          | 211-0008-0                       |                     |                     | 1        |                         | 40 X 0.25 INCH, PNH STL                                               | 83385          | OBD                        |           |
| -45          | 220-0547-0                       |                     |                     | 4        |                         | 0.26 X0.282 (2)4-40 THD<br>TTACHING PARTS)                            | 000FW          | OBD                        |           |
| ~46          | 211-0101-0                       |                     |                     | 4        |                         | 40 X 0.25,100 DEG,FLH STL<br>*                                        | 83385          | OBD                        |           |
| -47          | 214-0001-0                       | 0                   |                     | 1        | HINGE,BUTT:1.5 X        | 1.0,BRS<br>TTACHING PARTS)                                            | 71126          | B78                        |           |
| -48          | 210-0586-00                      |                     |                     | . 2      | NUT, PL, ASSEM WA:4     | 4-40 X 0.25.STL CD PL                                                 | 83385          | OBD                        |           |
| -49          | 211-0101-0                       | 0                   |                     | 2        | SCREW, MACHINE: 4-4     | 40 X 0.25,100 DEG,FLH STL                                             | 83385          | OBD                        |           |
| -50          | 380-0563-0                       | 0                   |                     | 1        | HSG, HV PWR SPLY:<br>(A | TTACHING PARTS)                                                       | 80009          | 380-0563-00                |           |
| -51          | 210-0457-00                      | 0                   |                     | 5        | NUT, PL, ASSEM WA:      | 6-32 X 0.312 INCH,STL                                                 | 83385          | OBD                        |           |
| -52          | 211-0507-00                      | 0                   |                     | 5        | SCREW, MACHINE: 6-      | 32 X 0.312 INCH, PNH STL                                              | 83385          | OBD                        |           |
| -53          | 342-0442-00                      | 0                   |                     | 2        | INSULATOR, WIRE:        |                                                                       | 80009          | 342-0442-00                |           |
| -54          | an an an she bin. 🕁 san gerang e | ~~                  |                     | 1        | CKT BOARD ASSY:H        | ORIZ OUTPUT(SEE A17 REPL)<br>ITACHING PARTS)                          |                | 512 0112 00                |           |
| -55          | 211-0008-00                      |                     |                     | 3        |                         | 40 X 0.25 INCH, PNH STL                                               | 83385          | OBD                        |           |
|              |                                  |                     |                     | -        | CKT BOARD ASSY I        | NCLUDES:                                                              |                |                            |           |
| -56          | 136-0252-0                       | 7 B0101             | 00 B031169          | 58       | . SOCKET, PIN CON       | N:W/O DIMPLE                                                          | 22526          | 75060-012                  |           |
| <i></i>      | 136-0252-01                      |                     | 70                  | 61       | . SOCKET, PIN CON       | N:W/O DIMPLE                                                          | 22526          | 75060-012                  |           |
|              | 131-1003-00                      |                     |                     |          |                         | :CKT BD MT, 3 PRONG                                                   | 80009          | 131-1003-00                |           |
| -58          | 200-0945-0<br>200-0945-0         | 1 B01010<br>1 B0311 | 00 B031169<br>70    | 1<br>3   | . COVER, HALF XST       | R:DUAL TO-18,W/2-56 THD<br>R:DUAL TO-18,W/2-56 THD<br>FTACHING PARTS) | 80009<br>80009 | 200-0945-01<br>200-0945-01 |           |
| -59          | 211-0001-00<br>211-0001-00       | ) B01010<br>B0311   | 00 B031169          | 1<br>3   | . SCREW, MACHINE:       | 2-56 X 0.25 INCH,PNH STL<br>2-56 X 0.25 INCH,PNH STL                  | 87308          |                            |           |
| -60          |                                  |                     |                     |          | -                       | *                                                                     | 87308          |                            |           |
|              | 131-0608-00                      |                     |                     | 1        | . COVER, HALF XST       | R:DUAL TO-18,ALUMINUM                                                 | 80009          | 200-0945-00                |           |
| -62          | 214-0579-00                      |                     |                     | 16<br>10 | . TERMINAL, PIN:0       | 365 L X 0.025 PH BRZ GOLD                                             | 22526          |                            |           |
| -63          | 195-0377-00                      |                     |                     |          | . TERM, TEST POINT      | TERS CD PL                                                            |                | 214-0579-00                |           |
| -64          | 441-1465-00                      |                     |                     | 1        |                         | RIZONTAL AMPLIFIER                                                    | 80009<br>80009 | 195-0377-00<br>441-1465-00 |           |
| -65          | 210-0457-00                      | า                   |                     | 2        |                         | TTACHING PARTS)<br>5-32 X 0.312 INCH,STL                              | 00005          |                            |           |
| -66          | 211-0008-00                      |                     |                     | 2        | SCREW, MACHINE: 4-4     | •0 X 0.25 INCH, PNH STL                                               | 83385<br>83385 |                            |           |
| -67          |                                  | u-                  |                     | 1        | CKT BOARD ASSY VI       | SRTICAL OUTPUT(SEE A18 REPL)                                          |                |                            |           |
| -68          | 211-0008-00                      | )                   |                     | 5        | SCREW, MACHINE: 4-4     | 40 X 0.25 INCH, PNH STL                                               | 83385          | OBD                        |           |
|              |                                  | **                  |                     |          | CKT BOARD ASSY IN       |                                                                       |                |                            |           |
| -69          | 200-1167-00                      |                     |                     | 1        |                         | P STAB FOR 2 TO-18 CS STYLE                                           | 80009          | 200-1167-00                |           |
|              | 131-0608-00                      |                     |                     | 8        | . TERMINAL, PIN:0       | .365 L X 0.025 PH BRZ GOLD                                            | 22526          |                            |           |
|              | 214-0973-00                      |                     |                     | 2        | . HEAT SINK, ELEC:      | :0.28 X 0.18 OVAL X 0.187"H                                           |                | 214-0973-00                |           |
|              | 214-0579-00                      |                     |                     | 2        | . TERM, TEST POIN       | I:BRS CD PL                                                           |                | 214-0579-00                |           |
|              | 136-0252-03                      |                     |                     |          | . SOCKET, PIN CON       |                                                                       |                | 75060-012                  |           |
|              | 131-1003-00                      |                     |                     | 4        | . CONN, RCPT, ELEC      | CKT BD MT.3 PRONG                                                     | 80009          | 131-1003-00                |           |
| -75          |                                  |                     |                     | 1        | . TRANSISTOR:(SEI       | E Q196 REPL)<br>ITACHING PARTS)                                       |                |                            |           |
| -76<br>-77   | 210-0551-00<br>211-0097-00       |                     |                     | 2<br>1   | . NUT, PLAIN, HEX.      | 4-40 X 0.25 INCH,STL<br>4-40 X 0.312 INCH,PNH STL                     | 000BK<br>83385 |                            |           |
| -78          |                                  | -                   |                     |          | . MICROCIRCUIT,LI       | *<br>L:(SEE U150 REPL)                                                |                | -                          | A. 1998 . |
| 70           | 010 0/07 -                       | •                   |                     |          | (A'                     | TTACHING PARTS)                                                       |                |                            |           |
| -79<br>-80   | 210-0407-00<br>210-0055-00       |                     |                     | 1<br>1   | . WASHER, LOCK: SPI     | 6-32 X 0.25 INCH,BRS<br>LIT,0.145 ID X 0.253 OD,STL                   | 73743<br>83385 | 3038-0228-402<br>OBD       |           |
|              |                                  |                     |                     |          | -                       | *                                                                     |                |                            |           |

A59-00

-118:555

Fig. &

Tektronix Serial/Model No

| Fig. &<br>Index<br>No. | Tektronix<br>Part No.      | Serial/Model No.<br>Eff Dscont | Qty | 1 2 3 4 5 Name & Description                                   | Mfr<br>Code    | Mfr Part Number            |
|------------------------|----------------------------|--------------------------------|-----|----------------------------------------------------------------|----------------|----------------------------|
| 4-81                   | 136-0252-00                | )                              | 20  | . SOCKET, PIN TERM:0.145 INCH LONG                             | 00779          | 2-330808-7                 |
| 0.0                    | 136-0252-06                |                                |     | . SOCKET, PIN TERM: 0.178 INCH LONG                            | 00779          | 2-332095-6                 |
|                        | 214-2416-00                |                                | 1   | . HT SK MICROCKT:VERTICAL AMPLIFIER, BACK<br>(ATTACHING PARTS) | 80009          | 214-2416-00                |
| -83                    | 210-0551-00                |                                | 2   | . NUT, PLAIN, HEX.: 4-40 X 0.25 INCH, STL                      | 000вк          | OBD                        |
| -84                    | 211-0511-00                |                                | 2   | . SCREW, MACHINE: 6-32 X 0.500, PNH, STL, CD PL                | 83385          | OBD                        |
| -85                    | 211-0008-00                | )                              | 2   | . SCREW, MACHINE: 4-40 X 0.25 INCH, PNH STL                    | 83385          | OBD                        |
| -86                    | 129-0303-00                | )                              | 2   | . POST, ELEC-MECH: 0.25 OD X 0.237 INCH LONG                   | 80009          | 129-0303-00                |
| -87                    | 348-0031-00                |                                | 2   | . GROMMET, PLASTIC: 0.156 INCH DIA                             | 80009          | 348-0031-00                |
| -88                    | 210-0599-00                | )                              | 2   | . NUT, SLEEVE:4-40 X 0.391 INCH LONG<br>(ATTACHING PARTS)      | 80009          | 210-0599-00                |
| -89                    | 211-0097-00                | )                              | 2   | . SCREW, MACHINE: 4-40 X 0.312 INCH, PNH STL                   | 83385          | OBD                        |
| -90                    | 210-0551-00                |                                | 2   | . NUT, PLAIN, HEX.: 4-40 X 0.25 INCH, STL                      | 000BK          |                            |
| -91                    | 210-0627-00                | )                              | 1   | . RIVET, SOLID:0.042 DIA X 0.25 INCH, RDH                      | 80000          | 210-0627 00                |
| -92                    | 214-0368-00                | )                              | 1   | . SPRING, HLCPS: 0.24 DIA X 0.438 INCH LONG                    | 80009<br>80009 | 210-0627-00                |
| -93                    | 343-0097-00                | )                              | 1   | . RTNR, TRANSISTOR: HEAT SINK                                  | 80009          | 214-0368-00<br>343-0097-00 |
| -94                    | 214-1683-00                | )                              | 1   | . HEAT SINK, ELEC: TRANSISTOR                                  | 80009          | 214-1683-00                |
| -95                    |                            |                                | 1   | RES., FXD, FILM: (SEE R83 REPL)<br>(ATTACHING PARTS)           | 00009          | 214-1003-00                |
| -96                    | 211-0511-00                | )                              | 2   | SCREW, MACHINE: 6-32 X 0.500, PNH, STL, CD PL                  | 83304          | 08D                        |
| -97                    | 210-0894-00                |                                | 2   | WASHER, NONMETAL:0.19 ID X 0.438" OD, PLSTC                    | 83385<br>09422 | OBD<br>OBD                 |
| -98                    | 166-0107-00                | )                              | 2   | SPACER, SLEEVE:0.18 ID X 0.219 L                               | 00000          | 1// 0107 00                |
| -99                    | 210-0201-00                |                                | 1   | TERMINAL, LUG: 0.12 ID, LOCKING, BRZ TIN PL                    | 80009<br>86928 | 166-0107-00<br>OBD         |
| -100                   | 211-0008-00                | )                              | 1   | (ATTACHING PARTS)<br>SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL    | 83385          | OBD                        |
| -101                   | 441-1463-00                | )                              | 1   | CHASSIS,SCOPE:VERTICAL AMPLIFIER<br>(ATTACHING PARTS)          | 80009          | 441-1463-00                |
| -102                   | 210-0457-00                | )                              | 5   | NUT, PL, ASSEM WA:6-32 X 0.312 INCH, STL                       | 83385          | OBD.                       |
|                        | 211-0507-00                |                                | 5   | SCREW, MACHINE: 6-32 X 0.312 INCH, SIL                         | 83385<br>83385 | OBD<br>OBD                 |
| -104                   | 136-0745-00                | )                              | 1   | SKT, PL-IN ELEK: CRT, 10 PIN W/LEADS                           | 80009          | 136-0745-00                |
| -105                   | 343-0254-00                | )                              | 1   | . CLP, ELCTRN TUBE:                                            | 80009          | 343-0254-00                |
| -106                   | 200-0917-01                |                                | 1   | . COV, ELECTRON TU:2.052 OD X 0.291" THK, PLSTC                | 80009          | 200-0917-01                |
|                        | 136-0304-03                |                                | 1   | . SKT, PL-IN ELEC: ELECTRON TUBE, 14 CONTACT                   | 80009          | 136-0304-03                |
| -108                   | 131-0707-00                | )                              | 5   | . CONNECTOR, TERM: 22-26 AWG, BRS& CU BE GOLD                  | 22526          | 47439                      |
|                        | 131-0621-00                |                                | 5   | . CONNECTOR, TERM: 22-26 AWG, BRS& CU BE GOLD                  | 22526          | 46231                      |
| -110                   | 352-0163-06                | ł                              | 1   | . CONN BODY, PL, EL:5 WIRE BLUE                                | 80009          |                            |
|                        | 352-0205-02                |                                | 1   | . CONN BODY, PL, EL:9 WIRE RED                                 | 80009          | 352-0163-06<br>352-0205-02 |
| -112                   | 367-0117-00                | 1                              | 1   | PULL, SOCKET:                                                  | 80009          | 367-0117-00                |
|                        | 386-4070-00                |                                | 1   | SUPPORT,CKT BD:REAR<br>(ATTACHING PARTS)                       | 80009          | 386-4070-00                |
| -114                   | 211-0510-00                | I                              | 4   | SCREW, MACHINE: 6-32 X 0.375, PNH, STL, CD PL                  | 83385          | 0.0.0                      |
| -115                   | 210-0949-00                | 1                              | 4   | WASHER, FLAT: 0.141 ID X 0.50 INCH OD, BRS                     |                |                            |
| -116                   | 211-0507-00                | I                              | 2   | SCREW, MACHINE: 6-32 X 0.312 INCH, PNH STL                     | 12327<br>83385 | OBD<br>OBD                 |
| -117                   | 343-0205-01                |                                | 1   | RTNR,ELCTRN TU:3.0 DIA X 1.5L,DELRIN<br>(ATTACHING PARTS)      | 80009          | 343-0205 <del>-</del> 01   |
| -118                   | 211-0170-00                |                                | 2   | SCREW, MACHINE: 4-40 X 2.75 INCH, PNH STL                      | 02205          | OPD                        |
| -119                   | 214-1333-00                |                                | 2   | SPRING, HLCPS: 0.213 OD X 0.375 INCH LONG                      | 83385<br>80009 | 214-1333-00                |
| -120                   | 354-0347-00                |                                | 1   | RING, CRT CLAMP:                                               | 00000          | 254 0247 00                |
| -121                   | 343-0217-00                |                                |     | CLAMP, COIL: Y-AXIS<br>(ATTACHING PARTS)                       | 80009<br>80009 | 354-0347-00<br>343-0217-00 |
| -122                   | 213-0138-00                |                                | 2   | SCR, TPG, TF: 4-24 X 0.188 INCH, PNH STL                       | 83385          | OBD                        |
| -123                   |                            |                                | 1   |                                                                |                |                            |
| -124                   | 352-0169-00                |                                |     | HLDR, TERM CONN:2 WIRE BLACK                                   | 00000          | 250 01/0 00                |
| -125                   | 348-0055-00                |                                |     | GROMMET, PLASTIC: 0.25 INCH DIA                                | 80009          | 352-0169-00                |
| -126                   | 214-0291-00                |                                | 1   | CONTACT,SPRING:1.188 X 0.375 X 0.25 INCH<br>(ATTACHING PARTS)  | 80009<br>80009 | 348-0055-00<br>214-0291-00 |
|                        | 210 0504 00                |                                | •   |                                                                | 00005          |                            |
|                        | 210-0586-00<br>211-0008-00 |                                | 1   | NUT, PL, ASSEM WA: 4-40 X 0.25, STL CD PL                      | 83385          | OBD                        |

W.F. Salar

A NAME OF THE REPORT OF THE RE

|                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Serial/Model No.<br>Eff Dscont | Qty                                                                                                                                | 1 2 3 4 5 Name & Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Mfr<br>Code                                                                                                                                                                                                         | Mfr Part Number                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -130 3<br>-131 3                                                                                                                                                                                                                                                              | 352-0169-00<br>337-1460-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                | 1<br>1<br>1<br>1                                                                                                                   | HLDR,TERM CONN:2 WIRE BLACK<br>SHLD,ELECTRON T:CRT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 80009<br>80009                                                                                                                                                                                                      | 352-0169-00<br>337-1460-00                                                                                                                                                                                                                                                                                                                                                |
| 2                                                                                                                                                                                                                                                                             | 211-0507-00<br>211-0510-00<br>210-0803-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                | 1<br>1<br>1                                                                                                                        | SCREW, MACHINE: 6-32 X 0.312 INCH, PNH STL<br>SCREW, MACHINE: 6-32 X 0.375, PNH, STL, CD PL<br>WASHER, FLAT: 0.15 ID X 0.032 THK, STL CD PL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 83385<br>83385<br>12327                                                                                                                                                                                             | OBD<br>OBD<br>OBD                                                                                                                                                                                                                                                                                                                                                         |
| 3<br>3<br>3                                                                                                                                                                                                                                                                   | 343-0298-00<br>343-0150-00<br>343-0549-00<br>348-0056-00<br>386-4064-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | B010151<br>B010151             | 1<br>1<br>1<br>1                                                                                                                   | CLAMP,LOOP:PLASTIC,W/ADHESIVE BACK<br>CLAMP,TIE DOWN:<br>STRAP,TIEDOWN:0.091 W X 3.62 INCH LONG<br>GROMMET,PLASTIC:0.375 INCH DIA<br>SUPPORT,CHASSIS:MAIN<br>(ATTACHING PARTS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 95987<br>95987<br>59730<br>80009<br>80009                                                                                                                                                                           | HPC25<br>OBD<br>TY100<br>348-0056-00<br>386-4064-00                                                                                                                                                                                                                                                                                                                       |
|                                                                                                                                                                                                                                                                               | 210-0457-00<br>211-0507-00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                | 3<br>3                                                                                                                             | NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL<br>SCREW,MACHINE:6-32 X 0.312 INCH,PNH STL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 83385<br>83385                                                                                                                                                                                                      | OBD<br>OBD                                                                                                                                                                                                                                                                                                                                                                |
| $ \begin{array}{c} 1\\ -137 \\ -138 \\ 1\\ -139 \\ 1\\ -140 \\ 1\\ -140 \\ -141 \\ -142 \\ -143 \\ -144 \\ 3\\ -144 \\ 3\\ -145 \\ 3\\ -146 \\ 3\\ -146 \\ 3\\ -147 \\ 3\\ -148 \\ 3\\ -148 \\ 3\\ -149 \\ 1\\ -150 \\ 2\\ -151 \\ 2\\ -152 \\ 1\\ -155 \\ 3\\ 3\end{array} $ | 11-0507-00 $198-4184-00$ $175-0825-00$ $175-0830-00$ $175-0857-00$ $175-0833-00$ $175-0837-00$ $352-0169-00$ $352-0161-03$ $352-0163-03$ $352-0165-07$ $352-0168-00$ $214-2629-00$ $131-0707-00$ $204-0675-00$ $214-2629-00$ $131-1810-00$ $175-0832-00$ $352-0167-07$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-0167-00$ $352-000$ |                                | 3<br>1<br>FT<br>FT<br>FT<br>FT<br>1<br>1<br>1<br>4<br>2<br>9<br>2<br>88<br>6<br>1<br>18<br>FT<br>82<br>1                           | <ul> <li>WIRE SET,ELEC:</li> <li>WIRE,ELECTRICAL:2 WIRE RIBBON</li> <li>WIRE,ELECTRICAL:3 WIRE RIBBON</li> <li>WIRE,ELECTRICAL:7 WIRE RIBBON</li> <li>WIRE,ELECTRICAL:7 WIRE RIBBON</li> <li>WIRE,ELECTRICAL:8 WIRE RIBBON</li> <li>WIRE,ELECTRICAL:8 WIRE RIBBON</li> <li>WIRE,ELECTRICAL:10 WIRE RIBBON</li> <li>WIRE,ELECTRICAL:10 WIRE RIBBON</li> <li>HLDR,TERM CONN:2 WIRE BLACK</li> <li>CONN BODY,PL,EL:3 WIRE ORANGE</li> <li>CONN BODY,PL,EL:5 WIRE ORANGE</li> <li>CONN BODY,PL,EL:7 WIRE VIOLET</li> <li>CONN BODY,PL,EL:8 WIRE GRAY</li> <li>CONN BODY,PL,EL:10 WIRE BLACK</li> <li>CONN BODY,PLUG:1 LKG CLIP POZ,0.025 SQ PIN</li> <li>PIN,ACTUATOR:</li> <li>CONTACT,ELEC:FEMALE,FOR 0.025 SQ PIN</li> <li>WIRING HARNESS:VERTICAL/HORIZONTAL</li> <li>CONNECTOR,TERM:22-26 AWG,BRS&amp; CU BE GOLD</li> <li>WIRE,ELECTRICAL:9 WIRE RIBBON</li> <li>STRAP,TIEDOWN:0.091 W X 3.62 INCH LONG</li> <li>HLDR,TERM CONN:9 WIRE BLACK</li> </ul> | 80009<br>80009<br>80009<br>80009<br>8261<br>08261<br>08261<br>80009<br>80009<br>80009<br>80009<br>80009<br>80009<br>22526<br>00779<br>80009<br>00779<br>80009<br>00779<br>80009<br>22526<br>08261<br>59730<br>80009 | 198-4184-00 $175-0825-00$ $175-0826-00$ $Ss-0726-710610C$ $Ss-0722-7(1061)$ $Ss-1026-7$ $352-0169-00$ $352-0161-03$ $352-0163-03$ $352-0165-07$ $352-0165-07$ $352-0166-08$ $352-0167-07$ $352-0168-00$ $47439$ $87175-2$ $214-2629-00$ $87124-1$ $179-2701-00$ $47439$ $Ss-0926(1061)0C$ $TY100$ $352-0167-00$                                                           |
| 1<br>2<br>2<br>3<br>3<br>1<br>-156<br>1<br>-157<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>2<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3<br>3                                                                                                                           | 179-2702-00<br>131-0707-00<br>214-2629-00<br>131-1810-00<br>204-0675-00<br>343-0549-00<br>175-0825-00<br>175-0827-00<br>175-0831-00<br>175-0831-00<br>175-0858-00<br>175-0858-00<br>175-0857-00<br>352-0169-02<br>352-0165-07<br>352-0167-04<br>352-0167-04<br>352-0167-07<br>352-0168-02                                                                                                                                                                                                                                                                                                                                                                                  |                                | 1<br>100<br>6<br>2<br>4<br>16<br>FT<br>FT<br>FT<br>FT<br>FT<br>FT<br>2<br>1<br>2<br>2<br>2<br>2<br>2<br>2<br>1<br>2<br>2<br>1<br>2 | <ul> <li>WIRING HARNESS:MAIN</li> <li>CONNECTOR, TERM:22-26 AWG, BRS&amp; CU BE GOLD</li> <li>PIN, ACTUATOR:</li> <li>CONTACT, ELEC:FEMALE, FOR 0.025 SQ PIN</li> <li>CONN BODY, PLUG:1 LKG CLIP POZ, 0.025 SQ PIN</li> <li>STRAP, TIEDOWN:0.091 W X 3.62 INCH LONG</li> <li>WIRE, ELECTRICAL:2 WIRE RIBBON</li> <li>CABLE, SP, ELEC:4, 26 AWG, STRD, PVC JKT, RBN</li> <li>WIRE, ELECTRICAL:5 WIRE RIBBON</li> <li>WIRE, ELECTRICAL:7 WIRE RIBBON</li> <li>WIRE, ELECTRICAL:8 WIRE RIBBON</li> <li>WIRE, ELECTRICAL:10 WIRE RIBBON</li> <li>WIRE, ELECTRICAL:7 WIRE RIBBON</li> <li>WIRE, ELECTRICAL:8 WIRE RIBBON</li> <li>WIRE, ELECTRICAL:8 WIRE RIBBON</li> <li>WIRE, ELECTRICAL:8 WIRE RIBBON</li> <li>HLDR, TERM CONN:2 WIRE BLACK</li> <li>CONN BODY, PL, EL:2 WIRE GREEN</li> <li>CONN BODY, PL, EL:3 WIRE YELLOW</li> <li>CONN BODY, PL, EL:9 WIRE YELLOW</li> <li>CONN BODY, PL, EL:9 WIRE RED</li> <li>CONN BODY, PL, EL:9 WIRE RED</li> <li>CONN BODY, PL, EL:9 WIRE RED</li> </ul>                                                                                                                                                             | 80009<br>22526<br>80009<br>00779<br>59730<br>80009<br>08261<br>08261<br>08261<br>08261<br>08261<br>08261<br>08261<br>08261<br>80009<br>80009<br>80009<br>80009<br>80009<br>80009<br>80009                           | $\begin{array}{c} 179-2702-00\\ 47439\\ 214-2629-00\\ 87124-1\\ 87175-2\\ TY100\\ 175-0825-00\\ SS04267(1061)0C\\ SS-0526-710610C\\ SS-0526-710610C\\ SS-0826-710610C\\ SS-0826-710610C\\ SS-026-7\\ SS-0722-7(1061)\\ SS-0822-7(1061)\\ S5-0822-7(1061)\\ 352-0169-00\\ 352-0169-00\\ 352-0165-07\\ 352-0165-07\\ 352-0167-04\\ 352-0167-04\\ 352-0168-02\\ \end{array}$ |

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|       | Fig. & |                                                 |                  |     |                   |                                                   |                |                          |
|-------|--------|-------------------------------------------------|------------------|-----|-------------------|---------------------------------------------------|----------------|--------------------------|
|       | Index  | Tektronix                                       | Serial/Model No. |     |                   |                                                   | Mfr            |                          |
|       | No.    | Part No.                                        | Eff Dscont       | Qty | 12345             | Name & Description                                | Code           | Mfr Part Number          |
|       | 5-1    | 426-0681-00                                     | )                | 1   | FR, PUSH BUTTON   | COAV DIACTIC                                      |                | 101 0101 00              |
|       | -2     | 426-1072-00                                     |                  |     | FRAME, PUSH BTIN  | INGRAL PLASILU                                    | 80009          | 426-0681-00              |
|       | -3     | 426-0568-00                                     |                  | g   | FR, PUSHBUTTON:   | PANEL MOUNT                                       | 80009          |                          |
|       | 4      | 366-1023-01                                     |                  | í   |                   | ID X0.392 OD X 0.531 H                            | 80009          |                          |
|       |        | 213-0246-00                                     |                  | 1   | SETSCREW.5-4      | 0 X 0.093 ITL BK OXD, HEX SKT                     | 80009          | 366-1023-01              |
|       | -5     | 358-0599-00                                     |                  | 1   | BUSHING SLEEVE    | :0.125 ID X 0.234 THK, PLSTC                      | 71159          | OBD                      |
|       | -6     | 333-2320-00                                     |                  | 1   | PANEL, REAR:      | 10.129 ID A 0.294 Ink, PLSIC                      | 28520<br>80009 | B-187-125<br>333-2320-00 |
|       | -7     | 212 0055 00                                     | 、<br>、           | -   |                   | (ATTACHING PARTS)                                 |                |                          |
|       | -7     | 213-0055-00                                     | )                | 5   | SCR, TPG, THD FO  | R:2-32 X 0.188 INCH, PNH STL                      | 93907          | OBD                      |
|       | -8     | 348-0204-00                                     | )                | 1   | SHLD GSKT.ELEK    | :FINGER TYPE, 10.65 INCH LONG                     | 80009          | 348-0204-00              |
|       |        | 129-0103-00                                     | )                | 1   | POST, BDG, ELEC:  | ASSEMBLY                                          | 80009          | 129-0103-00              |
|       |        |                                                 |                  |     |                   | (ATTACHING PARTS)                                 |                |                          |
|       | -9     | 210-0583-00                                     |                  | 1   | NUT, PLAIN, HEX:  | 0.25-32 X 0.312 INCH.BRS                          | 73743          | 2X20317-402              |
|       | -10    | 210-0046-00                                     | )                | 1   | WASHER,LOCK:0.    | 261 ID, INTL, 0.018 THK, BRS                      | 78189          | 1214-05-00-0541C         |
|       |        | 117 70 MX - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - |                  | _   | GND POST ASSY     | *<br>INCLUDES:                                    |                |                          |
|       |        | 200-0103-00                                     |                  | 1   |                   | URL:0.25-28 X 0.375" OD, BRASS                    | 80009          | 200-0103-00              |
|       | -12    | 129-0077-00                                     | )                | 1   | . STUD, SHOULDE   | RED:0.938 INCH LONG, BRASS                        | 80009          | 129-0077-00              |
|       |        | 337-1542-00                                     |                  | 1   | SHLD GSKT, ELEC   | T:2.10 INCHES LONG                                | 80009          | 337-1542-00              |
|       |        | 337-1543-00                                     |                  | 3   | SHLD GSKT, ELEC   | T:2.50 INCHES LONG                                | 80009          | 337-1543-00              |
|       | -15    | 131-1315-01                                     | L                | 1   | CONN, RCPT, ELEC  | : BNC, FEMALE                                     | 24931          | 28JR 306-1               |
|       | -16    | 220-0495-00                                     | )                | 1   | NUT DIATN UFV     | (ATTACHING PARTS)<br>:0.375-32 X 0.438 INCH BRS   | 70740          |                          |
|       | -17    | 210-0012-00                                     |                  | 1   | WASUED LOCK.IN    | TL,0.375 ID X 0.50" OD STL                        | 73743          | OBD                      |
|       |        |                                                 |                  | I   | WASHER, LOCK : IN | *                                                 | 78189          | 1220-02-00-0541C         |
|       | -18    | 351-0469-01                                     |                  | 2   | GUIDE, SWITCH: 3  | BUTTON                                            | 80009          | 351-0469-01              |
|       | -19    | 426-0806-02                                     | 2                | 1   | FRAME PNL, CAB.   |                                                   | 80009          | 426-0806-02              |
|       | -20    | 213-0270-00                                     | )                | 4   |                   | (ATTACHING PARTS)<br>R:10-32 X 0.75 INCH FILH STL | 00005          |                          |
| and a |        |                                                 |                  | -   | box, ire, ind fo  | +                                                 | 83385          | OBD                      |
| - AG  | -21    | 366-1480-02                                     | 2                | 1   | PUSH BUTTON:GR    |                                                   | 80009          | 366-1480-02              |
|       | -22    | 386-3440-00                                     | )                | 2   |                   | L:3 BUTTON,7.5 MM SPACING                         | 80009          | 386-3440-00              |
|       | -23    | 200-0935-00                                     | )                |     |                   | R:0.29 OD X 0.19 CASE                             | 80009          | 200-0935-00              |
|       | -24    |                                                 |                  | 1   |                   | :MODE SWITCH(SEE A2 REPL)                         | 0000)          | 200 0939 00              |
|       | - 2 5  | 011 0000 00                                     |                  | -   |                   | (ATTACHING PARTS)                                 |                |                          |
|       | -25    | 211-0008-00                                     |                  | 5   | SCREW, MACHINE:   | 4-40 X 0.25 INCH,PNH STL                          | 83385          | OBD                      |
|       |        |                                                 |                  | -   | CKT BOARD ASSY    |                                                   |                |                          |
|       | -26    | 366-1559-00                                     | )                | 3   |                   | SIL GY,0.18 SQ X 0.43                             | 80009          | 366-1559-00              |
|       | -27    |                                                 |                  | 1   | . PUSH BUTTON:    | WHITE.LEFT                                        | 80009          | 366-1765-05              |
|       | -28    | 366-1765-01                                     |                  | 2   | . PUSH BUTTON:    | WHITE, ALT                                        | 80009          | 366-1765-01              |
|       | -29    | 366-1765-02                                     | 1                | 1   | . PUSH BUTTON:    | WHITE ADD                                         | 80009          | 366-1765-02              |
|       | -30    | 366-1765-03                                     |                  | 2   | . PUSH BUTTON:    | WHITE, CHOP                                       | 80009          | 366-1765-03              |
|       | -31    | 366-1765-04                                     |                  | 1   | . PUSH BUTTON:    | WHITE, RIGHT                                      | 80009          | 366-1765-04              |
|       | -32    | 378-0074-00                                     | )                | 6   | . REFLECTOR, LI   | GHT:PUSH BUTTON                                   | 80009          | 378-0074-00              |
|       | -33    | 366-1650-00                                     | •                |     | . PUSH BUTTON:    | CLEAR,0.184 X0.214 X 8.0 L                        | 80009          | 360-1650-00              |
|       | -34    |                                                 |                  | 1   | . PUSH BUTTON:    | WHITE, A                                          | 80009          | 366-1765-06              |
|       |        | 366-1765-07                                     |                  | 1   | . PUSH BUTTON:    |                                                   | 80009          | 366-1765-07              |
|       |        | 384-1136-00                                     |                  | 3   | . EXTENSION SHA   | AFT:0.95 INCH LONG                                | 80009          | 384-1136-00              |
|       | -37    |                                                 |                  | 6   | . EXTENSION SH    | AFT:1.585 INCH LONG,OFFSET,NYL                    | 80009          | 384-1354-00              |
|       |        |                                                 |                  | 2   | . ACTR ASSY, PB   | :(SEE S109,S110 REPL)                             |                |                          |
|       |        |                                                 |                  | 9   | . ACTR ASSY, PB   | :(SEE S1,S2 REPL)                                 |                |                          |
|       |        | 0/0.0/05.00                                     |                  | 1   | . ACTR ASSY, PB   | :(SEE S40 REPL)                                   |                |                          |
|       | -41    | 343-0495-09                                     |                  | 1   |                   | FRONT,7.5 MM,9 UNIT<br>(ATTACHING PARTS)          | 80009          | 343-0495-09              |
|       | -42    | 210-3033-00                                     |                  | 9   |                   | LIC:0.59 OD X 0.156 INCH LONG                     | 07707          | SE-25                    |
|       | -43    | 343-0495-07                                     |                  | 1   | CLID SWITCH-      | *<br>FRONT,7.5MM,7 UNIT                           | 80000          | 2/2 0/05 07              |
|       | -      |                                                 |                  |     |                   | (ATTACHING PARTS)                                 | 80009          | 343-0495-07              |
|       | -44    | 210-3033-00                                     |                  | 7   |                   | LIC:0.59 OD X 0.156 INCH LONG                     | 07707          | SE-25                    |
|       | -45    | 343-0496-03                                     |                  | 3   |                   | *                                                 |                |                          |
|       |        |                                                 |                  | 5   | · OLIE, SWITCH:   | FRONT,10 MM X 3 UNIT<br>(ATTACHING PARTS)         | 80009          | 343-0496-03              |
|       | -46    | 210-3033-00                                     |                  | 9   | . EYELET, METALI  | LIC:0.59 OD X 0.156 INCH LONG                     | 07707          | SE-25                    |
| 100 m |        |                                                 |                  |     |                   | *                                                 |                |                          |

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### **Replaceable Mechanical Parts—7854 Service**

### Fig. & Index Tektronix Serial/Model No

| Fig. &<br>Index<br>No. | Tektronix<br>Part No.           | Serial/Model No.<br>Eff Dscont | 0tv    | 1 2 3 4 5 Name & Description                                                            | Mfr<br>Code    | Mfr Part Number         |                             |
|------------------------|---------------------------------|--------------------------------|--------|-----------------------------------------------------------------------------------------|----------------|-------------------------|-----------------------------|
| 5-47                   |                                 |                                |        | . CLIP,SWITCH:REAR,10 MM X 3 UNIT                                                       | 80009          | 343-0497-03             |                             |
| -48                    | 210-3033-00                     | )                              | 9      | (ATTACHING PARTS)<br>. EYELET,METALLIC:0.59 OD X 0.156 INCH LONG                        | 07707          | SE-25                   |                             |
| -49                    | 384-1148-00                     | )                              | 1      | *                                                                                       | 80009          | 384-1148-00             |                             |
| -50                    |                                 |                                | 1      | . CPLG, SHAFT, RGD: 0.128 ID X 0.312 OD X 0.5"L                                         | 80009          | 376-0029-00             |                             |
| -51                    | 343-0499-05                     | 5 B010100 B030154              |        | . CLIP, SWITCH: REAR, 7.5MM X 5 UNIT                                                    | 80009          | 343-0499-05             |                             |
|                        | 343-0499-14                     | • B030155                      | 1      | . CLIP, SWITCH: 7.5MM X 5 UNIT<br>(ATTACHING PARTS)                                     | 80009          | 343-0499-14             |                             |
| -52                    | 210-3033-00                     | )                              | 5      | . EYELET, METALLIC:0.59 OD X 0.156 INCH LONG                                            | 07707          | SE-25                   |                             |
| -53                    | 131-0608-00                     | )                              | 69     | . TERMINAL, PIN: 0.365 L X 0.025 PH BRZ GOLD                                            | 22526          | 47357                   |                             |
|                        | 131-0589-00                     | )                              | 18     | . TERMINAL, PIN:0.46 L X 0.025 SQ                                                       | 80009          | 131-0589-00             |                             |
|                        | 136-0252-07                     |                                |        | . SOCKET, PIN CONN: W/O DIMPLE                                                          | 22526          | 75060-012               |                             |
| -55                    | 131-1003-00                     | )                              |        | . CONN, RCPT, ELEC: CKT BD MT, 3 PRONG                                                  | 80009          | 131-1003-00             |                             |
| -56                    | 343-0499-03                     | 3                              | 3      | . CLIP,SWITCH:7.5 MM,4 UNIT<br>(ATTACHING PARTS)                                        | 80009          | 343-0499-03             |                             |
| -57                    | 210-3033-00                     | )                              | 9      | . EYELET, METALLIC:0.59 OD X 0.156 INCH LONG                                            | 07707          | SE-25                   |                             |
| 58                     | 384-1876-00                     |                                | 1      | EXTENSION SHAFT:                                                                        | 80009          | 384-1876-00             |                             |
| -59                    | 348-0193-00                     | )                              | 1      | FLIP-STAND, CAB.:                                                                       | 80009          | 348-0193-00             |                             |
| -60                    | 407-2109-01                     | 1                              | 2      | BRACKET, HINGE:                                                                         | 80009          | 407-2109-01             |                             |
| -61                    | 210-0457-00                     | ) .                            | 2      | (ATTACHING PARTS)<br>NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL                              | 83385          |                         |                             |
| -62                    | 200-1731-00                     | )                              | 1      | *<br>COVER,ELEC SW:1.9 X 1.0 INCH                                                       | 80009          | 200-1731-00             |                             |
| -63                    | 210-0405-00                     | )                              | 1      | (ATTACHING PARTS)<br>NUT,PLAIN,HEX.:2-56 X 0.188 INCH,BRS                               | 727/2          | 12157-50                |                             |
| -64                    |                                 |                                | ĩ      | SCREW, MACHINE: 2-56 X 0.50 INCH, PNH                                                   | 83385          |                         |                             |
| -65                    | 210-0850-00                     |                                | ĩ      | WASHER, FLAT: 0.093 ID X 0.281 INCH OD                                                  | 12327          |                         | ىرىيە <b>رىيە</b><br>مۇرىيە |
| -66                    | ann ann an an an an ann an agus | <b>*</b>                       | 1      | SWITCH, PUSH: (SEE S10 REPL)<br>(ATTACHING PARTS)                                       |                |                         |                             |
| -67                    | 211-0008-00                     | 0                              | 2      | SCREW, MACHINE: 4-40 X 0.25 INCH, PNH STL                                               | 83385          | OBD                     |                             |
| -68                    | 407-1873-00                     | )                              | 1      | BRACKET, ANGLE: POWER SWITCH, ALUMINUM<br>(ATTACHING PARTS)                             | 80009          | 407-1873-00             |                             |
| -69                    | 210-0457-00                     | )                              | 2      | NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL                                                   | 83385          | OBD                     |                             |
| -70                    | 210-0202-00                     |                                | 1      | TERMINAL,LUG:0.146 ID,LOCKING,BRZ TINNED<br>(ATTACHING PARTS)                           | 78189          | 2104-06-00-2520N        |                             |
| -71                    | 210-0457-00                     | )                              | 1      | NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL                                                   | 83385          | OBD                     |                             |
|                        | 210-0457-00<br>131-0800-00      |                                | 1<br>2 | NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL<br>CONTACT,ELEC:PLUG-IN GROUND                    | 83385<br>80009 | OBD<br>131-0800-00      |                             |
| -,                     | 010 0100 -                      |                                | _      | (ATTACHING PARTS)                                                                       |                |                         |                             |
|                        | 213-0138-00                     |                                |        | SCR, TPG, TF: 4-24 X 0.188 INCH, PNH STL                                                | 83385          |                         |                             |
|                        | 211-0008-00                     |                                | 1      | SCREW, MACHINE: 4-40 X 0.25 INCH, PNH STL                                               | 83385          | OBD                     |                             |
| -76<br>-77             | 210-0586-00<br>210-0202-00      |                                | 1<br>1 | NUT, PL, ASSEM WA:4-40 X 0.25, STL CD PL<br>TERMINAL, LUG:0.146 ID, LOCKING, BRZ TINNED | 83385<br>78189 | OBD<br>2104-06-00-2520N |                             |
| -78                    | 343-0007-00                     | )                              | 1      | CLAMP,LOOP:                                                                             | 95987          | 5-8-6B                  |                             |
| -79                    | 210-0457-00                     | )                              | 1      | (ATTACHING PARTS)<br>NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL                              | 83364          | OBD                     |                             |
| -80                    | 211-0578-00                     |                                | 1      | SCREW, MACHINE: 6-32 X 0.438 INCH, PNH STL                                              | 83385          |                         |                             |
| -81                    | 210-0853-00                     |                                | 1      | WASHER, FLAT: 0.25 ID X 0.438 INCH, PNH STL                                             | 83385<br>86044 | OBD<br>OBD              |                             |
| -82                    | 337-2603-00                     | )                              | 3      | SHIELD, ELEC: CIRCUIT BOARD<br>(ATTACHING PARTS)                                        | 80009          | 337-2603-00             |                             |
| -83                    | 211-0008-00                     | )                              | 9      | SCREW, MACHINE: 4-40 X 0.25 INCH, PNH STL                                               | 83385          | OBD                     |                             |
| -84                    | 131-0799-00                     | )                              | 3      | CONTACT,ELEC:PLUG-IN GROUND<br>(ATTACHING PARTS)                                        | 80009          | 131-0799-00             |                             |
| -85                    | 210-0586-00                     | )                              | 3      | NUT, PL, ASSEM WA:4-40 X 0.25, STL CD PL                                                | 83385          | OBD                     |                             |
| -86                    | 211-0008-00                     |                                | 3      | SCREW, MACHINE: 4-40 X 0.25 INCH, PNH STL                                               | 83385          | 000                     |                             |

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|    | Fig. &<br>Index<br>No. | Tektronix<br>Part No.                | Serial/Model No.<br>Eff Dscont                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Qty    | 12345                              | Name & Description                                                               | Mfr<br>Code    | Mfr Part Number              |
|----|------------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------------------|----------------------------------------------------------------------------------|----------------|------------------------------|
|    | 5-87                   | 131-0930-00                          | )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3      | CONTACT, ELEC:                     | PLUG-IN GROUND                                                                   | 80009          | 131-0930-00                  |
|    | -88<br>-89             | 210-0586-00<br>211-0008-00           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3<br>3 | NUT, PL, ASSEM<br>SCREW, MACHINE   | (ATTACHING PARTS)<br>WA:4-40 X 0.25,STL CD PL<br>:4-40 X 0.25 INCH,PNH STL       | 83385<br>83385 | OBD<br>OBD                   |
|    | -90                    | 351-0181-06                          | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4      | GUIDE,SLIDE:P                      | *<br>LUG-IN UNIT,LWR,BLK NYLON<br>(ATTACHING PARTS)                              | 80009          | 351-0181-06                  |
|    | -91                    | 213-0054-00                          | )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4      | SCR, TPG, THD F                    | OR:6-32 X 0.312 INCH, PNH STL                                                    | 93907          | OBD                          |
|    | -92                    | 441-1286-01                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1      | CHAS, PL-IN HS                     | (ATTACHING PARTS)                                                                | 80009          | 441-1286-01                  |
|    | -93<br>-94             | 210-0457-00<br>211-0507-00           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4<br>4 | NUT, PL, ASSEM                     | WA:6-32 X 0.312 INCH,STL<br>:6-32 X 0.312 INCH,PNH STL                           | 83385<br>83385 | OBD<br>OBD                   |
|    | -95                    | 426-1470-00                          | )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2      | FRAME SECT, CA                     | *<br>B.:COUPLING<br>(ATTACHING PARTS)                                            | 80009          | 426-1470-00                  |
|    | -96                    | 211-0507-00                          | )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4      | SCREW, MACHINE                     |                                                                                  | 83385          | OBD                          |
|    | -97                    | 407-2093-00                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2      |                                    | HINGE, ALUMINUM<br>(ATTACHING PARTS)                                             | 80009          | 407-2093-00                  |
|    | -98<br>-99             | 211-0559-00                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2      |                                    | :6-32 X 0.375"100 DEG,FLH STL                                                    | 83385          | OBD                          |
|    |                        | 426-1513-00<br>210-0457-00           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2      | ,                                  | (ATTACHING PARTS)                                                                | 80009          | 426-1513-00                  |
|    |                        | 211-0507-00                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2<br>2 | SCREW, MACHINE                     | WA:6-32 X 0.312 INCH,STL<br>:6-32 X 0.312 INCH,PNH STL                           | 83385<br>83385 | OBD<br>OBD                   |
|    | -102                   | we are an and one will be are one an |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1      | CKT BOARD ASS                      | Y:TRIGGER AMPLIFIER(SEE A13 REPL)                                                |                |                              |
|    | -103                   | 131-0608-00                          | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        | . TERMINAL PIL                     | N:0.365 L X 0.025 PH BRZ GOLD                                                    | 22526          | 17957                        |
|    |                        | 136-0252-07                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 77     | SOCKET PIN (                       | CONN:W/O DIMPLE                                                                  | 22526          |                              |
| ·  |                        | 131-1003-00                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                    |                                                                                  | 22526          |                              |
|    |                        |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 5      | . CONN, RCPT, E                    | LEC:CKT BD MT,3 PRONG                                                            | 80009          | 131-1003-00                  |
|    |                        | 136-0269-02                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2      | . SKT, PL-IN EI                    | LEK:MICROCIRCUIT, 14 DIP, LOW CLE                                                | 73803          | CS9002-14                    |
|    |                        | 136-0263-04                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 16     | . SOCKET, PIN                      | TERM:FOR 0.025 INCH SQUARE PIN                                                   | 22526          | 75377-001                    |
|    |                        |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1      | CKT BOARD ASSY                     | Y:LOGIC(SEE A14 REPL)                                                            |                |                              |
|    |                        | 214-0579-00                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 12     | . TERM, TEST PO                    | DINT: BRS CD PL                                                                  | 80009          | 214-0579-00                  |
|    | -110                   | 136-0241-00                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4      | . SOCKET.PLUG-                     | -IN:10 CONTACT, ROUND                                                            | 71785          | 133-99-12-064                |
|    | -111                   | 131-1003-00                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4      | CONN ROPT FI                       | LEC:CKT BD MT, 3 PRONG                                                           |                |                              |
|    |                        | 136-0252-07                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 52     | COCVET DIN (                       | JONN-H/O DINNE                                                                   | 80009          | 131-1003-00                  |
|    |                        | 136-0260-02                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 52     | . SUCKET, PIN (                    | CONN:W/O DIMPLE                                                                  | 22526          | 75060-012                    |
|    |                        |                                      | State at the state of the state | 4      | . SKT,PL-IN EI                     | LEK:MICROCIRCUIT,16 DIP,LOW CLE                                                  | 71785          | 133-51-92-008                |
|    |                        | 136-0263-04                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 46     | . SOCKET, PIN 1                    | TERM: FOR 0.025 INCH SQUARE PIN                                                  | 22526          | 75377-001                    |
|    |                        |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                    | (HORIZ INTCON(SEE A10 REPL)<br>(ATTACHING PARTS)                                 |                |                              |
|    | -110                   | 211-0008-00                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                    | 4-40 X 0.25 INCH, PNH STL                                                        | 83385          | OBD                          |
|    | -117                   |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        | CKT BOARD ASSY                     |                                                                                  |                |                              |
|    |                        | 136-0263-04                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 8      | . SOCKET, PIN 1                    | TERM: FOR 0.025 INCH SQUARE PIN                                                  | 22526          | 75377-001                    |
|    |                        | 136-0252-07                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4      | . SOCKET, PIN C                    | CONN:W/O DIMPLE                                                                  | 22526          | 75060-012                    |
|    |                        | 131-1003-00                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4<br>1 | . CONN, RCPT, E1<br>CKT BOARD ASSY | EC:CKT BD MT,3 PRONG<br>HORIZ CH SW(SEE A9 REPL)                                 | 80009          | 131-1003-00                  |
|    | -121                   | 211-0008-00                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2      | SCREW, MACHINE:                    | (ATTACHING PARTS)<br>4-40 X 0.25 INCH, PNH STL<br>*                              | 83385          | OBD                          |
|    |                        |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | _      | CKT BOADD ACCV                     |                                                                                  |                |                              |
|    | -122                   | 131-1003-00                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 6      | CKT BOARD ASSY                     |                                                                                  | 00000          | 101 1000 55                  |
|    |                        | 136-0252-07                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                    | LEC:CKT BD MT, 3 PRONG                                                           | 80009          | 131-1003-00                  |
|    |                        | 131-0589-00                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 6      |                                    | CONN:W/O DIMPLE                                                                  | 22526          | 75060-012                    |
|    | -125                   | 136-0263-04                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2      | . TERMINAL, PIN                    | 1:0.46 L X 0.025 SQ                                                              | 80009          | 131-0589-00                  |
|    |                        | 136-0260-02                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 7      | . SUCKET, PIN T                    | ERM: FOR 0.025 INCH SQUARE PIN                                                   | 22526          | 75377-001                    |
|    | -127                   | 200-0945-01                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1<br>2 | . COVER, HALF X                    | EK:MICROCIRCUIT,16 DIP,LOW CLE<br>STR:DUAL TO-18,W/2-56 THD<br>(ATTACHING PAPTS) | 71785<br>80009 | 133-51-92-008<br>200-0945-01 |
|    | -128                   | 211-0001-00                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2      | . SCREW, MACHIN                    | (ATTACHING PARTS)<br>E:2-56 X 0.25 INCH, PNH STL                                 | 87308          | OBD                          |
|    |                        | 200-0945-00                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2<br>1 | . COVER, HALF X<br>CKT BOARD ASSY  | STR:DUAL TO-18,ALUMINUM<br>':MAIN INTERFACE(SEE All REPL)                        | 80009          | 200-0945-00                  |
| ۰, | -131                   | 213-0119-00                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                    | (ATTACHING PARTS)<br>R:4-24 X 0.375 INCH, PNH STL                                |                |                              |

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## Replaceable Mechanical Parts-7854 Service

Fig. &

| Fig. &<br>Index<br>No. | Tektronix<br>Part No.      | Serial/Model No.<br>Eff Dscont          | Qty        | 1 2 3 4 5 Name & Description                                                            | Mfr<br>Code    | Mfr Part Number            |
|------------------------|----------------------------|-----------------------------------------|------------|-----------------------------------------------------------------------------------------|----------------|----------------------------|
| 5                      |                            | an an ann an | -          |                                                                                         |                |                            |
| 5                      | 131-0767-12                |                                         | 2          | CKT BOARD ASSY INCLUDES:<br>. CONNECTOR,RCPT,:CKT BD,32/76 CONTACT<br>(ATTACHING PARTS) | 80009          | 131-0767-12                |
| -132                   | 213-0232-00                | )                                       | 4          | . SCR, TPG, THD FOR: 2-32 X 0.312 INCH, PNH STL                                         | 83385          | OBD                        |
|                        |                            |                                         | ~          | . CKT BOARD ASSY INCLUDES:                                                              |                |                            |
|                        | 204-0365-02                |                                         | 4          | BODY, CONNECTOR: PLUG-IN CIRCUIT CARD                                                   | 80009          |                            |
|                        | 131-2158-01                | •                                       | 128        | CONTACT,ELEC:CKT BD CONNECTOR<br>(STRAIGHT OR OFFSET)                                   | 80009          | 131-2158-01                |
|                        | 200-0950-00                |                                         | 4          | COVER, ELEC CONN: PLASTIC                                                               | 80009          | 200-0950-00                |
|                        | 136-0619-00                |                                         | 1<br>2     | . CKT BOARD ASSY:DSPL FOLLOWER(SEE A34,A35 REPL                                         |                | 1 221(77 0                 |
|                        | 214-2675-00                |                                         | 2          | . SOCKET,PIN TERM:U/W 0.026-0.029 DIA PINS<br>. SPRING,CKT BD:                          | 00779<br>80009 | 1-331677-0                 |
|                        | 129-0363-00                |                                         | 4          | . POST,ELEC-MECH:HEX.,0.25 X 0.436 INCH LONG<br>(ATTACHING PARTS)                       | 80009          | 214-2675-00<br>129-0363-00 |
| -140                   | 211-0008-00                | )                                       | 4          | SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL                                                  | 83385          | OBD                        |
|                        | 131-0767-07                | 7                                       | 1          | . CONNECTOR,RCPT,:PLUG-IN CKT BD,70 CONTACT<br>(ATTACHING PARTS)                        | 80009          | 131-0767-07                |
| -141                   | 213-0232-00                | )                                       | 4          | . SCR, TPG, THD FOR: 2-32 X 0.312 INCH, PNH STL                                         | 83385          | OBD                        |
|                        |                            |                                         | -          | . CONNECTOR ASSY INCLUDES:                                                              |                |                            |
|                        | 204-0365-02                |                                         | 1          | BODY, CONNECTOR: PLUG-IN CIRCUIT CARD                                                   | 80009          |                            |
|                        | 200-0950-00                |                                         | 2          | COVER, ELEC CONN: PLASTIC                                                               | 80009          | 200-0950-00                |
|                        | 131-2158-01                | •                                       | 64<br>-    | CONTACT,ELEC:CKT BD CONNECTOR<br>(STRAIGHT OR OFFSET)                                   | 80009          | 131-2158-01                |
|                        | 131-0804-00                |                                         | 3          | . LINK, TERM. CONNE: J-SHAPE                                                            | 80009          | 131-0804-00                |
|                        | 131-0592-00                |                                         | 15         | . CONTACT, ELEC: 0.885 INCH LONG                                                        | 22526          | 47353                      |
| -14/                   | 131-0608-00<br>131-0608-00 |                                         | 131<br>113 | TERMINAL, PIN:0.365 L X 0.025 PH BRZ GOLD                                               | 22526          |                            |
|                        | 131-0589-00                |                                         | 18         | . TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD<br>. TERMINAL,PIN:0.46 L X 0.025 SQ          | 22526          | 47357<br>131-0589-00       |
| -148                   | 386-1558-00                |                                         | 7          | . SPACER,CKT BD:0.335 H,ACETAL                                                          | 80009          | 386-1558-00                |
|                        | 214-1568-00                |                                         | 4          | . PIN, GUIDE:0.119 DIA X 1.035 W/0.25 HEXCLR<br>(ATTACHING PARTS)                       | 80009          |                            |
|                        | 210-0406-00<br>210-0054-00 |                                         | 4<br>4     | . NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS<br>. WASHER,LOCK:SPLIT,0.118 ID X 0.212"OD STL   | 73743<br>83385 | 12161-50<br>OBD            |
|                        |                            | _                                       |            | *                                                                                       |                |                            |
|                        | 131-1003-00                |                                         | 10         | . CONN, RCPT, ELEC: CKT BD MT, 3 PRONG                                                  | 80009          | 131-1003-00                |
|                        | 136-0252-04<br>344-0147-0( |                                         | 10<br>4    | . SOCKET, PIN TERM: U/W 0.016-0.018 DIA PINS                                            | 22526          | 75060-007                  |
|                        | 131-0591-00                |                                         | 62         | . CLIP,SPR,TNSN:CIRCUIT CARD MOUNTING<br>. CONTACT,ELEC:0.835 INCH LONG                 | 80009<br>22526 | 344-0147-00<br>47352       |
|                        | 426-1487-00                |                                         |            | FRAME, PL-IN HSG: REAR                                                                  | 80009          |                            |
| -157                   | 179-2700-00                | 0                                       | 1          | WIRING HARNESS: MODE SWITCH                                                             | 80009          | 179-2700-00                |
| -158                   | 343-0549-00                | )                                       | 25         | . STRAP, TIEDOWN: 0.091 W X 3.62 INCH LONG                                              | 59730          | TY100                      |
|                        | 214-2629-00                |                                         | 2          | . PIN, ACTUATOR:                                                                        | 80009          | 214-2629-00                |
|                        | 131-0707-00                |                                         | 174        | . CONNECTOR, TERM: 22-26 AWG, BRS& CU BE GOLD                                           |                | 47439                      |
| -101                   | 352-0162-00<br>352-0162-00 |                                         | 2          | . HLDR, TERM CONN:4 WIRE BLACK                                                          | 80009          | 352-0162-00                |
|                        | 352-0162-04                |                                         | 2<br>4     | . CONN BODY,PL,EL:4 WIRE ORANGE<br>. CONN BODY,PL,EL:4 WIRE YELLOW                      | 80009<br>80009 | 352-0162-03                |
| -162                   | 352-0163-09                |                                         | 2          | . CONN BODY, PL, EL:5 WIRE WHITE                                                        | 80009          | 352-0162-04<br>352-0163-09 |
|                        | 352-0164-04                |                                         | 2          | . CONN BODY, PL, EL:6 WIRE YELLOW                                                       | 80009          | 352-0164-04                |
| -164                   | 352-0165-0                 | 5                                       | 2          | . CONN BODY, PL, EL:7 WIRE GREEN                                                        | 80009          | 352-0165-05                |
|                        | 352-0165-0                 |                                         | 2          | . CONN BODY, PL, EL: 7 WIRE VIOLET                                                      | 80009          | 352-0165-07                |
|                        | 352-0166-08                |                                         | 2          | . CONN BODY, PL, EL:8 WIRE GRAY                                                         | 80009          | 352-0166-08                |
| -106                   | 352-0167-02                |                                         | 2          | . CONN BODY, PL, EL:9 WIRE RED                                                          | 80009          | 352-0167-02                |
|                        | 352-0167-03<br>352-0167-09 |                                         | 2<br>2     | . CONN BODY,PL,EL:9 WIRE ORANGE<br>. CONN BODY,PL,EL:9 WIRE WHITE                       | 80009<br>80009 | 352-0167-03<br>352-0167-09 |
| -167                   | 352-0168-03                |                                         | 2          | . CONN BODY, PL, EL:9 WIRE WHITE<br>. CONN BODY, PL, EL:10 WIRE ORANGE                  | 80009          | 352-0168-03                |
|                        | 175-0827-00                |                                         | FT         | . CABLE, SP, ELEC: 4, 26 AWG, STRD, PVC JKT, RBN                                        | 08261          | SS04267(1061)0C            |
| -169                   | 175-0829-00                | )                                       | FT         | . WIRE, ELECTRICAL:6 WIRE RIBBON                                                        | 08261          | SS-0626-710610C            |
|                        | 175-0830-00                |                                         | FT         | . WIRE, ELECTRICAL: 7 WIRE RIBBON                                                       | 08261          | SS-0726-710610C            |
|                        | 175-0857-00                |                                         | FT         | . WIRE, ELECTRICAL:8 WIRE RIBBON                                                        | 08261          | SS-0822-7(1061)            |
|                        | 175-0832-00                |                                         | FT         | . WIRE, ELECTRICAL: 9 WIRE RIBBON                                                       | 08261          | SS-0926(1061)0C            |
| -173                   | 175-0833-00<br>198-4185-0  |                                         | FT<br>1    | . WIRE,ELECTRICAL:10 WIRE RIBBON<br>WIRE SET,ELEC:                                      | 08261<br>80009 | SS-1026-7<br>198-4185-01   |

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| Index<br>No. | Tektronix Seria<br>Part No. Eff                             | /Model No.<br>Dscont | Qty      | 1 | 2345            | Name & Description                                 | Mfr<br>Code    | Mfr Part Nun               |
|--------------|-------------------------------------------------------------|----------------------|----------|---|-----------------|----------------------------------------------------|----------------|----------------------------|
| 5-           | 175-3061-00                                                 |                      | 1        |   | CA ASSY.SP.E    | LEC:5,26 AWG,5.0 L,RIBBON                          | 80009          | 175-2061 00                |
|              | 131-0707-00                                                 |                      | 10       |   |                 | TERM: 22-26 AWG, BRS& CU BE GOLD                   | 22526          | 175-3061-00<br>47439       |
|              | 175-0828-00                                                 |                      | FT       |   | . WIRE ELECT    | RICAL:5 WIRE RIBBON                                | 08261          | SS-0526-7106               |
|              | 352-0163-05                                                 |                      | 2        |   |                 | PL,EL:5 WIRE GREEN                                 |                |                            |
|              | 175-3491-00                                                 |                      | 1        | • | CABLE ASSY R    | F:50 OHM COAX,11.0 L,9-2                           | 80009<br>80009 | 352-0163-05                |
|              | 175-3901-00                                                 |                      | î        | : | CA ASSY SP E    | LEC:2,26 AWG,3.0L,RIBBON                           | 80009          | 175-3491-00<br>175-3901-00 |
|              | 131-0707-00                                                 |                      | 2        |   |                 | TERM:22-26 AWG, BRS& CU BE GOLD                    |                |                            |
|              | 175-0825-00                                                 |                      | FŤ       | · | WIRE FIELD      | RICAL:2 WIRE RIBBON                                | 22526          | 47439                      |
|              | 352-0169-04                                                 |                      | 1        | • | CONN BODY       | PL,EL:2 WIRE YELLOW                                | 80009          | 175-0825-00                |
|              | 175-3948-00                                                 |                      | 1        | • | CA ACCY CD      | REF. F. O. AUG. ( OF DINDON                        | 80009          | 352-0169-04                |
|              | 131-0707-00                                                 |                      | 8        |   | CONNECTOR       | ELEC:5,26 AWG,6.0L,RIBBON                          | 80009          | 175-3948-00                |
|              | 175-0827-00                                                 |                      | FT       | • | . CONNECTOR,    | TERM: 22-26 AWG, BRS& CU BE GOLD                   | 22526          | 47439                      |
|              | 214-2629-00                                                 |                      |          |   |                 | LEC:4,26 AWG,STRD,PVC JKT,RBN                      | 08261          | SS04267(1061               |
|              | 352-0163-05                                                 |                      | 2        |   | . PIN, ACTUAT   |                                                    | 80009          | 214-2629-00                |
|              |                                                             |                      | 2        |   |                 | PL,EL:5 WIRE GREEN                                 | 80009          | 352-0163-05                |
|              | 175-3979-00                                                 |                      | 1        |   |                 | LEC:8,26 AWG,5.0L,RIBBON                           | 80009          | 175-3979-00                |
|              | 131-0707-00                                                 |                      | 16       | ٠ | . CONNECTOR,    | TERM:22-26 AWG, BRS& CU BE GOLD                    | 22526          | 47439                      |
|              | 175-0831-00                                                 |                      | FT       |   |                 | RICAL:8 WIRE RIBBON                                | 08261          | SS-0826-7106               |
|              | 352-0166-06                                                 |                      | 2        | • | . CONN BODY,    | PL,EL:8 WIRE BLUE                                  | 80009          | 352-0166-06                |
|              | 175-3981-00                                                 |                      | 1        | • | CA ASSY, SP, E  | LEC:10,26 AWG,4.5L,RIBBON                          | 80009          | 175-3981-00                |
|              | 131-0707-00                                                 |                      | 20       |   | . CONNECTOR,    | TERM: 22-26 AWG, BRS& CU BE GOLD                   | 22526          | 47439                      |
|              | 175-0833-00                                                 |                      | FT       |   | . WIRE, ELECT   | RICAL:10 WIRE RIBBON                               | 08261          | SS-1026-7                  |
|              | 352-0168-00                                                 |                      | 2        |   |                 | PL,EL:10 WIRE BLACK                                | 80009          | 352-0168-00                |
|              | 175-3982-00                                                 |                      | 1        |   |                 | LEC:10,26 AWG,4.5L,RIBBON                          |                |                            |
|              | 131-0707-00                                                 |                      | 20       |   | CONNECTOR       | TERM:22-26 AWG, BRS& CU BE GOLD                    | 80009<br>22526 | 175-3982-00<br>47439       |
|              | 175-0833-00                                                 |                      | FT       |   |                 |                                                    |                |                            |
|              | 352-0168-07                                                 |                      | 2        |   | . CONN BODY.    | RICAL:10 WIRE RIBBON                               | 08261          | SS-1026-7                  |
|              | 175-3983-00                                                 |                      | 1        |   | CA ASSA SD F    | PL,EL:10 WIRE VIOLET                               | 80009          | 352-0168-07                |
|              | 131-0707-00                                                 |                      |          | • | CA ASSI, Sr, E  | LEC:10,26 AWG,7.0L,RIBBON                          | 80009          | 175-3983-00                |
|              | 175-0833-00                                                 |                      | 20       |   |                 | TERM:22-26 AWG, BRS& CU BE GOLD                    | 22526          | 47439                      |
|              | 352-0168-06                                                 |                      | FT       | • | WIRE, ELECT     | RICAL:10 WIRE RIBBON                               | 08261          | SS-1026-7                  |
|              |                                                             |                      | 2        |   |                 | PL,EL:10 WIRE BLUE                                 | 80009          | 352-0168-06                |
|              | 175-3985-00                                                 |                      | 1        | • | CABLE ASSY,R    | F:93 OHM COAX,50.0L,9-N                            | 80009          | 175-3985-00                |
|              | 131-0622-00                                                 |                      | 2        | • | . CONTACT,EL    | EC:0.577"L,28-32 AWG WIRE                          | 22526          | 46241                      |
|              | 131-0792-00                                                 |                      | 2        | • | . CONNECTOR,    | TERM:18-20 AWG,CU BE GOLD PL                       | 22526          | 46221                      |
|              | 352-0198-04                                                 |                      | 2        | • | . HLDR,TERM     | CONN:2 WIRE YELLOW                                 | 80009          | 352-0198-04                |
|              | 175-3986-00                                                 |                      | 1        |   | CABLE ASSY,R    | F:50 OHM COAX,4.0 L,9-1                            | 80009          | 175-3986-00                |
|              | 175-3987-00                                                 |                      | 1        |   | CABLE ASSY,R    | F:50 OHM COAX,9.0 L,9-1                            | 80009          | 175-3987-00                |
|              | 175-3988-00                                                 |                      | 1        |   | CABLE ASSY,R    | F:50 OHM COAX,9.0 L,9-2                            | 80009          | 175-3988-00                |
|              | 175-3989-00                                                 |                      | 1        |   | CABLE ASSY R    | F:50 OHM COAX,9.0 L,9-3                            | 80009          | 175-3989-00                |
|              | 175-3990-00                                                 |                      | 1        |   | CABLE ASSY.R    | F:50 OHM COAX,6.0 L,9-4                            | 80009          | 175-3990-00                |
|              | 175-3991-00                                                 |                      | 1        |   |                 | F:50 OHM COAX,9.0 L,9-4                            | 80009          | 175-3991-00                |
|              | 175-3992-00                                                 |                      | 1        |   | CABLE ASSY R    | F:50 OHM COAX,6.0 L,9-5                            | 80009          | 175-3992-00                |
|              | 175-3993-00                                                 |                      | ī        |   | CABLE ASSY R    | F:50 OHM COAX,20.0 L,9-5                           | 80009          |                            |
|              | 175-3994-00                                                 |                      | 1        | • | CARLE ACCV D    | F:50 OHM COAX,6.0 L,9-6                            |                | 175~3993-00                |
|              | 175-3995-00                                                 |                      | 1        |   |                 |                                                    | 80009          | 175-3994-00                |
|              | 175-3996-00                                                 |                      | 1        | • | CADLE ASSI,K    | F:50 OHM COAX,20.0 L,9~6                           | 80009          | 175-3995-00                |
|              |                                                             |                      |          | • | CADLE ASSI,R    | F:50 OHM COAX,6.0 L,9-7                            | 80009          | 175-3996-00                |
|              | 175-3997-00<br>175-3998-00                                  |                      | 1        | • | CADLE ASSY,R    | F:50 OHM COAX,6.0 L,9-8                            | 80009          | 175-3997-00                |
|              |                                                             |                      | 1        | • | CABLE ASSY,R    | F:50 OHM COAX,13.0 L,9-8                           | 80009          | 175-3998-00                |
|              | 175-3999-00                                                 |                      | 1        |   | CA ASSY, SP, E  | LEC:2,26 AWG,3.0 L,RIBBON                          | 80009          | 175-3999-00                |
|              | 131-0707-00                                                 |                      | 2        |   | . CONNECTOR,    | TERM:22-26 AWG, BRS& CU BE GOLD                    | 22526          | 47439                      |
|              | 175-0825-00                                                 |                      | FT       | • | . WIRE, ELECT   | RICAL:2 WIRE RIBBON                                | 80009          | 175-0825-00                |
|              | 352-0169-05                                                 |                      | 1        |   |                 | PL,EL:2 WIRE GREEN                                 | 80009          | 352-0169-05                |
|              | 175-4337-00                                                 |                      | 1        | • | CA ASSY, SP, E  | LEC:8,26 AWG,13.0 L                                | 80009          | 175-4337-00                |
|              | 131-1810-00                                                 |                      | 16       | • | . CONTACT, EL   | EC:FEMALE,FOR 0.025 SQ PIN                         | 00779          | 87124-1                    |
|              | 175-0831-00                                                 |                      | FT       |   |                 | RICAL:8 WIRE RIBBON                                | 08261          | SS-0826-7106               |
|              | 204-0738-00                                                 |                      | 2        |   |                 | PLUG:8 CONTACTS, SGL ROW, LKG CLI                  |                | 1-87175-7                  |
|              | 175-4338-00                                                 |                      | 1        |   |                 | LEC:10,22 AWG,11.0 L                               | 80009          | 175-4338-00                |
|              | 131-1810-00                                                 |                      | 20       |   |                 | EC:FEMALE,FOR 0.025 SQ PIN                         | 00779          | 87124-1                    |
|              | 175-3997-00                                                 |                      | 1        |   | CABLE ASSY . R  | F:50 OHM COAX,6.0 L,9-8                            | 80009          | 175-3997-00                |
|              | 175-3998-00                                                 |                      | 1        |   | CABLE ASSY PI   | F:50 OHM COAX,6.0 L,9-8                            | 80009          |                            |
|              | 175-3999-00                                                 |                      | î        |   | CA ASSY SP E    | LEC:2,26 AWG,3.0 L,RIBBON                          | 80009          | 175-3998-00                |
|              | 131-0707-00                                                 |                      | 2        | • | CONNECTOR       | FERM-22_26 AUC BROK ON DE CONS.                    |                | 175-3999-00                |
|              | 175-0825-00                                                 |                      |          | • | UTDE ELECTOR,   | TERM: 22-26 AWG, BRS& CU BE GOLD                   | 22526          | 47439                      |
|              | 352-0169-05                                                 |                      |          |   |                 | RICAL:2 WIRE RIBBON                                | 80009          | 175-0825-00                |
|              |                                                             | 222                  | 1        |   |                 | PL,EL:2 WIRE GREEN                                 | 80009          | 352-0169-05                |
|              | 175-4337-00 XB031                                           |                      | 1        | • | CA ASSY, SP, EI | LEC:8,26 AWG,13.0 L                                | 80009          | 175-4337-00                |
|              | 131-1810-00 XB031                                           |                      | 16       | • | . CONTACT, ELI  | C:FEMALE,FOR 0.025 SQ PIN                          | 00779          | 87124-1                    |
|              | 175-0831-00 XB031                                           |                      | FT       | · | . WIRE, ELECTH  | RICAL:8 WIRE RIBBON                                | 08261          | SS-0826-7106               |
|              | 204-0738-00 XB031                                           |                      | 2        | • | . CONN BODY, 1  | PLUG:8 CONTACTS, SGL ROW, LKG CLI                  | P 00779        | 1-87175-7                  |
|              | 175-4338-00 XB031                                           | 273                  | 1        |   | CA ASSY, SP, EI | LEC:10,22 AWG,11.0 L                               | 80009          | 175-4338-00                |
|              |                                                             | 070                  |          |   | CONTRACTOR      |                                                    |                |                            |
|              | 131-1810-00 XB031                                           |                      | 20       | ٠ | . CUNIACI,ELI   | EC:FEMALE,FOR 0.025 SQ PIN                         | 00779          | 87124-1                    |
|              | 131-1810-00 XB031<br>175-0855-00 XB031<br>204-0760-00 XB031 | 273                  | 20<br>FT |   |                 | CC:FEMALE,FOR 0.025 SQ PIN<br>RICAL:10 WIRE RIBBON | 00779<br>08261 | 87124-1<br>SS-1022(1061)   |

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Fig. & Index Tektronix Serial/Model No

|   | Fig. &<br>Index<br>No. | Tektronix<br>Part No.      | Serial/Model No.<br>Eff Dscont | Qty           | 1 2 3 4 5 Name & Description                                                                | Mfr<br>Code    | Mfr Part Number       |
|---|------------------------|----------------------------|--------------------------------|---------------|---------------------------------------------------------------------------------------------|----------------|-----------------------|
|   | 6-                     | 620-0283-00                | )                              | 1             | POWER SUPPLY:LOW VOLTAGE<br>(ATTACHING PARTS)                                               | 80009          | 620-0283-00           |
|   | -1                     | 211-0578-00                |                                | 4             | SCREW, MACHINE: 6-32 X 0.438 INCH, PNH STL                                                  | 83385          | OBD                   |
|   | -2                     | 200-1262-00                | )                              | 1             | POWER SUPPLY INCLUDES:<br>. COVER,POWER SUP:LEFT SIDE<br>(ATTACHING PARTS)                  | 80009          | 200-1262-00           |
|   | -3                     | 211-0503-00                |                                | 7             | . SCREW, MACHINE: 6-32 X 0.188 INCH. PNH STL                                                | 83385          | OBD                   |
|   | -4                     | 211-0504-00                |                                | 2             | . SCREW, MACHINE: 6-32 X 0.25 INCH, PNH STL                                                 | 83385          | OBD                   |
|   | -5                     | 255-0334-00                |                                | 1             | . PLASTIC CHANNEL:12.75 X 0.175X 0.155,NYL                                                  | 11897          | 122-37-2500           |
|   | -6                     | 348-0233-00                |                                | 1             | . GROMMET, PLASTIC: GRAY, OVAL SHAPE, 0.927 ID                                              | 80009          | 348-0233-00           |
|   | -7                     | 351-0279-00                |                                | 2             | . GUIDE, SHOE: 5.18 X 0.375, NYLON                                                          | 80009          | 351-0279-00           |
|   | -8                     | 200-1906-00                |                                | 1             | . COVER, PWR SPLY: BOTTOM AND FRONT<br>(ATTACHING PARTS)                                    | 80009          | 200-1906-00           |
|   | -9                     | 211-0503-00                |                                | 5             | . SCREW, MACHINE: 6-32 X 0.188 INCH, PNH STL                                                | 83385          | OBD                   |
|   | -10                    | 200-1263-01                |                                | 1             | . COVER,PWR SPLY:RIGHT SIDE<br>(ATTACHING PARTS)                                            | 80009          | 200-1263-01           |
|   | -11<br>-12             | 211-0503-00<br>211-0504-00 |                                | 1<br>2        | . SCREW, MACHINE: 6-32 X 0.188 INCH, PNH STL<br>. SCREW, MACHINE: 6-32 X 0.25 INCH, PNH STL | 83385<br>83385 | OBD<br>OBD            |
|   | -13                    |                            |                                | 2             | TRANSISTOR:(SEE Q28,Q74 REPL)<br>(ATTACHING PARTS)                                          |                |                       |
|   |                        | 210-0406-00                |                                | 1             | . NUT, PLAIN, HEX.: 4-40 X 0.188 INCH, BRS                                                  | 707/0          | 101(1 50              |
|   | -15                    | 210-1178-00                |                                | ī             | . WASHER, SHLDR: U/W TO-220 TRANSISTOR                                                      |                | 12161-50              |
|   |                        | 211-0101-00                |                                | 1             | • MADILER, SHEDK. 0/ W 10-220 TRANSISTOR<br>• SCREW, MACHINE: 4-40 X 0.25,100 DEG, FLH STL  | 49671<br>83385 | DF137A<br>OBD         |
|   | -17                    |                            |                                | 2             | . TRANSISTOR:(SEE Q58,Q94 REPL)<br>(ATTACHING PARTS)                                        |                |                       |
| - | -18                    | 210-0406-00                |                                | 1             | . NUT, PLAIN, HEX.: 4-40 X 0.188 INCH. BRS                                                  | 73743          | 12161-50              |
|   | -19<br>-20             | 210-1178-00<br>211-0101-00 |                                | 1             | WASHER, SHLDR:U/W TO-220 TRANSISTOR<br>SCREW, MACHINE: 4-40 X 0.25,100 DEG, FLH STL         | 49671<br>83385 | DF137A<br>OBD         |
|   | -21<br>-22             | 342-0202-00                |                                | <b>2</b><br>1 | . INSULATOR, PLATE: TRANSISTOR<br>. TRANSISTOR: (SEE Q122 REPL)                             | 01295          | 10-21-023-106         |
|   | -23                    | 210-0406-00                |                                |               | (ATTACHING PARTS)                                                                           |                |                       |
|   | -24                    | 210-1178-00                |                                | 1             | . NUT, PLAIN, HEX.: 4-40 X 0.188 INCH, BRS                                                  | 73743          | 12161-50              |
|   | -25                    | 211-0038-00                |                                | 1             | . WASHER, SHLDR: U/W TO-220 TRANSISTOR                                                      | 49671          | DF137A                |
|   |                        |                            |                                |               | SCREW, MACHINE: 4-40 X 0.312, FLH, 100 DEG                                                  | 83385          | OBD                   |
|   | -27                    |                            |                                |               | . TRANSISTOR:(SEE Q126 REPL)<br>(ATTACHING PARTS)                                           |                |                       |
|   | -28                    | 210-0406-00<br>210-1178-00 |                                | 1             | NUT, PLAIN, HEX.: 4-40 X 0.188 INCH, BRS                                                    | 73743          | 12161-50              |
|   | -29                    | 211-0101-00                |                                | 1             | WASHER, SHLDR: U/W TO-220 TRANSISTOR                                                        | 49671          | DF137A                |
|   | -30                    | 342-0202-00                |                                |               | SCREW, MACHINE: 4-40 X 0.25,100 DEG, FLH STL                                                | 83385          | OBD                   |
|   | -31                    | J42-0202-00                |                                | 2             | INSULATOR, PLATE: TRANSISTOR                                                                | 01295          | 10-21-023-106         |
|   | -21                    | 131-0589-00                | XB031273                       | 1<br>18       | CKT BOARD ASSY:LV REGULATOR(SEE A22 REPL)<br>TERMINAL,PIN:0.46 L X 0.025 SQ                 | 80009          | 131-0589-00           |
|   | -32                    | 211-0008-00                |                                | 5             | (ATTACHING PARTS)<br>SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL                                 | 83385          | OBD                   |
|   |                        |                            |                                | -             | CKT BOARD ASSY INCLUDES:                                                                    |                |                       |
|   | -33                    | 131-0608-00                | B010100 B031272                |               | . TERMINAL, PIN: 0.365 L X 0.025 PH BRZ GOLD                                                |                |                       |
|   |                        | 131-0608-00                | B031273                        | 51            | . TERMINAL, FIN:0.365 L X 0.025 PH BRZ GOLD<br>TERMINAL, FIN:0.365 L X 0.025 PH BRZ GOLD    | 22526          |                       |
|   | -34                    | 214-0579-00                |                                | 6             | . TERM, TEST POINT: BRS CD PL                                                               |                | 47357                 |
|   | -35                    | 136-0252-07                |                                | 24            | . SOCKET, PIN CONN: W/O DIMPLE                                                              |                | 214-0579-00           |
|   |                        | 136-0514-00                |                                | 5             | . SKT, PL-IN ELEC: MICROCIRCUIT. 8 DIP                                                      |                | 75060-012<br>CS9002-8 |
|   | -37<br>-38             | 131-0993-00                |                                | 1             | . BUS,CONDUCTOR:2 WIRE BLACK<br>. TRANSISTOR:(SEE Q148 REPL)                                |                | 530153-2              |
|   | -39                    | 210-0551-00                |                                | 1             | (ATTACHING PARTS)                                                                           |                |                       |
|   |                        | 211-0097-00                |                                | 1             | NUT, PLAIN, HEX.: 4-40 X 0.25 INCH, STL                                                     | 000BK          |                       |
|   |                        | 210-1178-00                |                                | 1             | . SCREW, MACHINE:4-40 X 0.312 INCH, PNH STL<br>. WASHER, SHLDR:U/W TO-220 TRANSISTOR        | 83385          | OBD                   |
|   | -41                    | 410-11/0-00                |                                | 1             | - WASHER, SHIDR II/W TO-220 TELNOIDEN                                                       | 49671          |                       |

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### Replaceable Mechanical Parts-7854 Service

Fig. & Tektronix Serial/Model No.

| Fig. &<br>Index<br>No. | Tektronix<br>Part No.                    | Serial/Model No.<br>Eff Dscont                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Qty    | 1 | 2345                         | Name & Description                                                           | Mfr<br>Code    | Mfr Part Number                |
|------------------------|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---|------------------------------|------------------------------------------------------------------------------|----------------|--------------------------------|
| 6-42<br>-43            | 348-0023-00<br>441-1490-00               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |   |                              | C:CIRCUIT BOARD<br>ATTACHING PARTS)                                          | 02768<br>80009 | 207090201000101<br>441-1490-00 |
| -44<br>-45             | 211-0008-00<br>211-0507-00               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2<br>3 | • | SCREW, MACHINE               | 8:4-40 X 0.25 INCH,PNH STL<br>8:6-32 X 0.312 INCH,PNH STL                    | 83385<br>83385 |                                |
| -46                    | - Officer and game over particular and a |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1      |   | CAPACITOR: (SE               | *<br>EE C154 REPL)<br>ATTACHING PARTS)                                       |                |                                |
| -47                    | 212-0518-00                              | )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2      | • | SCREW, MACHINE               | E:10-32 X 0.312 INCH, PNH STL                                                | 83385          | OBD                            |
| -48                    |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1      |   | (                            | EC(SEE A24 REPL)<br>ATTACHING PARTS)                                         |                |                                |
| -49<br>-50             | 211-0008-00<br>211-0504-00               | )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 3<br>1 | • | SCREW, MACHINE               | E:4-40 X 0.25 INCH,PNH STL<br>E:6-32 X 0.25 INCH,PNH STL                     | 83385<br>83385 |                                |
| -51                    | 131-0608-00                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <br>22 | · | CKT BOARD ASS                | GY INCLUDES:<br>IN:0.365 L X 0.025 PH BRZ GOLD                               | 12526          | 47257                          |
|                        | 136-0252-0                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 6      | : | . SOCKET PIN                 | CONN:W/O DIMPLE                                                              |                | 47357<br>75060-012             |
| -53                    | 136-0260-02                              | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1      |   |                              | ELEK:MICROCIRCUIT, 16 DIP, LOW CLE                                           | 71785          | 133-51-02-008                  |
| -54                    | 136-0263-04                              | ł                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 6      |   | . SOCKET.PIN                 | TERM:FOR 0.025 INCH SQUARE PIN                                               |                | 75377-001                      |
| -55                    |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4      | • | . SEMICOND DE<br>. AND CR143 | EVICE:(SEE CR140,CR141,CR142                                                 | 22920          | /33//-001                      |
|                        |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |   |                              | ATTACHING PARTS)                                                             |                |                                |
| -56                    | 210-0410-00                              | )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 4      |   | . NUT, PLAIN, H              | IEX.:10-32 X 0.312 INCH, BRS                                                 | 73743          | 2X20003-402                    |
| -57                    |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4      | • | . WASHER, LOCK               | C:SPLIT,0.195 ID X 0.32" OD,P BRZ                                            |                | OBD                            |
| -58                    | 210-1003-00                              | )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 4      | • | . WASHER, FLAT               | :# 10 X 0.036 THICK, BRS                                                     | 12327          | OBD                            |
| -59                    | 386-1559-00                              | )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2      | • | . SPACER, CKT                | BD:0.47 H,ACETAL                                                             | 80009          | 386-1559-00                    |
| -60                    | 214-0579-00                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2      | • | . TERM, TEST F               | OINT:BRS CD PL                                                               | 80009          | 214-0579-00                    |
|                        | 131-0589-00                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4      | • | . TERMINAL, PI               | N:0.46 L X 0.025 SQ                                                          | 80009          | 131-0589-00                    |
| -62                    |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1      | • | . SEMICOND DE                | WICE:(SEE CR151 REPL)<br>ATTACHING PARTS)                                    |                | مەر<br>مەر                     |
| -63                    | 210-0586-00                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2      | • | . NUT, PL, ASSE              | CM WA:4-40 X 0.25,STL CD PL                                                  | 83385          | OBD                            |
| -64                    | 211-0012-00                              | )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2      | · | . SCREW, MACHI               | NE:4-40 X 0.375, PNH STL CD PL                                               | 83385          | OBD                            |
| -65                    | 386-0786-00                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1      | • | . INSULATOR, F               | LATE:XSTR,MICA                                                               | 80009          | 386-0786-00                    |
| -66                    | 214-2731-00                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |   | . HEAT SINK, D               |                                                                              | 80009          |                                |
| -67                    | 136-0254-01                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2      |   | . SOCKET, PIN                | TERM:U/W 0.031 TO 0.04 DIA PINS                                              | 00779          | 1-331892-8                     |
| -68                    |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2      | • | CAPACITOR:(SE                | E C16,C17 REPL)<br>ATTACHING PARTS)                                          |                |                                |
| -69                    |                                          | B010100 B010569                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 8      |   | SCREW, MACHINE               | :10-32 X 0.312 INCH, PNH STL                                                 | 83385          | OBD                            |
|                        | 212-0518-00                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4      | ٠ | SCREW, MACHINE               | ::10-32 X 0.312 INCH, PNH STL                                                | 83385          | OBD                            |
|                        | 212-0651-00<br>210-3057-00               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4<br>4 | • | SCREW MACHINE                | :10-32 X 0.312INCH, PNH, NYLON<br>.170 ID X 0.375 OD                         | 26365<br>95987 | OBD<br>NW8-3753                |
| -70                    | 342-0419-00                              | <b>)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |   |                              | *                                                                            |                |                                |
|                        | 407-2111-00                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |   | INSULATOR, CAP               |                                                                              | 80009          |                                |
|                        | 342-0452-00                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1      |   | BRACKET, CAP. :              |                                                                              |                | 407-2111-00                    |
| -73                    |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1      | • | TRANSFORMER:(                | M:CIRCUIT BOARD, POLYMIDE<br>SEE T110 REPL)                                  | 80009          | 342-0452-00                    |
| -74                    | 211-0008-00                              | )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 4      | • | SCREW, MACHINE               | ATTACHING PARTS)<br>:- 4-40 X 0.25 INCH, PNH STL                             | 83385          | OBD                            |
| -75                    | 348-0023-00                              | )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1      |   | PLUG, HOLE :                 |                                                                              | 02768          | 207090201000101                |
| -76                    | 441-1423-00                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ĩ      |   | CHASSIS, SCOPE               | :TRANSFORMER<br>ATTACHING PARTS)                                             | 80009          | 441-1423-00                    |
| -77                    | 211-0097-00                              | l de la constante de | 2      | • |                              | :4-40 X 0.312 INCH, PNH STL                                                  | 83385          | OBD                            |
| -78                    | 337-1490-01<br>337-1490-02               | B010125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        | • | SHIELD, ELEC:L               | INE INVERTER,CKT CD BOTTOM<br>INE INVERTER,CKT BD BOTTOM<br>ATTACHING PARTS) | 80009<br>80009 | 337-1490-01<br>337-1490-02     |
|                        | 211-0558-00                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1      |   | SCREW, MACHINE               | :6-32 X 0.250 BDGH,NYL,SLOT                                                  | 26365          | 921-1150-0014                  |
| -80                    |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1      | • | WASHER, LOCK:S               | PLIT,0.145 ID X 0.253 OD,STL                                                 | 83385          | OBD                            |
| -81                    |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1      | • | SCREW, MACHINE               | :4-40 X 0.25", BDGH PLSTC                                                    | 26365          | OBD                            |
| -82                    | 210-0054-00                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1      | • | WASHER, LOCK:S               | PLIT,0.118 ID X 0.212"OD STL                                                 | 83385          | OBD                            |
| -83                    | 220-0623-00                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1      |   | (                            | 75 X 0.5 X0.448,(3)6-32<br>ATTACHING PARTS)                                  | 80009          | 220-0623-00                    |
| -84                    | 211-0504-00                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1      | • | SCREW, MACHINE               | :6-32 X 0.25 INCH, PNH STL                                                   | 83385          | OBD                            |
|                        |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |   |                              |                                                                              |                |                                |

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| No.                                                                                          |                                                                                                                                         | Serial/Model No.<br>Eff Dscont | Qty                                                           | 1                   | 2                                      | 34                                                                                                         | 5                                                                                                       | Nar                                                                                                                                                                                          | ne & Description                                                                                                                                                                                                                    |             | Mfr<br>Code                                                                                              | Mfr Part Numt                                                                                                                             |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------|---------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 6-85                                                                                         |                                                                                                                                         | ,                              | 1                                                             | •                   | CI                                     | T BC                                                                                                       | )ARD                                                                                                    |                                                                                                                                                                                              | TER(SEE A23 REPL                                                                                                                                                                                                                    | )           |                                                                                                          |                                                                                                                                           |
| -86                                                                                          | 211-0008-00                                                                                                                             |                                | 4                                                             | •                   | so                                     | CREW,                                                                                                      | , MAC                                                                                                   | HINE:4-40 X                                                                                                                                                                                  | NG PARTS)<br>0.25 INCH,PNH S'<br>*                                                                                                                                                                                                  | TL          | 83385                                                                                                    | OBD                                                                                                                                       |
| 07                                                                                           |                                                                                                                                         |                                | -                                                             |                     | Ck                                     | T BC                                                                                                       | )ARD                                                                                                    | ASSY INCLU                                                                                                                                                                                   | DES:                                                                                                                                                                                                                                |             |                                                                                                          |                                                                                                                                           |
|                                                                                              | 131-0591-00<br>214-1914-00                                                                                                              |                                | 6<br>1                                                        |                     | •                                      | CONT<br>HEAT                                                                                               | CACT<br>C SI                                                                                            | NK,ELEC:                                                                                                                                                                                     | INCH LONG<br>NG PARTS)                                                                                                                                                                                                              |             |                                                                                                          | 47352<br>PB1-ZCB                                                                                                                          |
| -89                                                                                          | 211-0012-00                                                                                                                             | I                              | 1                                                             |                     |                                        | SCRE                                                                                                       | EW.M                                                                                                    |                                                                                                                                                                                              | X 0.375, PNH STL                                                                                                                                                                                                                    | CD PL       | 83385                                                                                                    | OBD                                                                                                                                       |
| -90                                                                                          | 210-0406-00                                                                                                                             |                                | , 1                                                           | •                   | ·                                      | NUT,                                                                                                       | , PLA                                                                                                   | IN,HEX.:4-4                                                                                                                                                                                  | 0 X 0.188 INCH, B                                                                                                                                                                                                                   | RS          |                                                                                                          | 12161-50                                                                                                                                  |
| -91                                                                                          | 361-0414-00                                                                                                                             | i                              | 1                                                             |                     |                                        | SPAC                                                                                                       | CER.                                                                                                    | DIODE:                                                                                                                                                                                       |                                                                                                                                                                                                                                     |             | 80009                                                                                                    | 361-0414-00                                                                                                                               |
| -92                                                                                          |                                                                                                                                         | 1                              |                                                               |                     |                                        |                                                                                                            |                                                                                                         |                                                                                                                                                                                              | 075 DIA X 4.0 L,                                                                                                                                                                                                                    | MLD RBR     | 98159                                                                                                    | 2859-75-4                                                                                                                                 |
|                                                                                              | 214-0579-00                                                                                                                             |                                | 4                                                             |                     |                                        | TERM                                                                                                       | 1. TE                                                                                                   | ST POINT:BR                                                                                                                                                                                  | S CD PL                                                                                                                                                                                                                             | LD RDR      | 80009                                                                                                    | 214-0579-00                                                                                                                               |
|                                                                                              |                                                                                                                                         |                                | 1                                                             | •                   |                                        | GROM                                                                                                       | <b>MET</b>                                                                                              | ,RUBBER:0.5                                                                                                                                                                                  | O INCH DIA                                                                                                                                                                                                                          |             | 70485                                                                                                    | 230                                                                                                                                       |
|                                                                                              | 129-0323-00                                                                                                                             |                                | 1                                                             | •                   | •                                      | POSI                                                                                                       | [,ELI                                                                                                   | EC-MECH: HEX                                                                                                                                                                                 | ,0.25 X 1 INCH LO<br>NG PARTS)                                                                                                                                                                                                      | ONG         | 80009                                                                                                    |                                                                                                                                           |
| -96                                                                                          | 211-0097-00                                                                                                                             |                                | 1                                                             | •                   | •                                      | SCRE                                                                                                       | W,M                                                                                                     | ACHINE:4-40                                                                                                                                                                                  | X 0.312 INCH, PNI                                                                                                                                                                                                                   | H STL       | 83385                                                                                                    | OBD                                                                                                                                       |
| -97                                                                                          | 385-0016-00                                                                                                                             |                                | 1                                                             | •                   | •                                      | SPAC                                                                                                       | ER,I                                                                                                    | OST:1.0 L                                                                                                                                                                                    | W/6-32 THD THRU,N<br>NG PARTS)                                                                                                                                                                                                      | NYLON       | 80009                                                                                                    | 385-0016-00                                                                                                                               |
|                                                                                              | 211-0507-00                                                                                                                             |                                | 1                                                             | •                   | •                                      | SCRE                                                                                                       | W,M/                                                                                                    | ACHINE:6-32                                                                                                                                                                                  | X 0.312 INCH, PNI<br>*                                                                                                                                                                                                              | H STL       | 83385                                                                                                    | OBD .                                                                                                                                     |
| -99                                                                                          | 134-0158-00                                                                                                                             |                                | 4                                                             |                     |                                        | BUTT                                                                                                       | ON.                                                                                                     | PLUG:0.187                                                                                                                                                                                   |                                                                                                                                                                                                                                     |             | 02768                                                                                                    | 207-080501-00                                                                                                                             |
| -100                                                                                         | 337-2533-00                                                                                                                             |                                | 1                                                             | •                   | SF                                     | IELD                                                                                                       | ),ELI                                                                                                   | C:LINE INV                                                                                                                                                                                   | ERT, TOP<br>NG PARTS)                                                                                                                                                                                                               |             | 80009                                                                                                    | 337-2533-00                                                                                                                               |
| -101                                                                                         | 211-0101-00                                                                                                                             |                                | 4                                                             | •                   | SC                                     | REW,                                                                                                       | MACI                                                                                                    | HINE:4-40 X                                                                                                                                                                                  | 0.25,100 DEG,FLH                                                                                                                                                                                                                    | d STL       | 83385                                                                                                    | OBD                                                                                                                                       |
| -102                                                                                         | 344-0118-00                                                                                                                             |                                | 2                                                             | •                   | CL                                     | IP,S                                                                                                       | PG 7                                                                                                    | TENS:CAPACI                                                                                                                                                                                  |                                                                                                                                                                                                                                     |             | 80033                                                                                                    | E50008-044                                                                                                                                |
| -103                                                                                         | 210-0586-00                                                                                                                             |                                | 2                                                             |                     | NT                                     | T PL                                                                                                       | . 45'                                                                                                   | SFM WA · A-AO                                                                                                                                                                                | X 0.25,STL CD PI                                                                                                                                                                                                                    | r           | 02205                                                                                                    | 0.0.0                                                                                                                                     |
| -104                                                                                         | 211-0008-00                                                                                                                             |                                | 2                                                             |                     | SC                                     | REW,                                                                                                       | MACI                                                                                                    | HINE:4-40 X                                                                                                                                                                                  | 0.25 INCH, PNH S1                                                                                                                                                                                                                   | ſL          | 83385<br>83385                                                                                           |                                                                                                                                           |
| -105                                                                                         |                                                                                                                                         |                                | 2                                                             | •                   | TR                                     | ANSI                                                                                                       | STOR                                                                                                    | R:(SEE Q34,                                                                                                                                                                                  |                                                                                                                                                                                                                                     |             |                                                                                                          |                                                                                                                                           |
| -106                                                                                         | 211-0034-00                                                                                                                             |                                | 2                                                             |                     | SC                                     | REW,                                                                                                       | MACI                                                                                                    |                                                                                                                                                                                              | 0.50 INCH, PNH                                                                                                                                                                                                                      |             | 83385                                                                                                    | OBD                                                                                                                                       |
|                                                                                              | 210-0053-00                                                                                                                             |                                | 2                                                             |                     | WA                                     | SHER                                                                                                       | LOC                                                                                                     | CK:INTL.0.0                                                                                                                                                                                  | 92 ID X 0.175"OD,                                                                                                                                                                                                                   | STL         | 83385                                                                                                    | OBD                                                                                                                                       |
|                                                                                              | 210-1008-00                                                                                                                             |                                | 2                                                             |                     | WA                                     | SHER                                                                                                       | ,FL/                                                                                                    | T:0.09 ID                                                                                                                                                                                    | K 0.188" OD, BRS                                                                                                                                                                                                                    | ,010        | 12360                                                                                                    | OBD                                                                                                                                       |
|                                                                                              | 342-0421-00                                                                                                                             |                                | 2                                                             | •                   | IN                                     | SULA                                                                                                       | TOR,                                                                                                    | BSHG:0.089                                                                                                                                                                                   | ID X 0.23 THK, NY                                                                                                                                                                                                                   | LON         | 80009                                                                                                    | 342-0421-00                                                                                                                               |
|                                                                                              | 342-0420-00                                                                                                                             |                                | 2                                                             |                     | IN                                     | SULA                                                                                                       | TOR                                                                                                     | PLATE : TRAN                                                                                                                                                                                 | SISTOR, PORCELAIN                                                                                                                                                                                                                   |             | 80009                                                                                                    | 342-0420-00                                                                                                                               |
|                                                                                              | 342-0202-00                                                                                                                             |                                | 2                                                             | •                   | IN                                     | SULA                                                                                                       | TOR                                                                                                     | PLATE: TRAN                                                                                                                                                                                  | SISTOR                                                                                                                                                                                                                              |             | 01295                                                                                                    | 10-21-023-106                                                                                                                             |
|                                                                                              | 386-2634-00                                                                                                                             |                                | 1                                                             |                     |                                        | ,СНО                                                                                                       |                                                                                                         | (ATTACHI                                                                                                                                                                                     | NG PARTS)                                                                                                                                                                                                                           |             | 80009                                                                                                    | 386-2634-00                                                                                                                               |
| -113                                                                                         | 211-0619-00                                                                                                                             |                                | 2                                                             | •                   | SC                                     | REW.                                                                                                       | MACE                                                                                                    | LINE: 6-32 X                                                                                                                                                                                 | 1.5 INCH, FLH STL                                                                                                                                                                                                                   |             | 83385                                                                                                    | OBD                                                                                                                                       |
|                                                                                              |                                                                                                                                         |                                |                                                               |                     |                                        |                                                                                                            |                                                                                                         | :                                                                                                                                                                                            | *                                                                                                                                                                                                                                   |             | 05505                                                                                                    | 0.22                                                                                                                                      |
|                                                                                              | 441-1420-00                                                                                                                             |                                |                                                               |                     | СН                                     | ASSI                                                                                                       | s,sc                                                                                                    | OPE:LINE II                                                                                                                                                                                  | •<br>Ivert<br>Ng Parts)                                                                                                                                                                                                             |             |                                                                                                          | 441-1420-00                                                                                                                               |
| -115                                                                                         | 213-0041-00                                                                                                                             |                                | 2                                                             | •                   | CH<br>SC                               | ASSI<br>R,TP                                                                                               | S,SC<br>G,TH                                                                                            | OPE:LINE II<br>(ATTACHII<br>ID CTG:6-32                                                                                                                                                      | VERT                                                                                                                                                                                                                                |             |                                                                                                          | 441-1420-00                                                                                                                               |
| -115<br>-116                                                                                 | 213-0041-00<br>342-0193-00                                                                                                              |                                | 2<br>1                                                        | •                   | CH<br>SC<br>IN                         | ASSI<br>R,TP<br>SULA                                                                                       | S,SC<br>G,TH<br>TOR,                                                                                    | COPE:LINE II<br>(ATTACHII<br>ID CTG:6-32<br>PLATE:                                                                                                                                           | WERT<br>NG PARTS)<br>X 0.375 INCH,TRH                                                                                                                                                                                               | I STL       | 80009                                                                                                    | 441-1420-00                                                                                                                               |
| -115<br>-116<br>-117                                                                         | 213-0041-00<br>342-0193-00<br>342-0103-00                                                                                               |                                | 2<br>1<br>1                                                   | •                   | CH<br>SC<br>IN<br>IN                   | ASSI<br>R,TP<br>SULA<br>SULA                                                                               | S,SC<br>G,TH<br>TOR,<br>TOR,                                                                            | COPE:LINE I<br>(ATTACHI<br>D CTG:6-32<br>PLATE:<br>BLOCK:HEAT<br>(ATTACHI                                                                                                                    | VERT<br>NG PARTS)<br>X 0.375 INCH,TRH<br>SINK SHIELD,NYLC<br>G PARTS)                                                                                                                                                               | H STL<br>DN | 80009<br>83385                                                                                           | 441-1420-00<br>OBD                                                                                                                        |
| -115<br>-116<br>-117<br>-118                                                                 | 213-0041-00<br>342-0193-00<br>342-0103-00<br>210-0457-00                                                                                |                                | 2<br>1<br>1<br>1                                              |                     | CH<br>SC<br>IN<br>IN                   | ASSI<br>R,TP<br>SULA<br>SULA<br>T,PL                                                                       | G,TE<br>G,TE<br>TOR,<br>TOR,                                                                            | COPE:LINE II<br>(ATTACHII<br>ID CTG:6-32<br>PLATE:<br>BLOCK:HEAT<br>(ATTACHII<br>EM WA:6-32                                                                                                  | VERT<br>NG PARTS)<br>X 0.375 INCH,TRH<br>F<br>SINK SHIELD,NYLC<br>NG PARTS)<br>X 0.312 INCH,STL                                                                                                                                     | I STL<br>DN | 80009<br>83385<br>80009                                                                                  | 441-1420-00<br>OBD<br>342-0193-00<br>342-0103-00                                                                                          |
| -115<br>-116<br>-117<br>-118<br>-119                                                         | 213-0041-00<br>342-0193-00<br>342-0103-00<br>210-0457-00<br>211-0512-00                                                                 |                                | 2<br>1<br>1<br>1<br>1                                         | •                   | CH<br>SC<br>IN<br>IN<br>NU<br>SC       | ASSI<br>R,TP<br>SULA<br>SULA<br>T,PL<br>REW,1                                                              | S,SC<br>G,TE<br>TOR,<br>TOR,<br>ASS<br>MACH                                                             | COPE:LINE I)<br>(ATTACHII<br>ID CTG:6-32<br>PLATE:<br>BLOCK:HEAT<br>(ATTACHII)<br>EM WA:6-32<br>[INE:6-32 X                                                                                  | VERT<br>NG PARTS)<br>X 0.375 INCH,TRH<br>A<br>SINK SHIELD,NYLC<br>G PARTS)<br>X 0.312 INCH,STL<br>0.50" 100 DEG,FL                                                                                                                  | I STL<br>DN | 80009<br>83385<br>80009<br>80009                                                                         | 441-1420-00<br>OBD<br>342-0193-00<br>342-0103-00<br>OBD                                                                                   |
| -115<br>-116<br>-117<br>-118<br>-119<br>-120                                                 | 213-0041-00<br>342-0193-00<br>342-0103-00<br>210-0457-00<br>211-0512-00<br>214-1625-00                                                  |                                | 2<br>1<br>1<br>1<br>1<br>1<br>1                               | ·                   | CH<br>SC<br>IN<br>IN<br>SC<br>SP<br>WI | ASSI<br>R,TP<br>SULA<br>SULA<br>T,PL<br>REW,I<br>RING<br>RE,SI                                             | G,TE<br>TOR,<br>TOR,<br>ASS<br>MACH<br>,FLA<br>ET,E                                                     | OPE:LINE 11<br>(ATTACH1)<br>D CTG:6-32<br>PLATE:<br>BLOCK:HEAT<br>(ATTACH1)<br>EM WA:6-32<br>INE:6-32 X<br>T:2.0 INCH<br>LEC:                                                                | WERT<br>WG PARTS)<br>X 0.375 INCH,TRH<br>SINK SHIELD,NYLO<br>G PARTS)<br>X 0.312 INCH,STL<br>0.50" 100 DEG,FL<br>LONG,BOWED                                                                                                         | I STL<br>DN | 80009<br>83385<br>80009<br>80009<br>83385<br>83385                                                       | 441-1420-00<br>OBD<br>342-0193-00<br>342-0103-00<br>OBD                                                                                   |
| -115<br>-116<br>-117<br>-118<br>-119<br>-120<br>-121                                         | 213-0041-00<br>342-0193-00<br>342-0103-00<br>210-0457-00<br>211-0512-00<br>214-1625-00<br><br>352-0169-00                               |                                | 2<br>1<br>1<br>1<br>1<br>1<br>1<br>2                          | • • • • • •         | CH<br>SC<br>IN<br>IN<br>SC<br>SP<br>WI | ASSI<br>R,TP<br>SULA<br>SULA<br>T,PL<br>REW,I<br>RING<br>RE,SI<br>HLDR                                     | G, TE<br>G, TE<br>TOR,<br>TOR,<br>TOR,<br>ASS<br>MACH<br>, FLA<br>ET, E<br>, TER                        | OPE:LINE 11<br>(ATTACH1)<br>ID CTG:6-32<br>PLATE:<br>BLOCK:HEAT<br>(ATTACH1)<br>EM WA:6-32<br>IINE:6-32 X<br>TI:2.0 INCH<br>LEC:<br>M CONN:2 WI                                              | WERT<br>WERT<br>WG PARTS)<br>X 0.375 INCH,TRH<br>SINK SHIELD,NYLC<br>G PARTS)<br>X 0.312 INCH,STL<br>0.50" 100 DEG,FL<br>LONG,BOWED<br>RE BLACK                                                                                     | I STL<br>DN | 80009<br>83385<br>80009<br>80009<br>83385<br>83385<br>83385<br>80009                                     | 441-1420-00<br>OBD<br>342-0193-00<br>342-0103-00<br>OBD<br>OBD<br>214-1625-00                                                             |
| -115<br>-116<br>-117<br>-118<br>-119<br>-120<br>-121<br>-122                                 | 213-0041-00<br>342-0193-00<br>342-0103-00<br>210-0457-00<br>211-0512-00<br>214-1625-00<br><br>352-0169-00<br>352-0161-09                |                                | 2<br>1<br>1<br>1<br>1<br>1<br>1<br>2<br>1                     | • • • • • • •       | CH<br>SC<br>IN<br>IN<br>SC<br>SP<br>WI | ASSI<br>R,TP<br>SULA<br>SULA<br>T,PL<br>REW,I<br>REW,I<br>RING<br>RE,SI<br>HLDR<br>CONN                    | G, TH<br>TOR,<br>TOR,<br>TOR,<br>ASS<br>MACH<br>, FLA<br>ET, E<br>, TER<br>BOD                          | COPE:LINE II<br>(ATTACHII)<br>ID CTG:6-32<br>PLATE:<br>BLOCK:HEAT<br>(ATTACHII)<br>EM WA:6-32<br>IINE:6-32 X<br>T:2.0 INCH<br>LEC:<br>M CONN:2 WI<br>Y,PL,EL:3 V                             | VERT<br>WERT<br>NG PARTS)<br>X 0.375 INCH,TRH<br>SINK SHIELD,NYLC<br>NG PARTS)<br>X 0.312 INCH,STL<br>0.50" 100 DEG,FL<br>LONG,BOWED<br>RE BLACK<br>VIRE WHITE                                                                      | I STL<br>DN | 80009<br>83385<br>80009<br>80009<br>83385<br>83385                                                       | 441-1420-00<br>OBD<br>342-0193-00<br>342-0103-00<br>OBD<br>OBD                                                                            |
| -115<br>-116<br>-117<br>-118<br>-119<br>-120<br>-121<br>-122<br>-123                         | 213-0041-00<br>342-0193-00<br>342-0103-00<br>210-0457-00<br>211-0512-00<br>214-1625-00<br><br>352-0169-00<br>352-0161-09<br>352-0162-04 |                                | 2<br>1<br>1<br>1<br>1<br>1<br>2<br>1<br>2                     |                     | CH<br>SC<br>IN<br>NU<br>SC<br>SP<br>WI | ASSI<br>R,TP<br>SULA<br>SULA<br>T,PL<br>REW,I<br>REW,I<br>RE,SI<br>HLDR<br>CONN<br>CONN                    | S,SC<br>G,TE<br>TOR,<br>TOR,<br>ASS<br>MACH<br>,FLA<br>ET,E<br>,TER<br>BOD                              | COPE:LINE 11<br>(ATTACH11)<br>ID CTG:6-32<br>PLATE:<br>BLOCK:HEAT<br>(ATTACH11)<br>EM WA:6-32<br>IINE:6-32 X<br>T:2.0 INCH<br>LEC:<br>M CONN:2 W<br>Y,PL,EL:3 V<br>Y,PL,EL:4 V               | VERT<br>NG PARTS)<br>X 0.375 INCH,TRH<br>SINK SHIELD,NYLC<br>NG PARTS)<br>X 0.312 INCH,STL<br>0.50" 100 DEG,FL<br>LONG,BOWED<br>RE BLACK<br>VIRE WHITE<br>VIRE YELLOW                                                               | I STL<br>DN | 80009<br>83385<br>80009<br>80009<br>83385<br>83385<br>83385<br>80009<br>80009                            | 441-1420-00<br>OBD<br>342-0193-00<br>342-0103-00<br>OBD<br>OBD<br>214-1625-00<br>352-0169-00                                              |
| -115<br>-116<br>-117<br>-118<br>-119<br>-120<br>-121<br>-122<br>-123<br>-124                 | 213-0041-00<br>342-0193-00<br>342-0103-00<br>210-0457-00<br>211-0512-00<br>214-1625-00<br>                                              |                                | 2<br>1<br>1<br>1<br>1<br>1<br>2<br>1<br>2<br>2                |                     | CH<br>SC<br>IN<br>IN<br>SC<br>SP<br>WI | ASSI<br>R,TP<br>SULA<br>SULA<br>T,PL<br>REW,I<br>RING<br>RE,SI<br>HLDR<br>CONN<br>CONN                     | S,SC<br>G,TH<br>TOR,<br>TOR,<br>TOR,<br>ASS<br>MACH<br>,FLA<br>ET,E<br>BOD<br>BOD<br>BOD                | COPE:LINE 11<br>(ATTACH11)<br>ID CTG:6-32<br>PLATE:<br>BLOCK:HEAT<br>(ATTACH11)<br>EM WA:6-32<br>(INE:6-32 X<br>T:2.0 INCH<br>LEC:<br>M CONN:2 WI<br>Y,PL,EL:3 W<br>Y,PL,EL:5 W              | VERT<br>NG PARTS)<br>X 0.375 INCH,TRH<br>SINK SHIELD,NYLC<br>G PARTS)<br>X 0.312 INCH,STL<br>0.50" 100 DEG,FL<br>LONG,BOWED<br>RE BLACK<br>VIRE WHITE<br>VIRE YELLOW<br>IRE GRAY                                                    | I STL<br>DN | 80009<br>83385<br>80009<br>80009<br>83385<br>83385<br>83385<br>80009<br>80009<br>80009                   | 441-1420-00<br>OBD<br>342-0193-00<br>342-0103-00<br>OBD<br>OBD<br>214-1625-00<br>352-0169-00<br>352-0161-09                               |
| -115<br>-116<br>-117<br>-118<br>-119<br>-120<br>-121<br>-122<br>-123<br>-124<br>-125         | 213-0041-00<br>342-0193-00<br>342-0103-00<br>210-0457-00<br>211-0512-00<br>214-1625-00<br>                                              |                                | 2<br>1<br>1<br>1<br>1<br>1<br>2<br>1<br>2<br>2<br>2           | · · · · · · · · · · | CH<br>SC<br>IN<br>IN<br>SC<br>SP<br>WI | ASSI<br>R,TP<br>SULA<br>SULA<br>T,PL<br>REW,I<br>REW,I<br>RE,SI<br>HLDR<br>CONN<br>CONN<br>CONN            | S, SC<br>G, TH<br>TOR,<br>TOR,<br>TOR,<br>ASS<br>MACH<br>, FLA<br>ET, E<br>BOD<br>BOD<br>BOD            | COPE:LINE 11<br>(ATTACH11<br>ID CTG:6-32<br>PLATE:<br>BLOCK:HEAT<br>(ATTACH11<br>EM WA:6-32<br>IINE:6-32 X<br>T:2.0 INCH<br>LEC:<br>M CONN:2 WI<br>Y,PL,EL:3 W<br>Y,PL,EL:5 W<br>Y,PL,EL:5 W | VERT<br>VERT<br>VG PARTS)<br>X 0.375 INCH,TRH<br>SINK SHIELD,NYLC<br>GC PARTS)<br>X 0.312 INCH,STL<br>0.50" 100 DEG,FL<br>LONG,BOWED<br>VICH WHITE<br>VIRE WHITE<br>VIRE YELLOW<br>VIRE GRAY<br>IRE BLACK<br>VIRE GRAY<br>IRE BLACK | H STL<br>DN | 80009<br>83385<br>80009<br>83385<br>83385<br>83385<br>80009<br>80009<br>80009<br>80009<br>80009          | 441-1420-00<br>OBD<br>342-0193-00<br>342-0103-00<br>OBD<br>0BD<br>214-1625-00<br>352-0169-00<br>352-0161-09<br>352-0162-04                |
| -115<br>-116<br>-117<br>-118<br>-119<br>-120<br>-121<br>-122<br>-123<br>-124<br>-125<br>-126 | 213-0041-00<br>342-0193-00<br>342-0103-00<br>210-0457-00<br>211-0512-00<br>214-1625-00<br>                                              |                                | 2<br>1<br>1<br>1<br>1<br>1<br>2<br>1<br>2<br>2<br>2<br>2<br>2 |                     | CH<br>SC<br>IN<br>IN<br>SC<br>SP<br>WI | ASSI<br>R, TP<br>SULA<br>SULA<br>T, PL<br>REW, 1<br>RING<br>RE, SI<br>HLDR<br>CONN<br>CONN<br>CONN<br>CONN | S,SC<br>G,TH<br>TOR,<br>TOR,<br>TOR,<br>,ASS<br>MACH<br>,FLA<br>ET,E<br>BOD<br>BOD<br>BOD<br>BOD<br>BOD | COPE:LINE 11<br>(ATTACH11)<br>ID CTG:6-32<br>PLATE:<br>BLOCK:HEAT<br>(ATTACH11)<br>EM WA:6-32<br>(INE:6-32 X<br>T:2.0 INCH<br>LEC:<br>M CONN:2 WI<br>Y,PL,EL:3 W<br>Y,PL,EL:5 W              | WERT<br>WERT<br>WERT<br>X 0.375 INCH,TRH<br>SINK SHIELD,NYLO<br>G PARTS)<br>X 0.312 INCH,STL<br>0.50" 100 DEG,FL<br>LONG,BOWED<br>RE BLACK<br>VIRE WHITE<br>VIRE WHITE<br>VIRE YELLOW<br>VIRE GRAY<br>VIRE RED<br>VIRE BLACK        | H STL<br>DN | 80009<br>83385<br>80009<br>83385<br>83385<br>83385<br>80009<br>80009<br>80009<br>80009<br>80009<br>80009 | 441-1420-00<br>OBD<br>342-0193-00<br>342-0103-00<br>OBD<br>0BD<br>214-1625-00<br>352-0169-00<br>352-0161-09<br>352-0162-04<br>352-0163-08 |

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### Replaceable Mechanical Parts-7854 Service

Fig. &

| Index<br>No. | Tektronix<br>Part No.              | Serial/Model No.<br>Eff Dscont | Qty | 1 2 3 4 5 Name & Description                                                         | Mfr<br>Code | Mfr Part Number  |
|--------------|------------------------------------|--------------------------------|-----|--------------------------------------------------------------------------------------|-------------|------------------|
| 6120         | 210 0000 00                        |                                |     |                                                                                      |             |                  |
|              | 210-0202-00                        |                                | 2   | TERMINAL, LUG: 0.146 ID, LOCKING, BRZ TINNED                                         | 78189       | 2104-06-00-2520N |
|              | 131-0707-00                        |                                | 51  | CONNECTOR, TERM: 22-26 AWG, BRS& CU BE GOLD                                          | 22526       | 47439            |
| -131         | 131-0622-00                        |                                | 4   | CONTACT, ELEC: 0.577"L, 28-32 AWG WIRE                                               | 22526       | 46241            |
| 120          | 131-0792-00                        |                                | 4   | CONNECTOR, TERM: 18-20 AWG, CU BE GOLD PL                                            | 22526       | 46221            |
| -132         | 131-2065-00                        | )                              | 4   | TERM,QIK DISC:18-22 AWG, BRASS TIN PLATED                                            | 00779       | 2-520181-2       |
| -135         | 210-0307-00                        | )                              |     | TERMINAL, LUG:RING, INS, 16-14 AWG, #8                                               | 09922       | BA14E-8          |
|              | 175-0825-00                        |                                | FT  | WIRE, ELECTRICAL: 2 WIRE RIBBON                                                      | 80009       | 175-0825-00      |
|              | 175-0826-00                        |                                | FT  | WIRE, ELECTRICAL: 3 WIRE RIBBON                                                      | 80009       | 175-0826-00      |
|              | 175-0827-00                        |                                | FT  | CABLE, SP, ELEC: 4, 26 AWG, STRD, PVC JKT, RBN                                       | 08261       | SS04267(1061)0C  |
|              | 175-0860-00                        |                                | FT  | WIRE, ELECTRICAL: 5 WIRE RIBBON                                                      | 08261       | SS-0522-7(1061)  |
| -130         | 175-0859-00<br>175-0858-00         | J<br>D                         | FT  | WIRE, ELECTRICAL: 6 WIRE RIBBON                                                      | 08261       | SS-0622-7(1061)  |
|              | 175-1091-00                        |                                | FT  | WIRE, ELECTRICAL: 7 WIRE RIBBON                                                      | 08261       |                  |
|              | 334-3379-01                        |                                | FT  | CABLE, SP, ELEC: (4) #18 STRANDED WIRE                                               |             | 175-1091-00      |
|              | 557 5579 01                        |                                | 1   | MARKER, IDENT: MARKED GROUND SYMBOL                                                  | 80009       | 334-3379-01      |
|              |                                    |                                | Т   | . SWITCH, SLIDE: (SEE S91 REPL)                                                      |             |                  |
| -143         | 210-0586-00                        | n                              | 2   | (ATTACHING PARTS)                                                                    |             |                  |
| -144         | 211-0097-00                        | 2                              | 2   | . NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL<br>. SCREW,MACHINE:4-40 X 0.312 INCH,PNH STL | 83385       |                  |
|              |                                    |                                | 2   | *                                                                                    | 83385       | OBD              |
| -145         | 210-0204-00                        | n                              | 1   | . TERMINAL, LUG:0.146 INCH DIA DE,45 DEG BEND                                        | 70100       |                  |
|              |                                    | 5                              | 1   | (ATTACHING PARTS)                                                                    | /8189       | 2157-06-01-2520N |
| -146         | 210-0457-00                        | 0                              | 1   | . NUT, PL, ASSEM WA:6-32 X 0.312 INCH, STL                                           | 02205       | 0.80             |
|              |                                    | -                              | 1   | *                                                                                    | 83385       | ORD              |
| -147         | 210-0202-00                        | 0                              | 1   | . TERMINAL, LUG: 0.146 ID, LOCKING, BRZ TINNED                                       | 78189       | 2104-06-00-2520N |
|              |                                    |                                |     | (ATTACHING PARTS)                                                                    | /0103       | 2104-00-00-2320N |
| -148         | 210-0457-00                        | )                              | 1   | . NUT, PL, ASSEM WA:6-32 X 0.312 INCH, STL                                           | 83385       | OBD              |
|              |                                    |                                |     | *                                                                                    | 03303       | 000              |
| -149         |                                    | ~                              | 1   | . SWITCH, SLIDE: (SEE S12 REPL)                                                      |             |                  |
|              |                                    |                                |     | (ATTACHING PARTS)                                                                    |             |                  |
| -150         | 210-0586-00                        | )                              | 2   | . NUT, PL, ASSEM WA: 4-40 X 0.25, STL CD PL                                          | 83385       | OBD              |
| -151         | 211-0097-00                        | )                              | 2   | . SCREW, MACHINE: 4-40 X 0.312 INCH, PNH STL                                         | 83385       |                  |
|              |                                    |                                |     | +                                                                                    | 05505       | 000              |
|              | 200-2264-00                        |                                | 1   | . CAP., FUSEHOLDER: 3AG FUSES                                                        | S3629       | FEK 031 1666     |
|              | 204-0832-00                        |                                |     | . BODY, FUSEHOLDER: 3AG, 5 X 20MM FUSES                                              | S3629       |                  |
|              | 210-1039-00                        |                                | 1   | . WASHER,LOCK:INT,0.521 ID X 0.625 INCH OD                                           | 24931       |                  |
| -155         | and and manager and and and and an | P                              | 1   | . FILTER, RFI: (SEE FL10 REPL)                                                       |             |                  |
|              |                                    |                                |     | (ATTACHING PARTS)                                                                    |             |                  |
|              | 210-0586-00                        |                                | 2   | . NUT, PL, ASSEM WA: 4-40 X 0.25, STL CD PL                                          | 83385       | OBD              |
| -157         | 211-0014-00                        | )                              | 2   | . SCREW, MACHINE: 4-40 X 0.50 INCH, PNH STL                                          | 83385       | OBD              |
| -159         | 216 0000 00                        |                                |     | *                                                                                    |             |                  |
|              | 214-2932-00                        |                                | 1   | . HINK SINK, ELEC: POWER SUPPLY                                                      | 80009       | 214-2932-00      |
| 1))          |                                    | -                              | 1   | CKT BOARD ASSY:VERT CHANNEL SW(SEE A19 REPL)                                         |             |                  |
| -160         | 211-0116-00                        | <b>`</b>                       |     | (ATTACHING PARTS)                                                                    |             |                  |
| 100          | 211 0110-00                        | )                              | 4   | SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH BRS                                             | 83385       | OBD              |
|              |                                    | -                              | _   | CKT BOARD ASSY INCLUDES:                                                             |             |                  |
| -161         | 136-0514-00                        | )                              |     | . SKT, PL-IN ELEC: MICROCIRCUIT, 8 DIP                                               | 72002       | asaaaa a         |
|              | 131-0608-00                        |                                |     | . TERMINAL, PIN:0.365 L X 0.025 PH BRZ GOLD                                          | 22526       | CS9002-8         |
|              | 426-1352-00                        |                                | 1   | . FRAME, MICROCKT: 1.75 CM, STEPPED                                                  |             |                  |
|              |                                    |                                | -   | (ATTACHING PARTS)                                                                    | 80009       | 426-1352-00      |
| -164         | 211-0259-00                        | )                              | 2   | . SCR,ASSEM WSHR:2-56 X 0.437,PNH,STL CD PL                                          | 78189       | OBD              |
| -165         | 211-0260-00                        | )                              | 2   | . SCR,ASSEM WSHR:2-56 X 0.6875L,PNH,STL CD                                           | 78189       | OBD              |
|              |                                    |                                |     | *                                                                                    | /010/       | 666              |
| -166         | 131-1968-01                        | L                              | 1   | . CONT SET, ELEC: MICROCKT, 1.75CM, RUBBER                                           | 80009       | 131-1968-01      |
| -167         | 136-0183-00                        | )                              | 2   | . SOCKET, PLUG-IN: 3 PIN, ROUND                                                      | 80009       | 136-0183-00      |
|              | 131-1003-00                        |                                | 8   | . CONN, RCPT, ELEC: CKT BD MT, 3 PRONG                                               | 80009       | 131-1003-00      |
|              | 214-1292-00                        |                                | 2   | . HEAT SINK, ELEC: TRANSISTOR                                                        | 05820       | 205-AB           |
|              | 136-0252-07                        |                                | 8   | . SOCKET, PIN CONN: W/O DIMPLE                                                       | 22526       | 75060-012        |
|              | 214-2823-00                        |                                | 1   | . HEAT SINK, ELEC: VERTICAL CHANNEL SW                                               | 80009       | 214-2823-00      |
| -172         | 333-2320-00                        | )                              | 1   | PANEL, REAR:                                                                         | 80009       | 333-2320-00      |
|              |                                    |                                |     | (ATTACHING PARTS)                                                                    |             |                  |
|              | 211-0507-00                        |                                | 2   | SCREW, MACHINE: 6-32 X 0.312 INCH, PNH STL                                           | 83385       | OBD              |
| -174         | 211-0008-00                        | )                              | 2   | SCREW, MACHINE: 4-40 X 0.25 INCH, PNH STL                                            | 83385       |                  |
|              |                                    |                                |     | *                                                                                    |             |                  |
|              |                                    |                                |     |                                                                                      |             |                  |

**REV JAN 1982** 

| Index<br>No.   | Tektronix<br>Part No. | Serial/Mo<br>Eff | del No.<br>Dscont | Qty    | 12   | 345              | Name & Description                                              | Mfr<br>Code | Mfr Part Number  |
|----------------|-----------------------|------------------|-------------------|--------|------|------------------|-----------------------------------------------------------------|-------------|------------------|
| 6 <b>-</b> 175 | 441-1378-00           |                  |                   | 1      | CHAS | SSIS,CH          | AN SW:                                                          | 80009       | 441-1378-00      |
| -176           | 441-1378-01           | B010500          |                   | 1<br>1 |      | SSIS,CH<br>BOARD | AN SW:<br>ASSY:SIGNAL OUTPUT(SEE A15 REPL)<br>(ATTACHING PARTS) | 80009       | 441-1378-01      |
| -177           | 211-0507-00           |                  |                   | 2      | SCRE | EW,MACH          | INE:6-32 X 0.312 INCH, PNH STL                                  | 83385       | OBD              |
|                |                       |                  |                   | -      | СКТ  | BOARD            | ASSY INCLUDES:                                                  |             |                  |
|                | 131-0608-00           |                  |                   | 5      | . TE | RMINAL           | ,PIN:0.365 L X 0.025 PH BRZ GOLD                                | 22526       | 47357            |
|                | 136-0252-07           |                  |                   | 5      | . SC | OCKET,P          | IN CONN:W/O DIMPLE                                              | 22526       | 75060-012        |
|                | 131-1003-00           |                  |                   | 5      | . CC | NN, RCP          | T,ELEC:CKT BD MT,3 PRONG                                        | 80009       | 131-1003-00      |
|                | 131-0955-01           |                  |                   | 3      | . cc | NN, RCP          | T, ELEC: BNC, FEMALE, MODIFIED                                  | 80009       | 131-0955-01      |
|                | 131-1315-01           |                  |                   | 2      | . co | ONN, RCP         | T,ELEC:BNC,FEMALE<br>(ATTACHING PARTS)                          | 24931       | 28JR 306-1       |
| -183           | 220-0551-00           |                  |                   | 2      | . NU | JT,PLAI          | N,HEX.:9 MM X 0.437 INCH                                        | 73743       | OBD              |
| -184           | 210-0012-00           |                  |                   | 5      | . WA | SHER, L          | OCK:INTL,0.375 ID X 0.50" OD STL                                | 78189       | 1220-02-00-05410 |
|                | 333-2440-00           |                  |                   | 1      |      |                  | AR:SIGNALS OUT                                                  | 80009       | 333-2440-00      |
| -186           | 441-1424-00           |                  |                   | 1      |      |                  | SCOPE:SIGNAL OUT<br>(ATTACHING PARTS)                           | 80009       | 441-1424-00      |
| -187           | 211-0008-00           |                  |                   | 3      | . sc | CREW, MA         | CHINE:4-40 X 0.25 INCH, PNH STL                                 | 83385       | OBD              |
|                | 426-0807-02           |                  |                   | 1      | FRAM | Æ PNL,           | CAB.:REAR<br>(ATTACHING PARTS)                                  | 80009       | 426-0807-02      |
| -189           | 213-0270-00           |                  |                   | 4      | SCR, | TPG, TH          | D FOR:10-32 X 0.75 INCH FILH STL                                | 83385       | OBD              |

Fig. &

Fig. & Index

### Index Tektronix Serial/Model No.

| Index<br>No. | Tektronix<br>Part No. | Serial/N<br>Eff | lodel No.<br>Dscont | Qtv | 1     | 23    | 45               |                                     | Code         | Mfr Part Number     |               |
|--------------|-----------------------|-----------------|---------------------|-----|-------|-------|------------------|-------------------------------------|--------------|---------------------|---------------|
|              | 141110.               | has 1 1         | Dooont              | ~~) | ••••• |       |                  |                                     |              |                     |               |
|              | 119-1369-00           | 0               |                     | 1   | WA    | VEFO  | RM CAI           | LC:                                 | 80009        | 119-1369-00         |               |
| 7-1          | 200-2280-0            | 1               |                     |     |       |       |                  |                                     |              | 200-2280-01         |               |
| <i>,</i> 1   | 200 2200 0.           | 1               |                     | 1   | •     | 0011  | <b>"</b> , 51 DI | (ATTACHING PARTS)                   | 00007        | 200 2200 01         |               |
| 2            | 010 0070 00           | 0               |                     |     |       | 0.000 |                  |                                     | <del>.</del> |                     |               |
| -2           | 213-0870-00           | 0               |                     | 2   | ٠     | SCRE  | w,TPG            | ,TR:6-32 X 0.75"100 DEG,FLH STL     | 93907        | OBD                 |               |
|              |                       | _               |                     | -   |       |       |                  |                                     |              |                     |               |
| -3           | 200-2281-0            | 1               |                     | 1   | •     | COVE  | R,SIDH           |                                     | 80009        | 200-2281-01         |               |
|              |                       |                 |                     |     |       |       |                  | (ATTACHING PARTS)                   |              |                     |               |
| 4            | 213-0870-00           | 0               |                     | 2   |       | SCRE  | W, TPG.          | ,TR:6-32 X 0.75"100 DEG,FLH STL     | 93907        | OBD                 |               |
|              |                       |                 |                     |     |       |       |                  | · * ·                               |              |                     |               |
| -5           | 348-0571-00           | 0               |                     | 4   |       | FOOT  | .KEYBO           | OARD: GRAY                          | 80009        | 348-0571-00         |               |
| -6           |                       | -               |                     |     |       |       |                  | ASSY:ELECTRONICS(SEE A36 REPL)      |              |                     |               |
| •            |                       |                 |                     | -   |       | URI . | DUNINO           | (ATTACHING PARTS)                   |              |                     |               |
| 7            | 211-0008-0            | 0               |                     | 2   |       | COR   | U MACI           |                                     | 83385        | OPD                 |               |
| ,            | 211-0008-0            | 0               |                     | 2   | •     | SUKE  | w, MACI          | *                                   | 0))0)        | OBD                 |               |
|              |                       |                 |                     |     |       | OWIN  |                  |                                     |              |                     |               |
| -            |                       |                 |                     |     |       |       |                  | ASSY INCLUDES:                      |              |                     |               |
| -8           | 136-0263-0            |                 |                     |     |       |       |                  |                                     | 22526        | 75377-001           |               |
| -9           | 131-0608-0            | 0               |                     |     |       |       |                  |                                     | 22526        |                     |               |
|              | 195-0956-0            | 0               |                     | 1   |       | LEAD  | ,ELEC            | TRICAL: 3.0 INCH LONG               | 80009        | 195-0956-00         |               |
|              |                       |                 |                     |     |       |       |                  | (ATTACHING PARTS)                   |              |                     |               |
| -10          | 210-0457-0            | 0               |                     | 2   |       | NUT.  | PL.ASS           |                                     | 83385        | OBD                 |               |
|              | 211-0538-0            |                 |                     | 1   |       | SCRE  | W.MACI           |                                     | 83385        |                     |               |
|              |                       |                 |                     | -   |       |       |                  | *                                   |              |                     |               |
|              |                       | ***             |                     | -   |       | WIDE  | SET              | INCLUDES:                           |              |                     |               |
| -12          | 210-0206-0            |                 |                     |     |       |       |                  |                                     | 86928        | A373-147-1          |               |
|              | 253-0192-0            |                 |                     |     |       |       |                  | · · · · ·                           |              |                     |               |
|              | 233-0192-0            |                 |                     | r 1 | •     | TAPE  | ,PRES            |                                     | 80009        | 253-0192-00         |               |
|              |                       |                 |                     | 1   | •     | CKT   | BOARD            | ASSY:BUTTON(SEE A37 REPL)           |              |                     |               |
| -15          | 386-4050-0            | 10              |                     | Ţ   | •     | . PA  | NEL,C            |                                     | 80009        | 386-4050-00         |               |
|              |                       |                 |                     |     |       |       |                  | (ATTACHING PARTS)                   |              |                     |               |
| -16          | 210-0406-0            | 0               |                     | 9   | •     | . NU  | T,PLA            |                                     | 73743        | 12161-50            |               |
|              |                       |                 |                     |     |       |       |                  | *                                   |              |                     |               |
| -17          | 210-1304-0            | 10              |                     | 11  |       | . SP  | ACER,            | SLEEVE:0.112 ID X 0.18 OD X 0.2 THK | 80009        | 210-1304-00         | "and the      |
| -18          | 200-2346-0            | 0               |                     |     |       |       |                  |                                     |              | 300-2346-00         |               |
| -19          | 131-0590-0            | 0               |                     |     |       |       |                  |                                     | 22526        |                     |               |
| -20          |                       |                 |                     |     |       |       |                  |                                     |              | 129-0285-00         |               |
| -21          |                       |                 |                     |     |       |       |                  |                                     | 000FU        |                     |               |
|              | 366-1783-0            |                 |                     | 1   |       |       |                  |                                     | 000FU        |                     |               |
|              | 366-1784-0            |                 |                     |     |       |       |                  |                                     |              |                     |               |
|              |                       |                 |                     | 5   |       |       |                  |                                     | 000FU        |                     |               |
|              | 366-1784-0            |                 |                     | 1   | •     | . PU  | SH BU            |                                     |              | OBD                 |               |
|              | 366-1784-0            |                 |                     | 1   |       |       |                  | •                                   | 000FU        |                     |               |
|              | 366-1784-0            |                 |                     | 1   |       |       |                  |                                     | 000FU        |                     |               |
|              | 366-1784-0            |                 |                     | 1   |       |       |                  |                                     | 000FU        |                     |               |
|              | 366-1784-0            |                 |                     | 1   | •     | . PU  | JSH BU           | TTON: GRAY, 5                       | 000FU        | OBD                 |               |
|              | 366-1784-0            | )6              |                     | 1   |       | . PU  | ISH BU           | TTON: GRAY, 6                       | 000FU        | OBD                 |               |
|              | 366-1784-0            | )7              |                     | 1   |       | . PU  | JSH BU           | TTON: GRAY, 7                       | 000FU        | OBD                 |               |
|              | 366-1784-0            | )8              |                     | 1   |       |       |                  |                                     | 000FU        | OBD                 |               |
|              | 366~1784-0            |                 |                     | 1   |       |       |                  | •                                   | 000FU        |                     |               |
|              | 366-1784-1            |                 |                     | ĩ   |       |       |                  |                                     | 000FU        |                     |               |
|              | 366-1784-1            |                 |                     |     | •     | . 10  |                  |                                     | 000FU        |                     |               |
|              | 366~1784-1            |                 |                     | 1   |       |       |                  |                                     | 000FU        |                     |               |
|              | 366-1784-1            |                 |                     |     |       |       |                  |                                     | 000FU        |                     |               |
|              | 366~1784-1            |                 |                     | 1   |       |       |                  |                                     |              |                     |               |
|              |                       |                 |                     |     |       |       |                  |                                     | 000FU        |                     |               |
|              | 366-1784-1            |                 |                     | 1   |       |       |                  |                                     | 000FU        |                     |               |
|              | 366~1784-1            |                 |                     | 1   |       |       |                  |                                     | 000FU        |                     |               |
|              | 366-1784-1            |                 |                     | 1   |       |       |                  | •                                   | 000FU        | OBD                 |               |
| -22          |                       |                 |                     | 80  | •     | . HO  | DLDER,           | PB:NATURAL PLASTIC                  | 80009        | 352-0553-00         |               |
| -23          |                       | 0               |                     | 80  | •     | . AC  | TUATO            | R,SWITCH:                           | 80009        | 105-0814-00         |               |
| -24          | 352-0478-0            | 00              |                     | 1   | •     | HLDR  | R, TERM          | CONN:26 WIRE, DBL ROW BLACK         | 22526        | 65043-091           |               |
| -25          | 012-0821-0            | 00              |                     | 1   |       | CABL  | LE, INT          | CON:72.0 INCH LONG                  | 80009        | 012-0821-00         |               |
|              |                       |                 |                     |     |       |       | ,                | (ATTACHING PARTS)                   |              |                     |               |
| -26          | 210-0457-0            | 00              |                     | 1   |       | NUT - | PL.AS            | SSEM WA:6-32 X 0.312 INCH,STL       | 83385        | OBD                 |               |
| -27          | 210-0006-0            |                 |                     | 2   |       |       |                  |                                     | 78189        | 1206-00-00-0541C    |               |
| - /          |                       |                 |                     | 4   | •     | "AO N | ык, 10           | *                                   | ,0103        | 1200 00 00 00 00410 |               |
| -28          | 358-0025-0            | 0               |                     | 1   |       | Reun  | C CTDA           | AIN RLF:                            | 28520        | SR-6P-4             |               |
| -29          |                       |                 |                     | 1   |       |       | -                |                                     |              |                     |               |
| 23           | 720 10/0-0            |                 |                     | 1   | •     | r KAM | IE SEC           | CT, CALC:                           | 80009        | 426-1578-00         |               |
|              |                       |                 |                     |     |       |       |                  |                                     |              |                     | - without the |

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| Fig. &<br>Index<br>No. | Tektronix<br>Part No.                      | Serial/Model No.<br>Eff Dscont |    | 12345            | Name & Description                         | Mfr<br>Code | Mfr Part Number |
|------------------------|--------------------------------------------|--------------------------------|----|------------------|--------------------------------------------|-------------|-----------------|
|                        |                                            |                                |    | OPTION OD        |                                            |             |                 |
| 8-1                    | 386-4232-00                                |                                | 1  | PLATE, CONN MTG: | W/O GPIB                                   | 80009       | 386-4232-00     |
|                        |                                            |                                |    | OPTION 02        |                                            |             |                 |
| -2                     |                                            |                                | 1  |                  | X-Y COMP(SEE A33 REPL)<br>ATTACHING PARTS) |             |                 |
| -3                     | 211-0008-00                                |                                | 2  | •                | -40 X 0.25 INCH, PNH STL                   | 83385       | OBD             |
|                        |                                            |                                | _  | . CKT BOARD ASS  |                                            |             |                 |
| -4                     | 136-0263-04                                |                                | 8  |                  | RM:FOR 0.025 INCH SQUARE PIN               | 22526       | 75377-001       |
| -5                     | 131-1003-00                                |                                | 4  |                  | C:CKT BD MT, 3 PRONG                       | 80009       | 131-1003-00     |
| -6                     | 1360252-04                                 |                                | 20 | . SOCKET, PIN TE | RM:U/W 0.016-0.018 DIA PINS                | 22526       | 75060-007       |
|                        |                                            |                                |    | OPTION 02D       |                                            |             |                 |
| -7                     | which are seen and the are and any are use |                                | 1  | CKT BOARD ASSY:  | 4K RAM(SEE A28 REPL)                       |             |                 |
| -8                     | 214-1337-00                                |                                | 2  |                  | 10 OD X 0.25 INCH L, STL                   | 80009       | 214-1337-00     |
| -9                     | 105-0160-00                                |                                | 2  | . EJECTOR, CKT B | •                                          | 80009       | 105-0160-00     |
| -10                    | 131-0608-00                                |                                | 12 | . TERMINAL, PIN: | 0.365 L X 0.025 PH BRZ GOLD                | 22526       | 47357           |
| -11                    |                                            |                                | 2  | . TRANSISTOR: (S | EE Q760,Q860 REPL)<br>ATTACHING PARTS)     |             |                 |
| -12                    |                                            |                                | 2  | . NUT, PL, ASSEM | WA:4-40 X 0.25,STL CD PL                   | 83385       | OBD             |
| -13                    | 211-0008-00                                |                                | 2  | . SCREW, MACHINE | :4-40 X 0.25 INCH, PNH STL                 | 83385       | OBD             |

| Fig. &<br>Index | Tektronix   | Serial/M |        |     |                  |                       | Mfr   | Mfu Daut Number |
|-----------------|-------------|----------|--------|-----|------------------|-----------------------|-------|-----------------|
| No.             | Part No.    | Eff      | Dscont | Qty | 12345            | Name & Description    | Code  | Mfr Part Number |
| 9-1             | 378-0603-00 | )        |        | 1   | FILTER, MESH: EM | Ŧ                     | 80009 | 378-0603-00     |
| -2              | 390-0696-00 |          |        | ī   | CAB.SIDE, SCOPE  |                       | 80009 | 390-0696-00     |
| -3              | 348-0332-00 |          |        | 2   | ,                | EC:4.285 INCH LONG    | 80009 | 348-0332-00     |
| -4              | 348-0333-00 |          |        | 4   |                  | EC:4.8 INCH LONG      | 80009 | 348-0333-00     |
| -5              | 214-0603-02 |          |        | 4   | . PIN ASSY, SEC  |                       | 80009 | 214-0603-02     |
| -6              | 386-1634-00 | )        |        | 4   | . PLATE, LCH IN  |                       | 80009 | 386-1634-00     |
| -7              | 386-1633-00 | )        |        | 4   | . PLATE, LCH LK  |                       | 80009 | 386-1633-00     |
| -8              | 348-0336-00 | )        |        | 4   | . SHLD, GSKT, EL | EC:9.625 INCH LONG    | 80009 | 348-0336-00     |
| -9              | 390-0695-00 | )        |        | 1   | CAB.SIDE, SCOPE  | :RIGHT,EMI            | 80009 | 390-0695-00     |
| -10             | 348-0332-00 | )        |        | 2   | . SHLD, GSKT, EL | EC:4.285 INCH LONG    | 80009 | 348-0332-00     |
| -11             | 348-0333-00 | )        |        | 4   | . SHLD, GSKT, EL | EC:4.8 INCH LONG      | 80009 | 348-0333-00     |
| -12             | 348-0336-00 | )        |        | 4   | . SHLD, GSKT, EL | EC:9.625 INCH LONG    | 80009 | 348-0336-00     |
| -13             | 214-0603-02 | 1        |        | 4   | . PIN ASSY, SEC  | RG:                   | 80009 | 214-0603-02     |
| -14             | 386-1634-00 | )        |        | 4   | . PLATE, LCH IN  | DEX:ACETAL            | 80009 | 386-1634-00     |
| -15             | 386~1633-00 | )        |        | 4   | . PLATE, LCH LK  | G:STEEL,CD PL         | 80009 | 386-1633-00     |
| -16             | 390-0554-00 | )        |        | 1   | CABINET, BOTTOM  | :                     | 80009 | 390-0554-00     |
| -17             | 348-0274-00 | )        |        | 2   | . SHLD GSKT,EL   | EK:FINGER TYPE,24.0 L | 30817 | 97-555CDC       |
| -18             | 214-0603-02 | 2        |        | 6   | . PIN ASSY, SEC  | RG:                   | 80009 | 214-0603-02     |
| -19             | 386-1634-00 | )        |        | 6   | . PLATE, LCH IN  | DEX:ACETAL            | 80009 | 386-1634-00     |
| -20             | 386-1633-00 | )        |        | 6   | . PLATE, LCH LK  |                       | 80009 | 386-1633-00     |
| -21             | 348-0335-00 | )        |        | 2   | . SHLD, GSKT, EL | EC:8.65 INCH LONG     | 80009 | 348-0335-00     |
| -22             | 348-0334-00 | )        |        | 2   | . SHLD, GSKT, EL | EC:7.64 INCH LONG     | 80009 | 348-0334-00     |

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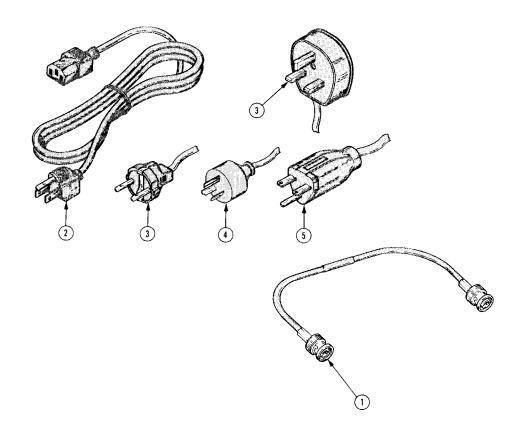


Fig. &

| Index<br>No. | Tektronix<br>Part No.    | Serial/N<br>Eff | Aodel No.<br>Dscont | Qty         | 12345                                          | Name & Description                                     | Mfr<br>Code    | Mfr Part Number            |
|--------------|--------------------------|-----------------|---------------------|-------------|------------------------------------------------|--------------------------------------------------------|----------------|----------------------------|
| -1           | 012-0208-00              |                 |                     |             | ,                                              | :10.0 INCH LONG                                        | 80009          | 012-0208-00                |
| -2<br>-3     | 161-0066-0<br>161-0066-0 |                 |                     | 1           | CABLE ASSY, PV                                 | VR,:3,18 AWG,115V,98.0 L<br>VR:3,0.75MM SQ,220V,96.0 L | 80009<br>80126 | 161-0066-00<br>OBD         |
| -4           | 161-0066-1               | 0               |                     | -           |                                                | VR:3,0.75MM SQ,240V,96.0 L                             | 80126          | OBD                        |
| -5           | 161-0066-1               | 1               |                     | - 1         | CABLE ASSY, PW                                 | UNITED KINGDOM)<br>WR:3,0.75MM,240V,96.0 L             | 80126          | OBD                        |
| -6           | 161-0066-1               | 2               |                     | 1           | (OPTION A3 -<br>CABLE ASSY, PV                 | VR:3,18 AWG,240V,96.0 L                                | 80126          | OBD                        |
|              | 070-2873-0<br>070-2874-0 | ••              |                     | -<br>1<br>1 | (OPTION A4 -<br>MANUAL,TECH:(<br>MANUAL,TECH:S |                                                        | 80009<br>80009 | 070-2873-00<br>070-2874-00 |

## INSTRUCTIONS FOR COMPLETING THE SOFTWARE/FIRMWARE PERFORMANCE REPORT

Please type or print clearly. Use a separate Software/Firmware Performance Report (SFPR) for each problem.

### II. SECTION A

1.

Fill in the serial number of the instrument, and the diagnostic version, which is located on a label on the rear panel. Press the ID key on the 7854 and copy the entire line of Version information, beginning with TEK/7854.

#### III. SECTION B

Use the complete company mailing address. Include the name and phone number of the person reporting the error. Also, be sure to fill in the name of the person submitting the SFPR.

#### IV. SECTION C

Check the reason for report and whether the error is reproducible. We cannot fix a problem when we cannot reproduce the error condition.

### V. SECTION D

Give a complete description of the system configuration on which the problem occurred. Include related peripherals, interfaces, options, special switch and/or strap settings and operating system.

### VI. SECTION E

Describe the problem completely. Include any information which might help in evaluating the error with the SFPR. If you have determined a procedure to avoid the error condition, please include this procedure. If this problem prevents you from accomplishing any useful work with the product, please state this fact. Be sure to include with the SFPR any information (programs, listings, hard copies, etc.) which will help us duplicate your problem.

### VII. SECTION F

This section is for use by Tektronix Lab Scopes Software Maintenance personnel. DO NOT WRITE IN THIS SPACE.

VIII. Mail all copies of the Software/Firmware Performance Report to:

TEKTRONIX, INC. LAB SCOPES SOFTWARE MAINTENANCE P.O. BOX 500 BEAVERTON, OREGON 97077

|                | P.O. BOX 500<br>BEAVERTON, OREGON 97077                      |                                                   |
|----------------|--------------------------------------------------------------|---------------------------------------------------|
|                | PRODUCT NAME 7854 Oscilloscope                               | SERIAL #                                          |
| ر              | DIAGNOSTIC VERSION _067-                                     |                                                   |
|                | LINE ONE OF DISPLAY WHEN ID KEY IS PRESSED TEK/7             | 854,                                              |
| в)             |                                                              | REASON FOR REPORT:                                |
|                | USER:                                                        | Software / Firmware Error     Documentation Error |
|                | ADDRESS:                                                     | Suggested Enhancement                             |
|                | CITY: STATE: ZIP:                                            |                                                   |
|                | PHONE: EXTENSION:                                            | IS THE ERROR REPRODUCIBLE                         |
|                | FORM SUBMITTED BY: DATE:                                     |                                                   |
|                | SYSTEM DESCRIPTION: (Hardware, software, firmware and host r |                                                   |
| D              | STOTEM DESCRIPTION. (Hardware, software, inniware and host i |                                                   |
|                |                                                              |                                                   |
|                |                                                              | ₩94900000000000000000000000000000000000           |
| Ê)             | DESCRIPTION OF PROBLEM:                                      |                                                   |
| 9              |                                                              |                                                   |
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|                |                                                              |                                                   |
|                | LIST ENCLOSURES:                                             |                                                   |
|                | LIST ENCLOSURES:                                             |                                                   |
|                | LIST ENCLOSURES:                                             |                                                   |
|                | INTERNAL USE ONL                                             |                                                   |
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| F              | INTERNAL USE ONL                                             |                                                   |



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At Tektronix, we continually strive to keep up with latest electronic developments by adding circuit and component improvements to our instruments as soon as they are developed and tested.

Sometimes, due to printing and shipping requirements, we can't get these changes immediately into printed manuals. Hence, your manual may contain new change information on following pages.

A single change may affect several sections. Since the change information sheets are carried in the manual until all changes are permanently entered, some duplication may occur. If no such change pages appear following this page, your manual is correct as printed.

| DESCRIPTION<br>EFF SN B030690<br>REPLACEABLE ELECTRICAL PARTS LIST AND SCHMATIC CHANGES<br>ADD:<br>A27R1210 315-0472-00 RES.,FXD,CMPSN:4.7K OHM,5%,0.25W<br>DIAGRAM (R) Microprocessor and Control - Partial                            | Tektronix         COMMITTED TO EXCELLENCE         Product:         7854         0SCILLOSCOPE | Date: <u>5-15-81</u>                                                                                                                  | ANGE INFOR<br>Change Reference:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | M43319 REV                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| ADD:         27R121       315-0472-00       RES.,FXD,CMPSN:4.7K OHM,5%,0.25M         DIAGRAM <       Image: Comparison of Control - Partial         Image: Comparison of Control - Partial       Image: Comparison of Control - Partial | ๛๛๛๛๛๚๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛                                                       | DESCRIPTION                                                                                                                           | 92000000000000000000000000000000000000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | KIRAN MARKAN |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                   | REPLACEABLE E<br>ADD:<br>A27R1210 315-0472-00<br>DIAGRAM 28 Microprocessor                   | ELECTRICAL PARTS LIST<br>RES., FXD, CMPSN: 4.7K<br>and Control – Partia<br>$ \begin{array}{c}  & & & & & & & & & & & & & & & & & & &$ | OHM, 5%, 0.25W<br>al<br>(1)<br>(1)<br>(2)<br>(2)<br>(2)<br>(2)<br>(2)<br>(2)<br>(2)<br>(2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                |
|                                                                                                                                                                                                                                         | $\begin{array}{c ccccccccccccccccccccccccccccccccccc$                                        | € TP1200-4 CRUCLK<br>TO UH400-6<br>H0LM<br>TO U5200-4                                                                                 | Inclusion of the second |                                                                                                                |



Date: \_\_\_\_\_

8-18-81 Change Reference:

M44153

7854 SERVICE Product: \_\_\_\_\_

\_ Manual Part No.: \_\_\_

## 070-2874-01

## DESCRIPTION

EFF SN B031000

REPLACEABLE ELECTRICAL PARTS AND SCHEMATIC CHANGES

CHANGE TO:

CKT BOARD ASSY: CONTROL LOGIC 670-5846-03 A26

A26C1330 281-0763-00 CAP., FXD, CER DI: 47PF, 10%, 100V

C1330 is located on the CONTROL LOGIC circuit board assembly and is shown on diagram 21 DIGITIZER CONTROL LOGIC.

| Tektr                    | onix                                    |                                              | ANGE INFORMATION                                                                                                           |
|--------------------------|-----------------------------------------|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| COMMI<br>Product: 785    | TED TO EXCELLENCE                       | Date: <u>9-11-81</u><br>SERVICE              | Change Reference: M42165<br>Manual Part No.: 070-2874-01                                                                   |
|                          |                                         | DESCRIPTION                                  |                                                                                                                            |
| EFF SN BO31              | 170                                     |                                              |                                                                                                                            |
| ELL 2M DOOI              | 170                                     | TEXT CHANGES                                 |                                                                                                                            |
| Page 2-42                | Third paragra                           | ph                                           |                                                                                                                            |
| CHANGE TO R              | EAD:                                    |                                              |                                                                                                                            |
|                          | that describe<br>Tr <i>a</i> nsistor Q6 | d above for the righ<br>3, along with resist | king circuit is identical to<br>nt Active Peaking circuit.<br>cors R53, R55, R56 and R57;<br>d Q62 with changes in temper- |
| Page 4-68<br>CHANGE TO R | Step E3, part<br>EAD:                   | n.                                           |                                                                                                                            |
|                          | on Horizontal                           | Amplifier Board Al7<br>the center 8 divisi   | resistor R32 (located<br>7) for one timemark per<br>lons of the display                                                    |
| Page 4-69<br>CHANGE TO R | Step E3, part                           | <b>₫</b> •                                   |                                                                                                                            |
|                          | q. ADJUST<br>HF Adj capaci              |                                              | omise the setting of the<br>N B031170 & up) HF Adj<br>nd 500-ps timing.                                                    |
|                          | REPLACEABLE ELE                         | CTRICAL PARTS LIST A                         | ND SCHEMATIC CHANGES                                                                                                       |
| CHANGE TO:               |                                         |                                              |                                                                                                                            |
| A17                      | 670~5833-01                             | CKT BOARD ASSY:HO                            | DRIZONTAL OUTPUT                                                                                                           |
| A17R32                   | 311-0978-00                             | RES.,VAR,NONWW:25                            |                                                                                                                            |
| A17R59                   | 321-0275-00                             | RES., FXD, FILM: 7.1                         |                                                                                                                            |
| A17R159<br>REMOVE:       | 321-0264-00                             | RES.,FXD,FILM:5.4                            | 9K OHM,1%,0.125W                                                                                                           |
| A17CR44                  | 152-0141-02                             | SEMICOND DEVICE:S                            | SILICON, 30V, 150MA                                                                                                        |
| A17CR45                  | 152-0141-02                             | SEMICOND DEVICE:S                            | SILICON, 30V, 150MA                                                                                                        |
| A17CR159                 | 152-0141-02                             | SEMICOND DEVICE:S                            |                                                                                                                            |
| A17CR160                 | 152-0141-02                             | SEMICOND DEVICE:S                            | SILICON, 30V, 150MA                                                                                                        |
| A17R44                   | 315-0123-00                             | RES., FXD, CMPSN: 12                         | K OHM.5%.0.25W                                                                                                             |

|            |                   | DESCRIPTION                      |  |
|------------|-------------------|----------------------------------|--|
| DD:        |                   |                                  |  |
| 17Q63      | 151-0190-00       | TRANSISTOR: SILICON, NPN, 2N3904 |  |
| 17R53      | 315-0751-00       | RES.,FXD,CMPSN:750 OHM,5%,0.25W  |  |
| 17R55      | 315-0332-00       | RES.,FXD,CMPSN:3.3K OHM,5%,0.25W |  |
| 17R56      | 315-0822-00       | RES.,FXD,CMPSN:8.2K OHM,5%,0.25W |  |
| 17R57      | 315-0911-00       | RES.,FXD,CMPSN:910 OHM,5%,0.25W  |  |
| IAGRAM (11 | > horizontal ampi | JFIER - Partial                  |  |
| leat sinks | s should be added | to Q21, Q121, Q41 and Q141.      |  |
|            |                   |                                  |  |
|            |                   | +50V                             |  |
|            |                   |                                  |  |
|            |                   | \$R62                            |  |
|            |                   |                                  |  |
|            | R4-3              |                                  |  |
|            |                   | Q61 7                            |  |
|            |                   |                                  |  |
|            |                   | Q62                              |  |
|            |                   | R 59 R 55<br>7.15 K \$ \$3.3 K m |  |
|            |                   | $7.15 K \leq 3.3 K / 77$         |  |
|            | TO                | C 54,                            |  |
|            |                   | C 5 5 5 853 \$ 856               |  |
|            |                   | \$750 Q63 \$ 8.2K                |  |
|            |                   | +150                             |  |
|            |                   |                                  |  |
|            | +16               | 5V1 - RIGO 77 \$ 910             |  |
|            | · .               | MIT                              |  |
|            |                   |                                  |  |
|            |                   | RI59<br>5.49K                    |  |
|            |                   | TO Q162                          |  |
|            |                   | TO Q161                          |  |
|            |                   |                                  |  |
|            |                   |                                  |  |
|            |                   |                                  |  |
|            |                   |                                  |  |
|            |                   |                                  |  |
|            |                   |                                  |  |

| Ţe | kt  | fO        | n      | <b>IX</b> ∞ |
|----|-----|-----------|--------|-------------|
|    | COM | AMATTED 1 | 'O EXC | ELLENCE     |

Date: <u>10-12-81</u> Change Reference: <u>M43813</u>

Product: 7854 OSCILLOSCOPE

SERVICE

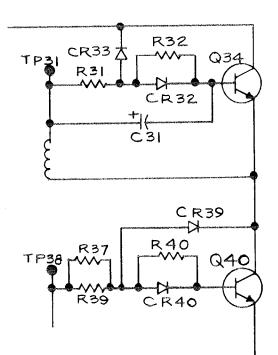
Manual Part No.: 070-2874-01

### DESCRIPTION

EFF SN B041395

|            | REPLACEABLE | ELECTRICAL PARTS LIST AND SCHEMATIC CHANGES |
|------------|-------------|---------------------------------------------|
| CHANGE TO: |             |                                             |
| A23        | 670-6259-01 | CKT BOARD ASSY: P.S. INVERTER               |
| ADD:       |             |                                             |
| A23CR33    | 152-0400-00 | SEMICOND DEVICE:SILICON,400V,1A             |
| A23CR39    | 152-0400-00 | SEMICOND DEVICE:SILICON,400V,1A             |
|            |             |                                             |

DIAGRAM (15) Converter/Rectifiers - Partial



| Tekt       | ronix.               |                        | ANGE INFOR         |             |
|------------|----------------------|------------------------|--------------------|-------------|
| COM        | MITTED TO EXCELLENCE | Date: <u>11-11-81</u>  | Change Reference:  |             |
| Product:   | 7854 EFF SN E        | 3041288                | Manual Part No.:   | 070-2874-01 |
|            |                      | DESCRIPTION            |                    |             |
|            | REPLACEABLE          | E ELECTRICAL PARTS ANI | SCHEMATIC CHANGES  |             |
| CHANGE TO: |                      |                        |                    |             |
| A25        | 670-5850-01          | CKT BOARD ASSY:DIG     | IT IZ ER           |             |
| A25C60     | 283-0107-00          | CAP., FXD, CER DI:511  | PF,5%,200V         |             |
| A25C561    | 281-0792-00          | CAP., FXD, CER DI:821  | PF,10%,100V        |             |
| A25R21     | 321165007            | RES., FXD, FILM:8.991  | K OHM,0.1%,0.125W  |             |
| A25R22     | 321-0666-07          | RES., FXD, FILM: 3.04  | K OHM,0.1%,0.125W  |             |
| A25R71     | 321-0816-07          | RES.,FXD,FILM:5K O     | HM,0.1%,0.125W     |             |
| A25R72     | 315-0272-00          | RES., FXD, CMPSN: 2.7  |                    |             |
| A25R73     | 321-1267 <b>-</b> 03 | RES.,FXD,FILM:5.97     | K OHM,0.25%,0.125W |             |
| A25R77     | 321-1313-07          | RES.,FXD,FILM:18K (    | OHM,0.1%,0.125W    |             |
| A25R79     | 321-0236-03          | RES.,FXD,FILM:2.8K     | OHM,0.25%,0.125W   |             |
| A25R80     | 311-0978-00          | RES., VAR, NONWW: TRM  | R,250 OHM,0.5W     |             |
| A25R81     | 321-1296-07          | RES., FXD, FILM: 12K ( | OHM,0.1%,0.125W    |             |
| A25R91     | 321-0657-07          | RES.,FXD,FILM:60 OF    | ₩,0.1%,0.125W      |             |
| A25R92     | 321-0239-07          | RES., FXD, FILM: 3.01  | к онм,0.1%,0.125W  |             |
| A25R289    | 321-0269-00          | RES.,FXD,FILM:6.19     | C OHM,1%,0.125W    |             |
| A25R292    | 321-1618-02          | RES.,FXD,FILM:6.5K     | OHM,0.5%,0.125W    |             |
| REMOVE:    |                      |                        |                    |             |
| A15C84     | 281-0788-00          | CAP.,FXD,CER DI:470    | )PF,10%,100V       |             |
| A25C87     | 283-0067-00          | CAP., FXD, CER DI:0.0  |                    |             |
| A25Q93     | 151-0190-05          | TRANSISTOR: SILICON,   | NPN                |             |
| A25Q94     | 151-0301-00          | TRANSISTOR:SILICON,    | PNP                |             |
| A25Q95     | 151-0301-00          | TRANSISTOR: SILICON,   |                    |             |
| A25R92     | 321-0274-00          | RES.,FXD,FILM:6.98     |                    |             |
| A25R93     | 315-0622-00          | RES., FXD, CMPSN: 6.21 |                    |             |
| A25R124    | 321-0218-00          | RES., FXD, FILM:1.82H  |                    |             |
| A25R125    | 321-0138-00          | RES., FXD, FILM: 267 ( |                    |             |
| A25R137    | 321-0133-00          | RES., FXD, FILM:237 (  |                    |             |
| A25R138    | 321-0189-00          | RES., FXD, FILM: 909 ( |                    |             |
| ADD:       |                      | ·                      |                    |             |
| A25R89     | 321-0657-07          | RES.,FXD,FILM:60 OF    | IM.0.1%.0.125W     |             |
| A25R90     | 321-0657-07          | RES., FXD, FILM:60 OF  |                    |             |
| A25R123    | 315-0121-00          | RES., FXD, CMPSN: 120  |                    |             |
| A25R136    | 321-0199-00          | RES.,FXD.FILM:1.15     |                    |             |

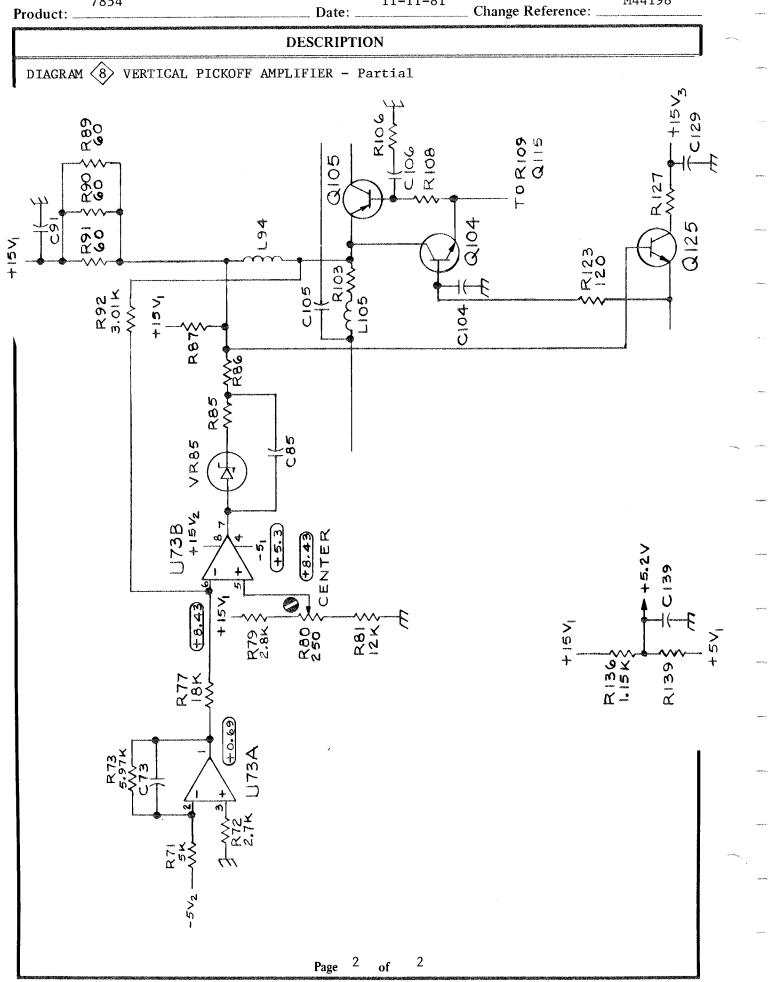
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Date: <u>12-17-81</u> Change Reference: <u>M44890</u>

Manual Part No.: 070-2874-01

**Product:** 7854

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1 alt INU.. 070 2014 01

REV.

# DESCRIPTION

EFF SN B031285

| BIT DN DOJI | 205          |                                           |                                          |
|-------------|--------------|-------------------------------------------|------------------------------------------|
|             | REPLACEAB    | LE ELECTRICAL PARTS AND SCHEMATIC CHANGES |                                          |
| CHANGE TO:  |              |                                           |                                          |
| A18 6       | 70-5832-01   | CKT BOARD ASSY:VERTICAL OUTPUT            |                                          |
| REMOVE:     |              |                                           |                                          |
| A18C12 2    | 83-0160-00   | CAP., FXD, CER DI:1.5PF, 10%, 50V         |                                          |
| A18C32 2    | 83-0160-00   | CAP.,FXD,CER DI:1.5PF,10%,50V             |                                          |
| A18C147 2   | 83-0160-00   | CAP.,FXD,CER DI:1.5PF,10%,50V             |                                          |
| A18C177 2   | 83-0160-00   | CAP., FXD, CER DI:1.5PF, 10%, 50V         |                                          |
| A18R12 3    | 17-0101-00   | RES.,FXD,CMPSN:100 OHM,5%,0.125W          |                                          |
| A18R32 3    | 17-0101-00   | RES.,FXD,CMPSN:100 OHM,5%,0.125W          |                                          |
| A18R147 3   | 17-0101-00   | RES.,FXD,CMPSN:100 OHM,5%,0.125W          |                                          |
| A18R177 3   | 17-0101-00   | RES.,FXD,CMPSN:100 OHM,5%,0.125W          |                                          |
| ADD:        |              |                                           |                                          |
| A18C164 2   | 81-0526-00   | CAP.,FXD,CER DI:1.5PF,+/0.5PF,500V        |                                          |
| A18C165 2   | 81-0151-00   | CAP., VAR, CER DI:1-3PF, 100V             |                                          |
| A18R164 3   | 11-0978-00   | RES., VAR, NONWW: TRMR, 250 OHM, 0.5W     |                                          |
| DIAGRAM ᠀   | Vertical Amp | Plifier - Partial $(+11.98)$ L148 U150    |                                          |
|             |              | R146/ ++                                  | 1                                        |
|             |              | $+15V_2$ $-1149$                          |                                          |
|             |              | C148-5                                    |                                          |
|             |              |                                           |                                          |
|             |              | C165芥SR143                                |                                          |
|             |              | 1-3                                       |                                          |
|             |              | 7                                         |                                          |
|             |              | + 12V                                     |                                          |
|             |              |                                           |                                          |
|             |              | C164                                      |                                          |
|             |              |                                           |                                          |
|             |              | 12                                        |                                          |
|             |              |                                           |                                          |
|             |              | C178 +++ 10                               |                                          |
|             |              | +15VR176) L178                            |                                          |
|             |              | €11.92 ·                                  |                                          |
|             |              | Page 1 of 1                               | i an |



7854 OSCILLOSCOPE

SERVICE

Date: <u>1-27-82</u> Change Reference: <u>M43949</u> 070-2874-01 Manual Part No.: \_\_\_\_

Product: ...

DESCRIPTION

EFF SN B041760

# **REPLACEABLE ELECTRICAL PARTS AND SCHEMATIC CHANGES**

| CHANGE TO: |                                         |                                     |
|------------|-----------------------------------------|-------------------------------------|
| A28        | 670-5848-08                             | CKT BOARD ASSY:4K EXPANDED RAM      |
|            | nan | (OPTION 2D ONLY)                    |
| A28C120    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF,+80-20%,50V   |
| A28C140    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF, + 80-20%,50V |
| A28C251    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF,+80-20%,50V   |
| A28C260    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF, +80-20%,50V  |
| A28C310    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF, +80-20%,50V  |
| A28C330    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF,+80-20%,50V   |
| A28C420    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF,+80-20%,50V   |
| A28C440    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF,+80-20%,50V   |
| A28C460    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF,+80-20%,50V   |
| A28C510    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF, +80-20%,50V  |
| A28C530    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF,+80-20%,50V   |
| A28C550    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF,+80-20%,50V   |
| A28C620    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF,+80-20%,50V   |
| A28C640    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF,+80-20%,50V   |
| A28C660    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF,+80-20%,50V   |
| A28C710    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF,+80-20%,50V   |
| A28C730    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF,+80-20%,50V   |
| A28C820    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF, +80-20%,50V  |
| A28C840    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF, +80-20%,50V  |
| A28C862    | 283-0421-00                             | CAP.,FXD,CER DI:0.1UF, +80-20%,50V  |
|            |                                         |                                     |



Date: May 3, 1982 Change Reference: M45630

Product: 7104 and 7854

Manual Part No.: See Below

### DESCRIPTION

EFF SN B021900 (7104) 070-2314-00 EFF SN B041800 (7854) 070-2874-01

#### REPLACEABLE ELECTRICAL PARTS CHANGES

CHANGE TO:

144637

jan.

| A12    | 670-5959-03                   | CKT BOARD ASSY: CONTROL/RECTIFIER(7854)             |
|--------|-------------------------------|-----------------------------------------------------|
| A24    | 670-5638-05                   | CKT BOARD ASSY: CONTROL/RECTIFIER(7104)             |
| A12C77 | 28 <b>3-00</b> 84-00          | CAP, FXD, CER DI: 270PF, 5%, 1000V(NOM. VALUE SEL.) |
| A12C78 | 283-0084-00                   | CAP, FXD, CER DI: 270PF, 5%, 1000V(NOM. VALUE SEL.) |
| C1277  | 283=0084=00                   | CAP, FXD, CER DI: 270PF, 5%, 1000V(NOM. VALUE SEL.) |
| C1278  | 28 <b>3=</b> 0084 <b>=0</b> 0 | CAP, FXD, CER DI: 270PF, 5%, 1000V(NOM. VALUE SEL.) |

A12C77 and A12C78 are located on the CONTROL/RECTIFIER board, and are shown on Diagram 15, Converter/Rectifiers(7854).

C1277 and C1278 are located on the CONTROL/RECTIFIER board, and are shown on Diagram 14, CONTROL RECTIFIER(7104).



Date: May 20, 1982 Change Reference: M44198 ADDEN.

7854 Product: ...

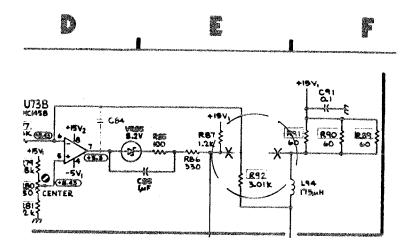
Manual Part No.: 070-2874-01

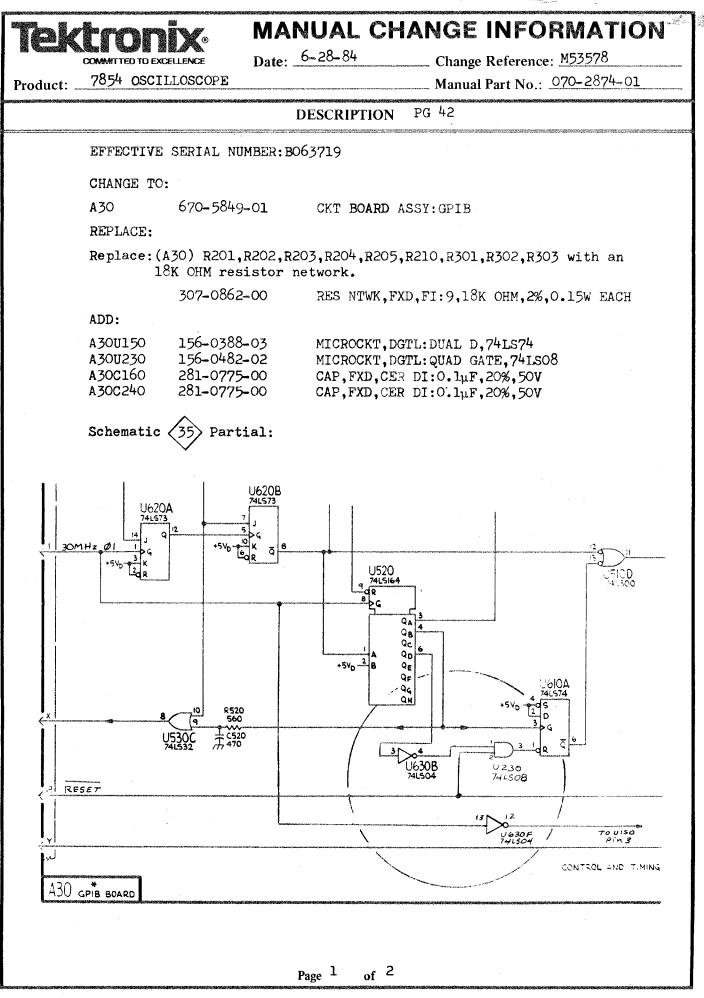
### DESCRIPTION

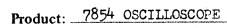
SCHEMATIC CHANGES

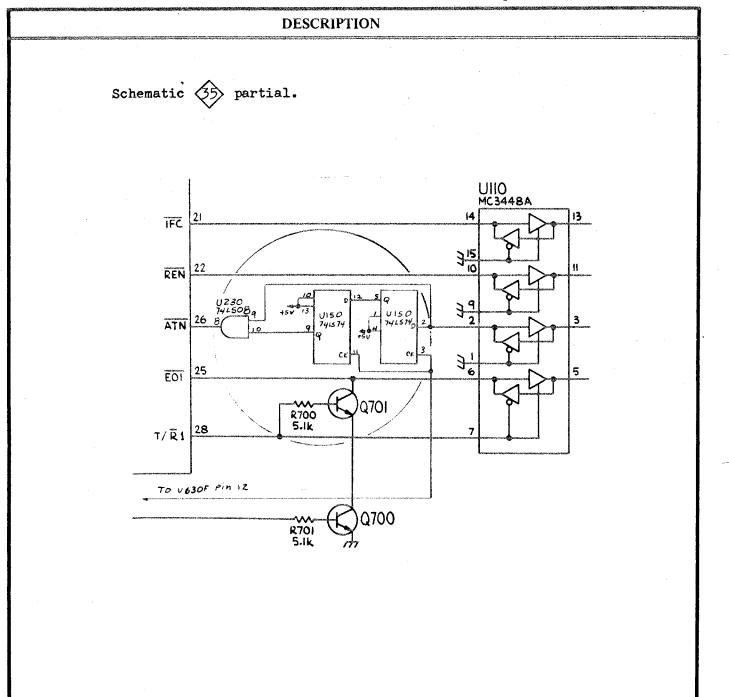
DIAGRAM 8, VERTICAL PICKOFF AMPLIFIER- Partial

Correction to the VOLTAGE/CURRENT REGULATOR circuit











02-04-85 Date:

**Change Reference:** 

See List Product:

Manual Part No.:

See List

### DESCRIPTION

PG 42

Eff SN B073999 (7854) 070-2874-01 B021130 (7904A) 070-4593-00

# **REPLACEABLE ELECTRICAL PARTS LIST CHANGES**

#### CHANGE TO:

| 7854<br>A20  | 670-5841-07 | CKT BOARD ASSY: HIGH VOLTAGE |
|--------------|-------------|------------------------------|
| 7904A<br>A20 | 670-5841-21 | KT BOARD ASSY: HIGH VOLTAGE  |

## **DIAGRAM CHANGES**

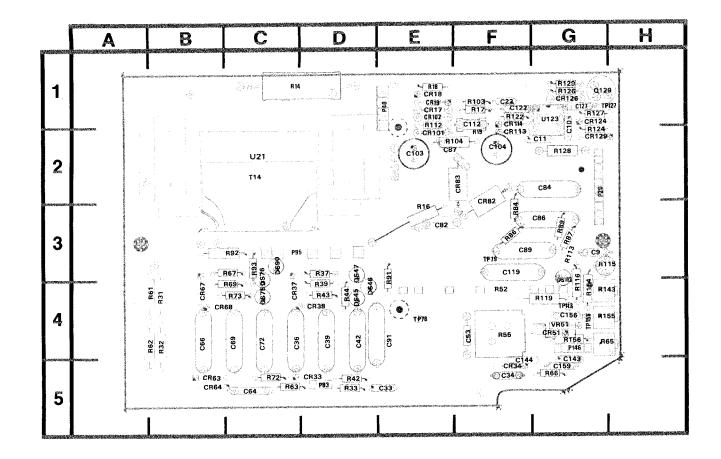
#### 7854

Add the following diagram and parts locator table to the Assemblies A21 & A20 diagram page. Figure 7-18a, A20-High Voltage circuit board assembly, and its parts locator table now apply to SN B042532 through B073998. Schematic locations remain the same.

#### 7904A

Add the following diagram and parts locator table to the Assembly A20 diagram page. Figure 8-17, A20-High Voltage circuit board assembly, and its parts locator table now apply to SN B021129 and below. Schematic locations remain the same.

PAGE 1 of 2



Change Reference: ....

M52285

|              | -                         |                                                  |                                                                                                                  |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------|---------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HIGH-VO      | LTAGE PO                  | NER SUPPLY                                       | AND CRT D                                                                                                        | IAGRAM                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|              |                           |                                                  |                                                                                                                  | in an |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ASSEMBLY A20 |                           |                                                  |                                                                                                                  |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| CIRCUIT      | BOARD                     | CIRCUIT                                          | BOARD                                                                                                            | CIRCUIT                                   | BOARD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| NUMBER       | LOCATION                  | NUMBER                                           | LOCATION                                                                                                         | NUMBER                                    | LOCATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| C9           | G3                        | CR102                                            | E1                                                                                                               | R62                                       | 84                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C10          | G2                        | CR113                                            | F2                                                                                                               | R63                                       | C5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C11          | G2                        | CR114                                            | FI                                                                                                               | R65                                       | H4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C22          | F1                        | CR124                                            | G1                                                                                                               | R66                                       | 84<br>C5<br>H4<br>G5<br>C3<br>C4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| C33          | E5                        | CR126                                            | G1                                                                                                               | R67                                       | C3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C34          | F5                        | CR129                                            | G2                                                                                                               | 869                                       | C4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C36          | C4                        |                                                  |                                                                                                                  | 872                                       | Č5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C39          | D4                        | DS45                                             | D4                                                                                                               | B73                                       | C4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C42          | D4                        | DS46                                             | D4                                                                                                               | R84                                       | F3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C53          | F4                        | DS47                                             | 03                                                                                                               | R86                                       | F3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C64          | C5                        | DS75                                             | C4                                                                                                               | R87                                       | G3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C66          | 84                        | DS76                                             | C3                                                                                                               | R89                                       | G3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C69          | C4                        | DS90                                             | C3                                                                                                               | R91                                       | E3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C72          | C4                        | DS113                                            | G4                                                                                                               | R92                                       | C3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C82          | E3                        | 03113                                            | 04                                                                                                               | R93                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| C84          | G2                        | P20                                              | <b>C</b> 2                                                                                                       |                                           | C3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C86          | G2<br>G3                  | P20                                              | G2                                                                                                               | R103                                      | F1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C86<br>C87   | 63<br>E2                  |                                                  | G2                                                                                                               | R104                                      | E2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|              |                           | P20                                              | G2                                                                                                               | R112                                      | E1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C89          | F3                        | P20                                              | G2                                                                                                               | R113                                      | G3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C91          | E4                        | P40                                              | E1                                                                                                               | R115                                      | G3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C103         | E2                        | P83                                              | D5                                                                                                               | R116                                      | G4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C104         | F2                        | P95                                              | C3                                                                                                               | 8119                                      | G4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C112         | F1                        | P146                                             | G4                                                                                                               | R122                                      | F1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C119         | F3                        | P146                                             | G4                                                                                                               | R124                                      | G2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C122         | F1                        |                                                  |                                                                                                                  | R126                                      | G1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C127         | G1                        | Q129                                             | G1                                                                                                               | R127                                      | G1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C143         | G5                        |                                                  |                                                                                                                  | R128                                      | G2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C144         | F5                        | R14                                              | C1                                                                                                               | R129                                      | G1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C156         | G4                        | R16                                              | E3                                                                                                               | R143                                      | G4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C159         | G5                        | R17                                              | F1                                                                                                               | R154                                      | G4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|              |                           | R18                                              | El                                                                                                               | R155                                      | G4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| CR17         | El                        | R19                                              | F2                                                                                                               | R156                                      | G4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| CR18         | E1                        | R31                                              | 84                                                                                                               |                                           | - · · ·                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| CR19         | E1                        | R32                                              | B4                                                                                                               | T14                                       | C2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| CR33         | D5                        | R33                                              | D5                                                                                                               |                                           | ~~                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| CR34         | F5                        | R37                                              | D3                                                                                                               | TP78                                      | E4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| CR37         | C4                        | R39                                              | D3                                                                                                               | TP79                                      | F3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| CR38         | D4                        | R42                                              | 05                                                                                                               | TP113                                     | F3<br>G4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| CR51         | G4                        | R43                                              | D4                                                                                                               | TP127                                     | G4<br>H1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| CR63         | 85                        | R44                                              | D4                                                                                                               | TP156                                     | G4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| CR64         | 85                        | 852A                                             | F4                                                                                                               | 17100                                     | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| CR67         | 84                        | R528                                             | F4<br>F4                                                                                                         |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| CR68         | 84<br>B4                  |                                                  |                                                                                                                  | U21                                       | C2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| CR82         |                           | R52C                                             | F4                                                                                                               | U123                                      | G1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|              | F2                        | R52D                                             | F4                                                                                                               |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| CR83         | F2                        | R55                                              | F4                                                                                                               | VR51                                      | G4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| CR101        | E2                        | R61                                              | B4                                                                                                               |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|              | FIRE STATES OF THE STATES | NEW WARMAN AND AND AND AND AND AND AND AND AND A | NAMES OF A DESCRIPTION OF A |                                           | en som en state in state of the |

PAGE 2 of 2

|             | 7054 00000000000000000000000000000000000 |                                          |                                          |
|-------------|------------------------------------------|------------------------------------------|------------------------------------------|
| Product:    | 7854 Oscilloscope                        | an a | Manual Part No.: 070-2874-01             |
|             |                                          | DESCRIPTION                              | Product Group 42                         |
| These cha   | nges are effective for                   | r all serial numbers.                    |                                          |
|             | REPLAC                                   | EABLE ELECTRICAL PART                    | IS LIST CHANGES                          |
| CHANGE 1    | °O:                                      |                                          |                                          |
| A36         | 670-5795-00                              | CKT BOARD ASSY:CALCULAT                  | OR ELECTRONICS                           |
|             | REPLACE                                  | EABLE MECHANICAL PAR                     | TS LIST CHANGES                          |
| CHANGE T    | O:                                       |                                          |                                          |
| Fig. 7-6    |                                          | 1 CKT BOARD ASSY:CALC                    | ULATOR ELECTRONICS (SEE A36 REPL)        |
|             |                                          | TEXT CHANGES                             |                                          |
| Theory of ( | Operation, Page 2-54                     |                                          |                                          |
| Chang       | e all occurences of U220.                | A to U202A in the CLOCK DIVIDE           | R and KEYBOARD SCANNER sections.         |
| Theory of ( | Operation, Page 2-57                     |                                          |                                          |
| Chang       | e all occurences of U220,                | A to U202A in the KEYBOARD ST            | OP / SCAN section.                       |
| Theory of ( | Operation, Page 2-58                     |                                          |                                          |
| Change      | e U220A to U202A and L                   | J220B to U202B in the second sente       | ence of the ROW SCANNER section.         |
| Change      | e all occurences of U220                 | D and U220E to U202D and U202E i         | in the LED DRIVERS section.              |
| Maintenand  | ce, page 3-26                            |                                          |                                          |
|             | e A36 – Calculator Ke<br>Removal.        | eyboard Electronics Board Rer            | noval to A36-Calculator Electronics      |
| Chara       | e Calculator Keyboard Ele                | ectronics board to Calculator Electron   | ics board in Step 5 under A36 Calculator |

### DESCRIPTION

## **DIAGRAM CHANGES**

## Assemblies A36 & A37

### Figure 7-27. A36-Calculator Keyboard circuit board assembly.

Change Figure 7-27 to A36-Calculator Electronics circuit board assembly.

Change U220 to U202 (location B2).

### PARTIAL A36 ASSY parts locator table.

Change U220A, U220B, U220D, U220E, and U220F to U202A, U202B, U202D, U202E, and U202F.

# 19 Calculator Keyboard

Change U220A to U202A (location G2).

Change U220B to U202B (location H1).

Change U220D to U202D (location B3).

Change U220E to U202E (location B2).

Change U220F to U202F (location B4).

Change A36 from CALCULATOR KEYBOARD BOARD to CALCULATOR ELECTRONICS BOARD (location G5).