TEK

070-6864-02
Product Group 38

24X5B/2467B
OPTIONS
SERVICE

(SERIAL NUMBER B050000 AND ABOVE)

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. Refer to Operators Safety Summary and Service Safety Summary prior to performing any service.

Please check for CHANGE INFORMATION at the rear of this manual.

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COMMITTED TO EXCELLENCE

Instrument Serial Numbers

Each instrument manufactured by Tektronix has a serial number on a panel insert or tag, or stamped on the chassis. The first letter in the serial number designates the country of manufacture. The last five digits of the serial number are assigned sequentially and are unique to each instrument. Those manufactured in the United States have six unique digits. The country of manufacture is identified as follows:

B010000	Tektronix, Inc., Beaverton, Oregon, USA
E200000	Tektronix United Kingdom, Ltd., London
J300000	Sony/Tektronix, Japan
H700000	Tektronix Holland, NV, Heerenveen, The Netherlands

Instruments manufactured for Tektronix by external vendors outside the United States are assigned a two digit alpha code to identify the country of manufacture (e.g., JP for Japan, HK for Hong Kong, etc.).

Tektronix, Inc., P.O. Box 500, Beaverton, OR 97077

PREFACE

This manual contains service information about the following options to the TEKTRONIX 2445B, 2455B, 2465B, and 2467B Oscilloscopes:

- Option 10 (GPIB)
- Option 05 (TV) and Option 5H (HDTV)
- Option 06 (CTT), Option 09 (CTT and WR), Option 1E (CTT with EFR)
- Option 01 (DMM)

Option 10 makes it possible to remotely control the instrument through the General Purpose Interface Bus; Option 05 and 5H make it easier to trigger and view television signals; Option 06 and Option 09 give the oscilloscope increased measurement, counting, and triggering capability through the Counter/Timer/Trigger and Word Recognizer, Option 1E increases the accuracy and resolution of Option 06 and Option 09 frequency measurements through External Frequency Reference; Option 01 adds a fully autoranging digital multimeter. Operating information for the options is contained in the Operators manual for the oscilloscope.

A few words about the organization of this manual should be helpful. Some sections deal with each option individually and some sections apply to all the options. The lists of replaceable electrical and mechanical parts include all the options, but are separated according to oscilloscope model numbers.

Sections 1 through 4 are each devoted to one of the options. They include these topics: Specifications, Preparation for Use, Theory of Operation, and Performance Check and Calibration Procedures.

Section 5 covers Maintenance for all the options.

Sections 6 through 9 are the four Replaceable Electrical Parts lists, one for each separate instrument.

Section 10 contains diagrams on foldout pages. Then the diagrams for each specific option are grouped in order, with the Detailed Block Diagram first and the Troubleshooting Procedure last. The Interconnection Charts and Interconnection Diagram complete Section 10.

Sections 11 through 14 consist of Replaceable Mechanical Parts lists and exploded drawings for all the options.

At the back of the manual there is a place to insert Change Information.

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OPERATORS SAFETY SUMMARY

The general safety information in this part of the summary is for both operating and servicing personnel. Specific warnings and cautions will be found throughout the manual where they apply and do not appear in this summary.

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.

Terms As Marked On Equipment

CAUTION indicates a personal injury hazard not immediately accessible as one reads the markings, 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

This symbol indicates where applicable cautionary or other information is to be found. For maximum input voltage see Table 1-1.

Symbols As Marked On Equipment

DANGER – High voltage.

Protective ground (earth) terminal.

ATTENTION – Refer to manual.

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.

Grounding the Product

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 making any connections to the product input or output terminals. 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 insulated) can render an electric shock.

Use the Proper Power Cord

Use only the power cord and connector specified for your product.

Use only a power cord that is in good condition.

For detailed information on power cords and connectors, see Table 2-1.

Use the Proper Fuse

To avoid fire hazard, use only a fuse of the correct type, voltage rating and current rating as specified in the parts list for your product.

Do Not Operate in Explosive Atmospheres

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

Do Not Remove Covers or Panels

To avoid personal injury, do not remove the product covers or panels. Do not operate the instrument without the covers and panels properly installed.

SERVICING SAFETY SUMMARY

FOR QUALIFIED SERVICE PERSONNEL ONLY

Refer also to the preceding Operators Safety Summary.

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 With Power On

Dangerous voltages exist at several points in this product. To avoid personal injury, do not touch exposed connections or components while power is on.

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

Power Source

This product is intended to operate from a power source that does 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.

Section 1

GPIB

SPECIFICATION

INTRODUCTION

Option 10 to the 24X5B and 2467B Oscilloscopes adds the hardware and software that allows these instruments to be remotely controlled and queried using a standard interface system. The interface implemented conforms to the specifications contained in *IEEE Standard Digital Interface for Programmable Instrumentation (ANSI/IEEE Std 488-1978)*, commonly referred to as the General Purpose Interface Bus (GPIB). It also complies with a Tektronix Standard relating to GPIB Codes, Formats, Conventions and Features.

This manual describes GPIB operational elements only in relation to communication between the oscilloscope and the remote controller by way of the bus. For complete information regarding GPIB electrical, mechanical, and functional aspects, refer to ANSI/IEEE Std 488-1978, which is published by:

The Institute of Electrical and Electronics Engineers, Inc.
345 East 47th Street
New York, New York 10017

Messages originating from a remote controlling device and transmitted over the GPIB perform one of three functions:

1. Set the oscilloscope operating mode.

2. Query the state of the oscilloscope.

3. Query the results of measurements made.

All oscilloscope front-panel functions are controllable through the GPIB interface, with these exceptions: BEAM FIND, FOCUS, TRACE ROTATION, ASTIG, SCALE ILLUM, and POWER. Structure and format of the commands and queries executable by the GPIB Option are explained in Section 5, "Communication Between Oscilloscope and Controller," of the 24X5B/2467B Option 10 Instrument Interfacing Guide (IIG). A listing of command headers and arguments, along with concise descriptions, is provided in Section 6 of the IIG.

The alphanumeric CRT readout is used to display measurement results, diagnostic test messages, exercise messages, and calibration messages. Any measurement result that is displayed on the CRT readout can also be transmitted over the GPIB.

ACCESSORIES AND SOFTWARE

Standard Accessory

In addition to the standard accessories listed in the oscilloscope manuals, one copy of the following Option 10 accessory is provided:

24X5B/2467B Option 10 Instrument Interfacing Guide

Optional Accessories

The optional accessories for Option 10 are:

24X5B/2467B Options Service Manual

GPIB Cables—1 m, 2 m and 4 m double shield, low EMC

Protective Waterproof Vinyl Cover

Software

The following software is available for instruments with GPIB:

EZ-TEK 2400 Test Program Generator

EZ-TEK 2400 PC Test Program Generator (requires GURU hardware)

GPIB User's Resource Utility (GURU)

The service manual and all other optional accessories and software can be ordered from Tektronix, Inc. A local Tektronix Field Office, representative, or the Tektronix Product catalog can provide ordering and product information.

STANDARD FUNCTIONS, FORMATS, AND FEATURES

The total interface-function repertoire of an instrument on the GPIB, in terms of interface-function subsets, is identified in *ANSI/IEEE Std 488-1978*. The status of subsets applicable to 24X5B and 2467B Oscilloscopes with Option 10 are listed in Table 1-1.

A Tektronix standard identifies the format and features of messages sent over the bus to communicate with other instruments equipped with a GPIB interface. Specific features implemented in the 24X5B and 2467B Oscilloscopes are listed in Table 1-2, and specific formats are shown in Table 1-3.

Table 1-1
ANSI/IEEE Std 488-1978 (GPIB) Functions

Function	Description
SH1	Source Handshake. Complete capability.
AH1	Acceptor Handshake. Complete capability.
T6	Basic Talker. Responds to Serial Poll. Unaddress if My Listen Address (MLA) is received.
L3	Basic Listener. Listen Only. Unaddress if My Talk Address (MTA) is received.
SR1	Service Request. Complete capability.
RL1	Remote-Local. Complete capability.
DC1	Device Clear. Complete capability.
PP0	Parallel Poll. Does not respond to Parallel Poll.
DT0	Device Trigger. Does not have Device Trigger capability.
C0	Controller. Does not have Controller capabilities.

NOTE

Open collector bus drivers (E1) are used by this instrument.

Table 1-2
Specific Features Implemented

Feature	Description
Indicators	REM (remote), SRQ (service request), and LOCK (front-panel lockout) indicators are included.
Parameter Selection	Selection is via diagnostic menu and CRT readout. Nonvolatile storage is in the base instrument's RAM. No hard-wired switches are provided for this feature.
Secondary Addressing	Not implemented.

Table 1-3
Specific Format Choices

Format Parameter	Description
Format Characters	Not transmitted; ignored on reception.
Message Terminator	Either the End-or-Identify (EOI) or the Line-Feed (LF) mode can be selected.
Measurement Terminator	Follows program message-unit syntax, which allows numeric characters in headers and alphabetic data arguments for reporting.
Link Data (Arguments)	Used in Listen and Talk modes.
Instrument Identification Query	Descriptors are added for other installed options.
SETtings Query	Extended, using LLSet commands, to allow block binary response.
INIt Command	Causes the oscilloscope to return to a power-on condition. All operating modes then agree with actual front-panel settings.
Return to Local (rtl) Message	Asserted when any front-panel control attempts to change a GPIB-controllable function.
Time/Date Commands	Not implemented.
Stored Setting Commands	Not implemented.
Waveform Transmission	Not implemented.
Device Trigger (DT)	Not implemented.
Multiple Event Reporting	Not implemented.
IEEE 728	Compliance not intended.

PERFORMANCE CONDITIONS

Except as noted in Tables 1-4 and 1-5 of this manual, the electrical, environmental, and mechanical characteristics of Option 10 instruments (including the performance conditions) are identical to those specified in the respective 24X5B and 2467B Oscilloscope Operators manual.

Table 1-4
Option 10 Electrical Characteristics

Characteristics	Performance Requirements
Vertical Position Accuracy	Position accuracy is only valid when: 1. Positioning occurs after a BALance command is invoked at the ambient temperature in which the instrument is operating. 2. The VOLTS/DIV VAR control is in the calibrated detent.
CH 1, CH 2 (noninverted)	
$+15°C$ to $+35°C$	$\pm$(0.3 division + 3% of distance from center screen in div + 0.5 mV/V/DIV setting).
CH 2 Inverted	Add 0.2 div.
$-15°C$ to $+15°C$ and $+35°C$ to $+55°C$	Add 1.5 mV/V/DIV setting.
CH 3 and CH 4	$\pm$(0.7 division + 3% of distance from center screen in divs.)
IEEE 488 Outputs	
Volts Out for True ($I_{OT} = 48$ mA)	Max 0.5 V.[a]
Volts Out for False ($I_{OF} = -5.2$ mA)	Min 2.5 V.[a]
Volts Out with Output Disabled	Max 3.7 V, Min 2.5 V.[a]
Output Leakage Current with Power OFF ($0 V < V_{IN} < 2.5 V$)	Max 40 μA.[a]
IEEE 488 Inputs	
Volts In for True	Max 0.8 V, Min 0 V.[a]
Volts In for False	Max 5.5 V, Min 2.0 V.[a]
Current In for True ($V_{IT} = 0.5$ V)	Max -0.1 mA.[a]
Current In for False ($V_{IF} = 2.7$ V)	Max 20 μA.[a]

[a]**Performance Requirement not checked in manual.**

Table 1-5
Option 10 Mechanical Characteristics

Characteristics	Performance Requirements
Weight	
With Power Cord, Cover, Pouch, Probes, Operators Manual, and Options	≤ 12.0 kg (26.4 lb).
Domestic Shipping Weight	≤ 17.6 kg (38.8 lb).

GPIB PREPARATION FOR USE

Before initially turning on power to the instrument, read Section 2 in the standard oscilloscope Service manual and follow the safety and precautionary information described there.

POWER-UP SEQUENCE

The power-up tests, automatically performed each time the oscilloscope is turned on, examine both the oscilloscope circuitry and the Option 10 GPIB circuitry. Tests that apply to the GPIB Option are integrated into the power-up tests for the host oscilloscope; they include the GPIB Kernel tests and a Confidence test.

Kernel Tests

Operation of the Option 10 memory (ROM) is checked by Kernel tests. Failure of any GPIB Kernel test is also signaled by a flashing A SWP TRIG'D indicator on the instrument front panel.

Even with a Kernel failure, pressing the A/B TRIG button may still place the instrument in an operating mode. However, if the operating mode is successfully entered, instrument operation may be unpredictable.

Confidence Test

Failure of the GPIB Confidence test during power-up is indicated in the bottom line of the CRT readout. The failure display has the following format:

GP TEST 11 FAIL YY

where **YY** represents the code for the failed test segment.

A Confidence test failure may not render the GPIB interface inoperable. Pressing in the A/B TRIG button may still place the instrument into the normal operating mode; however, it may not meet all GPIB specifications.

Successful Power-Up Sequencing

When the power-up routine is successfully completed without a failure indication, five instrument events occur:

1. The oscilloscope enters the normal operating mode.
2. The GPIB interface enters the Local State (LOCS).
3. The GPIB interface asserts Service Request (SRQ) provided the Request Service (RQS) status is ON. (See the RQS System Command description in Table 6-5 of the 24X5B/2467B Option 10 Instrument Interfacing Guide.)
4. The oscilloscope functions are set to the values which were established before the instrument was last turned off, with front-panel settings taking precedence.
5. The GPIB interface responds to a controller's serial poll with a status byte of 65 (decimal), meaning that all tests were successful and power is on, provided the Request Service (RQS) stored status is ON. (See the RQS System Command description in Table 6-5 of the 24X5B/2467B Option 10 Instrument Interfacing Guide.)

The instrument is now ready to make measurements as required.

Unsuccessful Power-Up Sequencing

If power-up tests fail, four instrument events occur:

1. The oscilloscope does not enter the normal operating mode.
2. The GPIB interface enters the Local State (LOCS).
3. The GPIB interface asserts Service Request (SRQ) provided the Request Service (RQS) stored status is ON. (See the RQS System Command description in Table 6-5 of the 24X5B/2467B Instrument Interfacing Guide.)
4. The GPIB interface responds to a controller's serial poll with a status byte of 65 (decimal), meaning that power is on, provided the Request Service (RQS) stored status is ON. (See the RQS System Command description in Table 6-5 of the 24X5B/2467B Option 10 Instrument Interfacing Guide.)

As explained in preceding paragraphs, it may be possible, after a power-up test failure, to place the instrument into a normal operating mode by pressing the A/B TRIG button. If it then functions adequately for your particular measurement requirement, the instrument can be used, but refer it to a qualified service technician for repair of the problem as soon as possible.

POWER-DOWN SEQUENCE

There are no special sequences associated with powering down the instrument. When the POWER switch is set to OFF, the instrument powers down and the most recent RQS ON or RQS OFF command determines whether the GPIB interface will assert the Service Request (SRQ) message at the next power-on.

THEORY OF OPERATION

INTRODUCTION

SECTION ORGANIZATION

This section contains a functional circuit description of the Option 10 (GPIB) circuitry for the 24X5B and 2467B Oscilloscopes. The discussion begins with an overview of the option functions and continues with detailed explanations of each major circuit. Reference is made to supporting schematic and block diagrams, which aid in understanding the text. These diagrams show interconnections between parts of the circuitry, identify circuit components, list specific component values, and show interrelationships with the standard oscilloscope.

The block and schematic diagrams are located in the tabbed "Diagrams" section at the rear of this manual. The particular schematic diagram associated with each circuit description is identified by number in the text. The diagram number, enclosed within a diamond symbol, also appears on the tab of the appropriate foldout page. For optimum understanding of the circuit being described, refer to both the applicable schematic and block diagrams.

DIGITAL LOGIC CONVENTIONS

Digital logic circuits perform many functions within the instrument. The operation of these circuits is represented by specific logic symbology and terminology. Logic-function descriptions contained in this manual use the positive-logic convention. The specific voltages which constitute a HI or a LO vary among individual devices. For specific device characteristics, refer to the manufacturer's data book.

GENERAL CIRCUIT DESCRIPTION

Before individual circuits are discussed in detail, a general block-level discussion is provided to help you understand overall operation of the option circuitry. A simplified block diagram of the option, showing basic interconnections, is shown in Figure 10-4. The diamond-enclosed numbers in the blocks refer to the schematic diagrams at the rear of this manual in which the corresponding circuitry is located. Throughout this discussion, standard oscilloscope refers to 24X5B and 2467B Oscilloscope circuitry without option circuitry.

The activities of the option are directed by the microprocessor contained in the standard oscilloscope. The microprocessor, under the control of firmware present in the option, monitors the option's functions and sets up the operating modes according to instructions received.

While executing the control program, the microprocessor retrieves previously stored calibration constants and front-panel settings and, as necessary, places program-generated data in temporary storage for later use. The random access memory (RAM), and ultraviolet erasable programmable read only memory (EPROM) contained in the option circuit boards, and the nonvolatile RAM in the base instrument provide these storage locations.

The microprocessor control bus, address bus, and data bus are buffered by Control board circuitry. Microprocessor bus timing for the option is modified by buffers on the Control board to make bus timing more compatible with the options. Address bus decoding allows individual circuits to be addressed.

These signal paths are used for communication between the option and the standard oscilloscope and involve both data and control signals. The main oscilloscope circuitry uses them to control the option. The option uses them to send information to the standard oscilloscope for display and to control the standard oscilloscope.

GPIB BOARD

The GPIB option adds a GPIB port to the instrument. The GPIB board contains the microprocessor interface, including RAM and EPROM, that permits the microprocessor to control the option. A GPIB interface IC, buffers, and connector provide the actual interface connection to the GPIB. Status indicators located on the front panel indicate the current status of the GPIB interface.

DETAILED CIRCUIT DESCRIPTION

INTRODUCTION

The following discussion provides detailed information concerning the electrical operation and circuit relationships of the GPIB Option. Unique circuitry in this option is described in detail, while circuits common in the electronics industry are not. The descriptions are supported by the associated detailed block diagram (Figure 10-9) and schematic diagrams located at the rear of this manual in the tabbed foldout pages.

GPIB CIRCUIT BOARD

The GPIB circuit board (see diagram 22) provides a GPIB port to the instrument and its options. It contains the following digital circuits:

Address Bus and Decoding

The microprocessor address bus is buffered by U4501 and U4505.

The address decode circuitry generates enabling signals and strobes that allow the microprocessor to control the various circuit functions and devices as in the standard oscilloscope (see "Address Decode" description in the Service manual of the standard oscilloscope). The memory map for the GPIB option is shown in Table 1-6.

**Table 1-6
GPIB Option Memory Map**

ADDRESS	DESCRIPTION	DEVICE NO.
2000-3BFF	Non-paged EPROM	U4710
3C00-3F7F	RAM	U4811
3FB0-3FB7	GPIB interface IC	U4818
3FCX	Input multiplexer and GPIB page select latch	U4625
3FDX	Output multiplexer latch	U4626
3FEX	Status register	U4701
4000-7FFF	Paged EPROM	U4715
7FFF	Option select register	U4838

Page register U4838B enables and disables access to paged EPROM U4715 and is selected by U4601. Whenever there is a write to address 7FFF, data bus line D0 is latched by the page register. If D0 is latched HI, paged EPROM U4715 will be selected for memory accesses within the paged address space. The paged EPROMs address is decoded by U4705B. Both the paged address range and the page register output signals are combined in U4735A to give $\overline{\text{PAGE}}$ (TP4748), the enable signal for the paged EPROM (U4715 pin 20). Within the EPROM, two pages of memory are available for the GPIB operating code. The internal EPROM pages are selected through U4625. A 0 on pin 15 of U4625 selects page 0 while a 1 selects page 1.

Nonpaged EPROM U4710, RAM U4811, and I/O decoder addresses are decoded by U4605, U4606, U4738, and U4706. The lower address lines (BA12 to BA7) determine whether the nonpaged EPROM, RAM, or the I/O decoder is selected. A LO $\overline{\text{ROM}}$ signal (TP4841) indicates that EPROM U4710 is selected. A LO $\overline{\text{RAM}}$ signal (TP4843) indicates that RAM U4811 is selected. One-of-eight decoder U4708 decodes the I/O. Its gate inputs, pins 4 through 6, select the address range from 3F80 through 3FFF. Only four of the eight outputs are used:

STATUS—pin 9 selects status register U4701.

OUTMUX—pin 10 selects output multiplexer register U4626.

INMUX—pin 11 selects input multiplexer and GPIB page select register U4625.

GPIB—12 selects GPIB interface IC U4818.

A write strobe, $\overline{\text{GW}}$, is generated by U4831C. A LO $\overline{\text{GW}}$ indicates bus data should be written to the enabled device. Similarly, read strobes $\overline{\text{GR}}$ and GR are generated by U4706D and U4705D. They are used to identify microprocessor read cycles. All three strobes are generated from $\overline{\text{E}}$ and BR/$\overline{\text{W}}$ DLYD.

The three major address-space strobes, for the page register and the unpaged and paged ROMs, are brought together at U4738B to generate OPTS. It will be HI whenever the option is addressed.

Data Bus Buffers

The data bus is buffered by bidirectional buffer U4608. This buffer is enabled by OPTS and $\overline{\text{E}}$ through U4706A and U4705A. The direction of data is controlled by the delayed R/$\overline{\text{W}}$ signal. This delayed R/$\overline{\text{W}}$ signal, which extends the time data buffer U4608 is enabled, is generated through latch U4801 pins 4, 5, 3, and 2 which are connected to form a two-bit shift register clocked by the 10-MHz clock. This delay is required whenever there is a write to either the RAM or the GPIB interface IC.

Wait State Generator

A wait state is required any time the GPIB interface IC is written to. The wait state (MR LO, U4730D) is started by $\overline{\text{GW}}$ and $\overline{\text{GPIB}}$ through U4831B, U4706B, and U4730D. It continues until the same signals are clocked through shift register U4801, latch U4838A, and U4730D. The shift register and latch combination provide a delay of 500-600 ns.

GPIB Interface IC and Buffers

The actual interface to the IEEE 488 bus is accomplished by GPIB interface IC U4818 and buffers U4805 and U4808. The GPIB interface IC is enabled by $\overline{\text{GPIB}}$, which is generated by U4708. Bus data is gated out of and into the IC by GR and $\overline{\text{GW}}$. The microprocessor enable line $\overline{\text{E}}$ is used as a clock at pin 18. Address lines A0, A1, and A2 are applied to register select pins 6, 7, and 8 to select registers internal to the interface IC. Data bus lines are reversed, D0 for D7, to accommodate the GPIB interface IC's internal convention. The TRIG signal, pin 39, is sensed by STATUS register pin 4 for a diagnostic check of the GPIB interface IC. Bus buffers U4805 and U4808 provide the drive characteristics required by IEEE 488 bus standards.

GPIB Buffer Power Switch

To prevent glitches occurring at power-up from disturbing the GPIB bus, a fast-rise-time power-supply switch is provided for GPIB buffers U4805 and U4808. At power-up $\overline{\text{BRESET}}$ clears U4801 via pin 1. With U4801 reset, both Q4745 and Q4743 are held OFF, preventing the buffers from receiving power. Both inputs to U4735D are LO after reset, keeping U4801 pin 17 LO and the buffer power switch off. The first time that status register U4701 is enabled and read, pin 13 of both U4701 and U4735D go LO. This causes U4801 pins 16 and 17 to change states and to stay HI, applying power to the GPIB buffers.

Status Register

This tristate buffer (U4701) is used for the following diagnostic and operational functions:

Check GPIB interface IC U4818 via pin 5.

Check the GPIB buffer's switched 5 V supply via pin 3.

Check wait state generation via pin 7.

Check latches U4625 and U4626 and light-emitting diode (LED) driver U4730 via pins 9, 11, and 17.

Control the GPIB buffer's switched supply via pin 13.

Light-Emitting Diode Drivers and LED Board GPIB status U4626

Open collector, inverting buffers U4730A, U4730B, and U4730C drive the remotely located LED board. Series resistors at the output of each buffer limit LED current. The buffer outputs are sensed by the Status register U4701 for diagnostic purposes.

PERFORMANCE CHECK AND ADJUSTMENT PROCEDURES

INTRODUCTION

This section contains the Option 10 (GPIB) portion of the instrument's performance check and adjustment procedures. The "Performance Check Procedure" is used to check the instrument's performance against the requirements listed in Table 1-4. The "Adjustment Procedure" is used to restore optimum performance or return the option to conformance with its "Performance Requirements" as listed in Table 1-4.

Instrument performance should be checked after every 2000 hours of operation or once each year if used infrequently. A more frequent interval may be necessary if the instrument is subjected to harsh environments or severe usage. The results of these periodic checks will determine the need for recalibration.

Before performing these procedures, ensure that the LINE VOLTAGE SELECTOR switch is set for the ac power source being used (see Section 2 of the standard instrument Service manual). Connect the instrument to be checked and the test equipment to an appropriate power source.

LIMITS AND TOLERANCES

The tolerances given in these procedures are valid for an instrument that has been previously calibrated in an ambient temperature between +20°C and +30°C and is operating in an ambient temperature between −15°C and +55°C. The instrument also must have had at least a 20-minute warm-up period. To assure instrument performance, perform all steps in the following procedures at the same ambient temperature. When performing the GPIB Option checks and adjustment, it is assumed that the standard instrument meets all of its "Performance Requirements" as stated in Section 1 of the standard instrument Service manual.

TEST EQUIPMENT

Test equipment listed in Table 1-7 is required to perform this procedure. Since detailed operating instructions for the test equipment are not provided in this procedure, refer to the appropriate test-equipment instruction manual if additional information is required.

Table 1-7
Test Equipment Required

Item and Description	Specification	Examples of Applicable Test Equipment
1. GPIB Controller	IEEE-488-1978 compatible.	TEKTRONIX 4050-Series Computers.
2. GPIB cable	IEEE-488-1978 compatible.	Tektronix Part Number 012-0630-03.

PERFORMANCE CHECK PROCEDURE

This procedure is used to verify proper operation of the option. This check may also be used as an acceptance test and as a preliminary troubleshooting aid. Perform all steps, both in the sequence presented and in their entirety, to ensure that control settings are correct for the following step.

PREPARATION

Removing the wrap-around cabinet is not necessary to perform this procedure. All checks are made using the operator accessible front- and rear-panel controls and connectors.

Turn the instrument on and ensure that no error message is displayed on the CRT. If the instrument displays **"DIAGNSTIC. PUSH A/B TRIG TO EXIT"** at power on, one of the power-up tests has failed. If the error message on the bottom line of the CRT is **"TEST 04 FAIL XX"** where XX is X1, 1X, or 11, the stored calibration data is in error and the instrument should be recalibrated by a qualified service technician before performing the "Performance Check Procedure." If any other error messages occur, the failure is probably not related to calibration and the instrument should be repaired by a qualified service technician before performing either procedure.

Set the oscilloscope's GPIB address to 1, the end-of-message terminator to EOI, and the talk/listen mode to TALK LISTEN. To set these parameters:

1. Hold in both the ΔV and Δt buttons and press the Trigger SLOPE button to enter the Diagnostic Menu. The top row of readout will display **"DIAGNSTIC. PUSH A/B TRIG TO EXIT."**
2. Press and hold the lower Trigger MODE button to sequence through the TEST and EXER routine labels until the message **"GP EXER 11"** appears at the lower left corner of the CRT.
3. Press the upper Trigger COUPLING button, causing the top row of the readout to display **"GPIB ADDRESS nn"** (where nn is a primary address within the range 0 through 31).
4. Turn the Δ control to select the desired address (1).
5. Press the lower Trigger COUPLING button to update the stored address and return the oscilloscope to the Diagnostic Menu.
6. Briefly press the upper Trigger MODE button, causing the message **"GP EXER 12"** to appear at the lower left corner of the CRT.
7. Press the upper Trigger COUPLING button, causing the top row of the readout to display

"TERMINATOR _ MODE __________________"

where the terminator may be either **"LF"** or **"EOI"** and the mode may be either **"LISTEN ONLY"** or **"TALK LISTEN"**.

8. Press one of the Trigger MODE buttons to select the desired terminator (EOI) and press one of the Trigger SOURCE buttons to select the desired mode (TALK LISTEN).
9. Press the lower Trigger COUPLING button to update the stored terminator and mode settings and return to the Diagnostic Menu.
10. Press A/B TRIG to return to normal instrument operation.

GPIB OPTION CHECKS

Initial Control Settings

Control settings not listed do not affect the procedure.

a. Set:

VERTICAL MODE

CH 1, CH 2, CH 3, CH 4	On
ADD, and INVERT	Off
CHOP/ALT	ALT (button out)
20 MHz BW LIMIT	Off

VOLTS/DIV

CH 1 and CH 2	1 V
CH 1 and CH 2 VAR	In detent
CH 3 and CH 4	0.1 V

Input Coupling

CH 1 and CH 2	1 MΩ GND

Horizontal

A SEC/DIV	1 ms (knob in)
SEC/DIV VAR	In detent
X10 MAG	Off
TRACE SEP	Fully CW

Delta

Δt and ΔV	Off (press and release until associated readout is off)
TRACKING	Off

Trigger

HOLDOFF	Fully CCW
LEVEL	Midrange
SLOPE	+ (plus)
A/B TRIG	A
MODE	AUTO LVL
SOURCE	VERT
COUPLING	DC

1. Verify GPIB STATUS Indicators.

a. Set:

CH 2, CH 3, and CH 4	Off

b. Set the oscilloscope's POWER button to OFF and then to ON.

c. VERIFY—All three GPIB STATUS indicators illuminate during the oscilloscope's power-up sequence.

d.VERIFY—The GPIB STATUS SRQ indicator is still illuminated when the power-up sequence is finished.

NOTE

If the RQS stored status is Off, the indicator will not be illuminated.

e. Turn on the controller and enter "Program A" from the "Programming" part of Section 2 of this manual.

f. Run "Program A".

g. Connect the GPIB controller to the oscilloscope's rear-panel GPIB CONNECTOR using the GPIB cable.

h. Enter 1 in response to the controller's prompt for the oscilloscope's address.

i. VERIFY—Response displayed by the controller is:

ERROR - SRQ CODE 65
- EVENT NO. 401

NOTE

If the RQS stored status is Off, there will be no SRQ or EVENT code displayed.

j. VERIFY—The GPIB STATUS SRQ indicator is no longer illuminated.

k. VERIFY—The GPIB STATUS REM indicator is now illuminated.

To perform the checks that follow, enter the commands exactly as shown. You must include spaces and punctuation (final periods excluded), but the lowercase letters are optional and the uppercase letters may be entered in lowercase.

2. Check GPIB Vertical Position Accuracy.

a. Enter the BALance command.

b. Enter the command CH1 POS:3.0.

c. CHECK—The oscilloscope trace is between 2.6 and 3.4 divisions above the center horizontal graticule line.

d. Enter the command CH1 POS:−3.0.

e. CHECK—The oscilloscope trace is between 2.6 and 3.4 divisions below the center horizontal graticule line.

f. Enter the command CH1 POS:0.0.

g. CHECK—The oscilloscope trace is within 0.3 division of the center horizontal graticule line.

h. Enter the VMOde CH1:OFF,CH2:ON;CH2 POS:3.0 commands.

i. CHECK—The oscilloscope trace is between 2.6 and 3.4 divisions above the center horizontal graticule line.

j. Enter the command CH2 POS:−3.0.

k. CHECK—The oscilloscope trace is between 2.6 and 3.4 divisions below the center horizontal graticule line.

l. Enter the command CH2 POS:0.0.

m. CHECK—The oscilloscope trace is within 0.3 division of the center horizontal graticule line.

n. Enter the VMOde CH2:OFF,CH3:ON;CH3 POS:3.0 commands.

o. CHECK—The oscilloscope trace is between 2.2 and 3.8 divisions above the center horizontal graticule line.

p. Enter the command CH3 POS:−3.0.

q. CHECK—The oscilloscope trace is between 2.2 and 3.8 divisions below the center horizontal graticule line.

r. Enter the command CH3 POS:0.0.

s. CHECK—The oscilloscope trace is within 0.7 division of the center horizontal graticule line.

t. Enter the VMOde CH3:OFF,CH4:ON;CH4 POS:3.0 commands.

u. CHECK—The oscilloscope trace is between 2.2 and 3.8 divisions above the center horizontal graticule line.

v. Enter the command CH4 POS:−3.0.

w. CHECK—The oscilloscope trace is between 2.2 and 3.8 divisions below the center horizontal graticule line.

x. Enter the command CH4 POS:0.0.

y. CHECK—The oscilloscope trace is within 0.7 division of the center horizontal graticule line.

z. Enter the VMOde CH4:OFF,CH2:ON,INVert:ON;CH2 POS:3.0 commands.

aa. CHECK—The oscilloscope trace is between 2.4 and 3.6 divisions above the center horizontal graticule line.

bb. Enter the command CH2? POS.

cc. VERIFY—Response displayed by the controller is:

CH2 POS:<X>

where <X> is between 2.98 and 3.01.

dd. Enter the command CH2 POS:−3.0.

ee. CHECK—The oscilloscope trace is between 2.4 and 3.6 divisions below the center horizontal graticule line.

ff. Enter the command CH2 POS:0.0.

gg. CHECK—The oscilloscope trace is within 0.5 division of the center horizontal graticule line.

3. Verify GPIB Trace Separation.

a. Enter the VMOde CH2:OFF, INVert:OFF, CH1:ON;CH1 POS:3.0 commands.

b. Enter the command HMode ALTernate.

c. Enter the HORizontal ASEcdiv:1E−3,BSEcdiv: .5E−3,TRACEsep:−4.0 command.

d. VERIFY—There are two traces on the CRT.

e. Disconnect the test setup.

ADJUSTMENT PROCEDURE

INTRODUCTION

The "Adjustment Procedure" is used to restore optimum performance or to return the option to conformance with its "Performance Requirements" as listed in Table 1-4. Adjustment of the instrument must be done at an ambient temperature between +20°C and +30°C, and the instrument must have had a warm-up period of at least 20 minutes. Performing this procedure while the temperature is drifting or before the standard instrument is calibrated may cause erroneous calibration settings.

NOTE

When performing any of the automatic calibration routines, such as CAL 02, the CAL/NO CAL jumper P501 must be moved to its CAL postion (between pins 2 and 3) before turning on the power. When the desired calibration has been performed, return the jumper to its NO CAL position.

GPIB-controlled instrument functions are automatically adjusted as part of the standard instrument CAL 02 procedure. If it is suspected that these functions need to be adjusted, refer to the "Adjustment Procedure" section of the standard instrument Service manual. Instructions on running the CAL 02 routine are under "Automatic Calibration Constants, Horizontal and Vertical Gain, Centering, and Transient Response Adjustments".

APPENDIX A

SAMPLE PROGRAM A

The program that follows is written to run on TEKTRONIX 4050-series controllers. It first asks for the GPIB address of the oscilloscope, then repeatedly asks for a command to be entered. When a command is entered at the controller, the program sends it to the oscilloscope. Any response from the oscilloscope is printed on the controller's display. If there are any service requests, a serial poll is performed. The service request and the EVENT codes are then printed before returning to the main part of the program.

```
100 REM      Program to send commands and queries to and receive
110 REM      responses from TEKTRONIX 24X5B and 2467B Oscilloscopes
120 INIT
125 PAGE
130 REM Disable SRQ Handler until ready
140 ON SRQ THEN 570
150 REM * Page when screen is full *
160 PRINT @32,26:2
170 REM
180 REM
190 PRINT "Enter address of the oscilloscope ";
200 REM * Get address and put in variable A *
210 INPUT A
220 REM * Enable SRQ handler *
230 ON SRQ THEN 440
240 REM
250 PRINT
260 PRINT "*******"
270 PRINT "ENTER COMMAND OR QUERY: ";
280 REM * Put command or query in string Z$ *
290 INPUT Z$
300 REM * Send string Z$ to the oscilloscope *
310 PRINT @A:Z$
320 REM * Get response (if any) and put in string S$ *
330 INPUT @A:S$
340 REM * Check if there is a response *
350 REM *    If not then ready to send another command or query *
360 REM *    If yes then print the response *
370 IF LEN(S$)=0 THEN 250
380 PRINT
```

```
390 PRINT "RESPONSE FROM THE OSCILLOSCOPE IS: "
400 PRINT S$
410 REM * Ready to send another command or query *
420 GO TO 250
430 REM *** SRQ HANDLER ***
440 POLL D,C;A
450 REM * Look for an Event and put Event in E *
460 REM *       If EVENT=0 then no error *
470 REM *       If EVENT<>0 then warn the user and
480 REM *              print SRQ Code and EVENT NO.
490 REM *
500 PRINT @A: "EVENT?"
510 INPUT @A:E
520 IF E=0 THEN 570
530 PRINT "    ERROR - SRQ CODE ";
540 PRINT C;
550 PRINT " - EVENT NO. ";
560 PRINT E
570 RETURN
```

SAMPLE PROGRAM B

The program example that follows performs functions similar to Sample Program A, but is written to run on a TEKTRONIX 4041 controller.

```
100   !     Program to send commands and queries to and receive
110   !     responses from TEKTRONIX 2445B and 2465B Oscilloscopes
120   !
130     Init all
140   !     Disable SRQ handler until ready
150     Disable srq
160   ! Get address of the oscilloscope
170     Print "Enter the GPIB address of the 2445B/65B:  ";
180     Input addr$
190   ! Set up physical and logical unit -
200   ! Set up so only EOI can terminate the communication.
210   !
220     Set driver "gpib0(eom=<0>):"
230     Open #1:"gpib0(pri="&addr$&",eom=<0>):"
240   !
250   !     Enable SRQ handler
260     On srq then gosub srqhdl
270     Enable srq
280   !
290 Repeat:    ! Sending command or query
300     Print "******"
```

```
310      Print
320      Print "Enter command or query :";
330    ! Get the command
340      Input a$
350    ! Send command or query to scope
360      Print #1:a$
370    ! Get response if there is any
380      DIM resp$ to 2000
390      Input #1:resp$
400      Print
410    ! If no response then prompt for another command
420      If len(resp$)=0 then goto repeat
430    ! If yes then print the response
440      Print "Response from the oscilloscope is:"
450      Print resp$
460      Goto repeat
470  Srqhdl:     ! routine to handle the srq
480        Poll stb,dev
490        Print #dev:"event?"
500      ! Get event number
510        Input #dev:event
520        Print "Instrument #";dev;" status byte = ";stb;", event = ";event
530        Resume
```

SAMPLE PROGRAM C

The program example that follows performs functions similar to Sample Programs A and B, but is written to run on the Hewlett-Packard 9836C controller.

```
100 !This program is written for the Hewlett-Packard 9836C controller.
110 !It is designed for a single instrument on the GPIB bus. The user
120 !is asked for the address and termination mode of the instrument,
130 !and then it will send commands and receive query responses from that
140 !instrument, as well as handle service requests (SRQ's).
150 !
160 INPUT "Instrument address (0-30)?",Address
170 IF (Address<0 OR Address>30) THEN 150
180 Address=Address+700
190 INPUT "LF (1) or EOI (2) termination?",Termin
200 IF (Termin<1 OR Termin>2) THEN 180
210 IF (Termin=1) THEN
220  !use three character escape sequence for ^L, hex OAH
230  ASSIGN @Instr TO Address;EOL "^L"
240 ELSE
250  !use three character escape sequence for ^M, hex ODH
```

```
260   ASSIGN  @Instr  TO  Address;EOL   "^M"  END
270  END  IF
280  DIM  Response$[4000]
290  DIM  Event$[100]
300  ON  INTR  7 GOSUB  480
310  Mask=2
320  ENABLE  INTR  7;Mask
330  Response$=""
340  LINPUT  "Command?";Response$
350  IF  (LEN (Response$)=0)    THEN  340
360  PRINT  "TO  instrument   :  ";Response$
370  OUTPUT  @Instr;Response$
380  Query=0
390  FOR  I=1  TO  LEN (Response$)
400   IF  (Response$[I,I]="?")     THEN  Query=1
410  NEXT  I
420  IF  (Query=1)   THEN
430   ENTER  @Instr;Response$
440   PRINT  "FROM  instrument   :  ";Response$
450  END  IF
460  SEND  7;UNT  UNL
470  GOTO  330
480  Stbyte=SPOLL (@Instr)
490  OUTPUT  @Instr;"EVENT?"
500  ENTER  @Instr;Event$
510  PRINT  Event$
520  SEND  7;UNT  UNL
530  ENABLE  INTR  7
540  RETURN
550  STOP
560  END
```

APPENDIX B

STATUS AND ERROR REPORTING

The status and error reporting system used by the GPIB Option interrupts the bus controller by asserting the Service Request (SRQ) line on the GPIB. This SRQ provides the means of indicating that an event (either a change in status or an error) has occurred. To service a request, the controller performs a Serial Poll; in response, the instrument returns a Status Byte (STB), which indicates the type of event that occurred. Bit 4 of the Serial-Poll Status Byte is used to indicate that the command processor is active. This bit will be set when the command processor is executing a command, and reset when it is not. The Status Byte, therefore, provides a limited amount of information about the specific cause of the SRQ. The various status events and errors that can occur are divided into several categories as defined in Table B-1.

Each serial poll can in turn cause a second SRQ assertion, if more than one error exists. The most serious error at the time of the serial poll is the reported error. An EVEnt? query returns a number which can be used as an index to the specific type of error that occurred. Table B-2 lists the Serial-Poll Status Bytes and the associated EVEnt? codes generated by the GPIB Option.

If there is more than one event to be reported, the instrument reasserts SRQ until it reports all events. Each event is automatically cleared when it is reported by means of serial poll. The Device Clear (DCL) interface message may be used to clear all events, except the power-on event.

Table B-1
Status Event and Error Categories

Category	Serial-Poll Status Byte	Description
Command Error	97 or 113	The instrument received a command that it cannot understand.
Execution Error	98 or 114	The instrument received a command that it cannot execute. This is caused by either out-of-range arguments or settings that conflict.
Internal Error	99 or 115	The instrument detected a hardware condition or a firmware problem that prevents operation.
System Events	65-67 and 81-83	Events common to instruments in a system (e.g., Power-on and User Request).
Execution Error Warning	101 or 117	The instrument received a command and is executing it, but a potential problem may exist. For example, the instrument is out of range, but is sending a reading anyway.
Internal Warning	102 or 118	The instrument detected a problem. It remains operational, but the problem should be corrected (e.g., out of calibration).
Device Status	0 or 16, 193-238, and 209-254	Device-dependent events.

With both the RQS OFF and the WARning OFF commands invoked, all service requests are inhibited. In this mode, the EVEnt? query allows the controller to determine event status without first performing a serial poll. The controller may then send the EVEnt? query at any time, and the instrument returns the code for an event waiting to be reported. The controller can clear all events by repeatedly sending the EVEnt? query until a zero Status Byte is returned. An alternative method for clearing all events (except power-on) is the use of the Device Clear (DCL) interface message.

Table B-2
GPIB Status Codes

Serial-Poll Status Byte	EVENT? Code	Instrument Status
00, 16	000	No status to report
65, 81	401	Power on
66, 82	402	Operation complete
67, 83	403	User request
97, 113	101	Command header error
97, 113	102	Header delimiter error
97, 113	103	Command argument error
97, 113	104	Argument delimiter error
97, 113	105	Non-numeric argument, numeric expected
97, 113	106	Missing argument
97, 113	107	Invalid message-unit delimiter
97, 113	108	Checksum error
97, 113	109	Byte-count error
98, 114	201	Remote-only command in Local mode
98, 114	202	Pending settings lost on rtl
98, 114	203	I/O deadlock detected
98, 114	204	Setting conflict
98, 114	205	Argument out of range
98, 114	250	Diagnostic in progress
98, 114	251	Diagnostic step in progress
98, 114	252	In normal mode
98, 114	253	Option not installed
98, 114	254	Option not in correct mode
98, 114	255	GPIB command lost to local override
99, 115	302	System error
99, 115	350	Math pack error

Table B-2 (cont)
GPIB Status Codes

Serial-Poll Status Byte	EVENT? Code	Instrument Status
101, 117	550	Warning of possible conflict
102, 118	650	Warning that measurement not yet available
193, 209	750	Asynchronous option error
194, 210	751	Overrange error
195, 211	752	No probe installed
196, 212	753	Fifty-ohm overload
200, 216	770	Oscilloscope test/cal/exer complete, passed
201, 217	779	Oscilloscope test complete, failed
231, 247	771	Option 1 measurement complete
232, 248	772	Option 2 measurement complete
233, 249	773	Option 3 measurement complete
234, 250	774	Option 4 measurement complete
235, 251	775	Option 5 measurement complete
236, 252	776	Option 6 measurement complete
237, 253	777	Option 7 measurement complete
238, 254	778	Option 8 measurement complete

Section 2

TELEVISION

SPECIFICATION

INTRODUCTION

The TV Option (Option 05) to the TEKTRONIX 24X5B and 2467B Oscilloscopes provides additional hardware and software to simplify triggering and viewing of television signals. The option adds TV (Back Porch) Clamp circuitry to the Channel 2 input and provides TV trigger coupling modes that allow a user to select either horizontal or vertical sync pulses to obtain horizontal-line-sync or field-sync pulse triggering. This option also permits the user to trigger on a specific line number within a TV field and provides sync polarity switching for either sync-negative or sync-positive composite video signals.

NOTE

Composite video is the picture waveform complete with vertical and horizontal blanking and sync. Composite sync is vertical and horizontal sync combined as a single waveform, but without video (picture) waveforms.

Both system-M and nonsystem-M protocols are available, providing compatibility with most television signal line-numbering protocols.

Stable video rejection and sync separation are obtained from sync-positive or sync-negative composite video signals having interlaced or non-interlaced scan, 525 to 1280 horizontal lines per frame, and 50- or 60-Hz field rates.

ACCESSORIES

Standard Accessories

In addition to the standard accessories listed in the oscilloscope manuals, the following TV Option accessories are provided:

1 CCIR Graticule CRT Filter
1 NTSC Graticule CRT Filter
1 Polarized Collapsible Viewing Hood

Optional Accessories

The following optional accessories are also available:

24X5B/2467B Options Service Manual
Protective Waterproof Vinyl cover

The optional accessories can be ordered from Tektronix, Inc. A local Tektronix Field Office, representative, or the Tektronix Product catalog can provide ordering and product information.

PERFORMANCE CONDITIONS

Except as noted in Tables 2-1 and 2-2 of this manual, the electrical, environmental, and mechanical characteristics of TV Option instruments are identical to those specified for standard instruments in the respective 24X5B and 2467B Oscilloscope manuals.

Table 2-1
Option 05 Electrical Characteristics

Characteristics	Performance Requirements
VERTICAL DEFLECTION SYSTEM—CHANNEL 1 AND CHANNEL 2	
Frequency Response	For VOLTS/DIV switch settings between 5 mV and 200 mV/div with VAR control in calibrated detent. Five-division, 50-kHz reference signal from a 50-Ω system with external 50-Ω termination on 1-MΩ input.
Full Bandwidth	
50 kHz to 5 MHz	Within ±1%.
>5 MHz to 10 MHz	Within +1%, −2%.
>10 MHz to 30 MHz	Within +2%, −3%.
Bandwidth Limit	
50 kHz to 5 MHz	Within +1%, −4%.
Square Wave Flatness	With fast-rise step (rise time ⩽1 ns), 1-MΩ dc input coupling, an external 50-Ω termination, and VAR VOLTS/DIV control in calibrated detent. Exclude the first 50 ns following the step transition. For signals with rise times ⩽10 ns, add 2% p-p between 155 ns and 165 ns after step transition.
Field Rate	
5 mV/div to 10 mV/div	1.5% p-p at 60 Hz with input signal of 0.1 V.[a]
20 mV/div	1% p-p at 60 Hz with input signal of 0.1 V.
50 mV/div	1% p-p at 60 Hz with input signal of 1.0 V.
Line Rate	
5 mV/div to 10 mV/div	1.5% p-p at 15 kHz with input signal of 0.1 V.[a]
20 mV/div	1% p-p at 15 kHz with input signal of 0.1 V.
50 mV/div	1% p-p at 15 kHz with input signal of 1.0 V.
TV (Back-Porch) Clamp (CH 2 only)	For VOLTS/DIV switch settings between 5mV and 200 mV with VAR control in calibrated detent. Six-division reference signal.
60-Hz Attenuation	⩾18 dB.
Back-Porch Reference	Within 1.0 division of ground reference (adjustable).

[a]Performance requirement not checked in manual.

Table 2-1 (cont)

Characteristics	Performance Requirements
TRIGGERING	
Sync Separation	Stable video rejection and sync separation from sync-positive or sync-negative composite video, 525 to 1280 lines, 50 Hz or 60 Hz, interlaced or noninterlaced systems. For noninterlaced scan systems, the video signal source must start and end with full lines of video for correct line identification in the field trigger modes.
Line Selection Range in FLD 1, FLD 2, or Both Coupling Modes	The lesser of 1280 or the number of lines in the field.
Input Signal Amplitude for Stable Triggering	
Channel 1 or Channel 2	Minimum sync-pulse amplitude within 18 divisions of input ground reference.
Composite Video	1 division.
Composite Sync	0.3 division.
Channel 3 or Channel 4	Minimum sync-pulse amplitude within 9 divisions of input ground reference.
Composite Video	0.5 division.
Composite Sync	0.25 division.

Table 2-2
Option 05 Mechanical Characteristics

Characteristics	Performance Requirements
Weight	
With Power Cord, Cover, Pouch, Probes, Operators Manual, and Options	≤12.0 kg (26.4 lb).
Domestic Shipping Weight	≤17.6 kg (38.8 lb).

PREPARATION FOR USE

This part of the manual contains information related to the power-up of the standard instrument containing the TV Option. The power-up sequence of the oscilloscope is described, along with explanations of potential option-related error messages that may occur if the instrument is not functioning properly. Also included is initial setup information for the selection of the TV protocol and the line number format parameters.

FILTER/GRATICULE REPLACEMENT

The plastic filter or graticule over the CRT faceplate can be removed by sliding the filter or graticule up until the bottom edge is exposed. Pull the bottom edge out and slide the filter or graticule down.

POWER-UP SEQUENCE

Before initially turning on power to the instrument, read Section 2 in the standard oscilloscope Service manual and follow the safety and precautionary information described there.

The power-up tests, automatically performed each time the oscilloscope is turned on, test both the standard oscilloscope circuitry and the TV Option circuitry. The TV Kernel test is integrated into the power-up tests for the host oscilloscope.

Kernel Test

Operation of the TV Option memory (ROM) is checked by the standard instrument Kernel test. Kernel test failures will result in an attempt to flash the front-panel A SWP TRIG'D indicator.

Even with a Kernel failure, pressing the A/B TRIG button may still place the instrument in an operating mode. However, if the operating mode is successfully entered, instrument operation may be unpredictable. If the instrument then functions adequately for your particular measurement requirement, it can be used; but refer it to a qualified service technician for repair of the problem as soon as possible.

Successful Power-Up Sequencing

When the power-up routine is successfully completed without a failure indication, the oscilloscope enters the normal operating state. The oscilloscope parameters are set to correspond with current front-panel settings and functions that were established before instrument power was last turned off. The instrument is now ready to make measurements as required.

POWER-DOWN SEQUENCE

When the POWER switch is set to OFF, the instrument powers down and the instrument front panel settings that were established prior to power off will be stored for use the next time power is applied to the instrument.

TV PROTOCOL AND LINE-NUMBERING FORMAT SELECTION

The following procedures are used to select a particular protocol or line-numbering format. Both involve access to Diagnostic monitor routines (TV EXER 61 and TV EXER 62) and affect field triggering only (FLD 1, Alternate FLD 1—FLD 2, or FLD 2). TV protocol selection allows the user to choose between system-M and nonsystem-M protocols. Selecting the incorrect system for a given TV protocol will not affect the ability to trigger on a given TV waveform. It will, however, cause the line number displayed to be inaccurate. Line-numbering format selection allows the user to select a preferred line-numbering scheme. Format 1 references line one from the beginning of the field being used for trigger reference. Format 2 always references line one from the first line of Field 1.

Exercise procedure TV EXER 61, accessed via the oscilloscope Diagnostic Menu, allows the user to select between system-M and nonsystem-M television protocols. When system-M is selected, the line count begins three lines before the field-sync pulse is encountered. If nonsystem-M is selected, the line count begins with the field-sync pulse.

Exercise procedure TV EXER 62, accessed via the oscilloscope Diagnostic Menu, allows the user to select one of two line-number formats. When Format 1 is selected, field 1 uses line numbers 1 through 263 and field 2 uses line numbers 1 through 262. When Format 2 is selected, field 1 uses line numbers 1 through 263 and field 2 uses line numbers 264 through 525. Clockwise rotation of the FLD LINE # control increases the line number. Counterclockwise rotation of the FLD LINE # control decreases the line number.

To choose or determine the TV protocol:

1. Hold in both the ΔV and Δt buttons and press the Trigger SLOPE button to enter the Diagnostic Menu. The top row of the readout will display **"DIAGNSTIC. PUSH A/B TRIG TO EXIT."**

2. Press and hold the upper or lower Trigger MODE button to sequence through the TEST and EXER routine labels until the message **"TV EXER 61"** appears at the lower left corner of the CRT.

3. Press the upper Trigger COUPLING button, causing the currently selected protocol to appear at the top of the CRT display. The message meanings are as follows:

LINE 1 OCCURS PRIOR TO FLD SYNC—System-M protocol is currently selected.

LINE 1 COINCIDENT WITH FLD SYNC—Nonsystem-M protocol is currently selected.

4. If the desired protocol is not displayed, press the upper Trigger COUPLING button. The desired protocol message should now be displayed.

5. Press the lower Trigger COUPLING button to store the selected protocol and return the oscilloscope to the Diagnostic Menu.

To choose or determine the line number format:

6. Briefly press the upper Trigger MODE button, causing the message **"TV EXER 62"** to appear at the lower left corner of the CRT.

7. Press the upper Trigger COUPLING button to display the currently selected format at the top of the CRT. The message meanings are as follows:

LINE NO RESETS ON EACH FIELD—Format 1 is selected; line numbering begins with the first line of both field 1 and field 2.

LINE NO RESETS ON FLD 1 ONLY—Format 2 is selected; line numbering begins at the first line of field 1 and continues through field 2.

8. If the desired line format message is displayed, exit the Diagnostic Menu by pressing the A/B TRIG button to resume normal oscilloscope operation.

9. If the desired line format message is not displayed, press the upper Trigger COUPLING button. The desired line format message should now be displayed.

10. Press the lower Trigger Coupling button to store the selected line format and return to the Diagnostic Menu.

11. Press the A/B TRIG button to exit the Diagnostic Menu and resume normal oscilloscope operation.

AUTOMATIC SYNC SELECTION

Automatic sync selection allows the user to preselect the polarity of sync used most often. Automatic sync selection will change the sync to the preselected polarity when the user enters a TV trigger coupling selection. Once

TV trigger has been activated, the user may change the polarity as desired. Changing trigger coupling selections within the TV Option area will not cause the sync selection to be changed. There are three possible sync selections:

POSITIVE:	TV Option will select sync positive when entering TV trigger.
NEGATIVE:	TV Option will select sync negative when entering TV trigger.
SLOPE DEFAULT:	TV Option will default to the A trigger slope.

To choose or determine automatic sync polarity, enter the Diagnostic Monitor and choose TV EXER 63 (see instructions 1 and 2 under "TV Protocol and Line-Numbering Format Selection"). After entering TV EXER 63, the top line of the CRT display will read:

"TV SYNC:POSITIVE"

or

"TV SYNC:NEGATIVE"

or

"TV SYNC:SLOPE DEFAULT"

Press the upper Trigger COUPLING button to cycle through these states. When the desired state is displayed, press the lower Trigger COUPLING button to store the selection and return to the Diagnostic Menu. Press the A/B TRIG button to return to normal oscilloscope operation.

THEORY OF OPERATION

INTRODUCTION

SECTION ORGANIZATION

This section contains a functional circuit description of the Option 05 (TV Option) circuitry for the 24X5B and 2467B Oscilloscopes. The discussion begins with an overview of option functions and continues with detailed explanations of each major circuit. Reference is made to supporting schematic and block diagrams, which aid in understanding the text. These diagrams show interconnections between parts of the circuitry, identify circuit components, list specific component values, and show interrelationships with the standard oscilloscope.

The block and schematic diagrams are located in the tabbed "Diagrams" section at the rear of this manual. The particular schematic diagram associated with each circuit description is identified by number in the text. The diagram number, enclosed within a diamond symbol, also appears on the tab of the appropriate foldout page. For optimum understanding of the circuit being described, refer to both the applicable schematic and block diagrams.

DIGITAL LOGIC CONVENTIONS

Digital logic circuits perform many functions within the instrument. The operation of these circuits is represented by specific logic symbology and terminology. Logic-function descriptions contained in this manual use the positive-logic convention. The specific voltages which constitute a HI or a LO vary among individual devices. For specific device characteristics, refer to the manufacturer's data book.

GENERAL CIRCUIT DESCRIPTION

Before individual circuits are discussed in detail, a general block-level discussion is provided to aid in understanding overall operation of the option circuitry. A simplified block diagram of the option, showing basic interconnections, is shown in Figure 10-5. The diamond-enclosed numbers in the blocks refer to the schematic diagrams at the rear of this manual in which the corresponding circuitry is located. Throughout this discussion, standard oscilloscope refers to the 24X5B and 2467B Oscilloscopes without option circuitry.

The activities of the option are directed by the microprocessor contained in the standard oscilloscope. The microprocessor, under the control of firmware present in the option, monitors the option's functions and sets up the operating modes according to instructions received.

While executing the control program, the microprocessor retrieves previously stored calibration constants and front-panel settings and, as necessary, places program-generated data in temporary storage for later use. The random access memory (RAM) in the base instrument and the ultraviolet erasable programmable read only memory (EPROM) contained in the option circuit board provide these storage locations.

The microprocessor control bus, address bus, and data bus are buffered by Control board circuitry. Microprocessor bus timing for the options is modified by buffers on the Control board to make bus timing compatible with the options. These signal paths are used for communication between the TV option and the standard oscilloscope and involve both data and control signals. The main oscilloscope circuitry uses them to control the option. The option uses them to send information to the standard oscilloscope for display and to control the standard oscilloscope. Address bus decoding allows individual circuits to be addressed.

TV BOARD

The TV option adds hardware and software to the standard oscilloscope that make it possible to trigger on and view complex television signals. The TV board is divided into analog and digital sections.

Circuitry in the analog section of the TV board processes composite video from the selected trigger source. If enabled, the TV (Back Porch) Clamp acts as a dc restorer to eliminate waveform tilt and prevent level changes due to changes in average picture level (APL). Sync pulses are extracted from the composite video by the Sync Pickoff comparator. The horizontal and vertical sync pulses are separated and used to produce the horizontal clock and field signals used by the digital circuitry.

The digital section of the TV board contains the microprocessor interface, which allows the microprocessor to control the option. It includes the Data Bus buffer, the Memory and I/O decoders, the Option Select register, and the EPROM. The TV Control register stores the option's control information. Sync pulses for TV field(s) are counted by counters in the Counter/Timer integrated circuit (IC). The Mode Select logic selects the proper signal to arm the Auxiliary Trigger generator. The Auxiliary Trigger generator triggers the standard instrument's sweep generator when sweep holdoff has ended and the selected horizontal sync pulse arrives.

DETAILED CIRCUIT DESCRIPTION

INTRODUCTION

The following discussion provides detailed information concerning the electrical operation and circuit relationships of the 24X5B and 2467B Television circuitry. Unique circuitry is described in detail, while circuits common in the electronics industry are not. The descriptions are supported by the associated detailed block diagram (Figure 10-11) and schematic diagrams located at the rear of this manual in the tabbed foldout pages.

TELEVISION OPTION CIRCUIT BOARD

The TV Option circuit board adds hardware and firmware that make it possible to trigger on and view television signals. The TV board is divided into analog and digital sections. The following descriptions are supported by the circuit timing diagram (Figure 10-14) located in the tabbed foldout pages in the rear of the manual.

The analog section contains the composite video signal processing circuitry. It includes signal amplification, automatic gain control, back-porch clamping, sync pickoff, and sync separation circuitry. Clocks at the horizontal (line) rate and a field indicator signal are sent to the digital section. The digital section contains the microprocessor interface and circuitry that triggers the standard instrument's sweep generator. The trigger is generated when the selected horizontal sync pulse (line) occurs.

Analog Circuitry

The TV option Analog circuitry (see Diagram 23) processes the composite video. Back-porch level control, horizontal clock, and vertical field signals are produced for other circuitry in the instrument.

VARIABLE GAIN AMPLIFIER. The Variable Gain Amplifier stage amplifies the input composite video signal. The front-panel SLOPE selector determines whether the amplifier is inverting or noninverting.

Differential amplifier U5436 amplifies the input composite video signal. It contains two pairs of switching transistors that provide signal inversion when desired. The Sync Tip Clamp and Automatic Gain Control circuitry controls the channel resistance of Q5530, which in parallel with R5530 determines the gain of the amplifier. The gain is automatically adjusted to maintain proper sync-tip level. With no input signal, the gain is maximum.

The composite video signal is applied to one input of the differential amplifier (U5436, pin 3) and to its dc offset amplifier (U5634B). The input to the dc offset amplifier is low-pass filtered by R5433 and C5630, so that its output is the dc component of the composite video signal. This filtered output is then applied to the other input of the differential amplifier (U5436, pin 11).

Four transistors of U5436 are controlled by the SLOPE signal from U5764. When SLOPE is HI, the transistors connected to pins 2 and 6 will be biased on, and the collector signal at pin 7 will drive Q5528. When SLOPE is LO, the transistors connected to pins 13 and 9 will be on, and the collector signal at pin 14, which is inverted with respect to both the input signal and the signal at pin 7, will drive Q5528.

Common-base transistor Q5528 level shifts the signal from U5436 and provides voltage gain to drive Q5532. For stable triggering, the composite video signal which drives Q5532 must be sync-negative; if the displayed input signal is sync-positive, the SLOPE button must be pushed to invert the signal.

FIXED GAIN AMPLIFIER AND BACK-PORCH CLAMP. The second-stage amplifier circuitry provides additional gain to the video signal from the Variable Gain Amplifier. Also, additional start-up circuitry is used to set amplifier parameters when a signal is first applied.

Additional amplification is provided by U5445. Transistors U5445B and U5445C form a differential amplifier, with U5445A supplying their emitter current. The output of U5445C drives the input of the Sync Pickoff comparator.

When a signal is first applied, the amplifier operating levels are established by feedback. The channel resistance of Q5530 is minimum when no signal is applied. This will set up the circuitry for maximum gain to enable the feedback circuits, the Back Porch clamp, and the Sync Tip Clamp and Automatic Gain Control. Once a signal is applied, U5445D and associated circuitry will increase the dc level associated with the input signal if any of the signal is below ground. When the signal is below ground, diode CR5526A will forward bias, shutting off U5445D and forward biasing CR5623B. This reduces the output voltage of U5634C and decreases the base drive voltage on U5445C. This raises the transistor's collector voltage and turns off CR5526A.

SYNC PICKOFF COMPARATOR. The comparator, composed of Q5515 and Q5512, is switched by the sync pulse. The switching threshold is adjusted by the Trigger LEVEL control on the front panel. The Trigger LEVEL control allows positioning of the trigger at any point on the falling edge of the sync pulse. When entering the TV Option or when pushing the Init @50% button on the front-panel, the switching threshold is set at about 50% of the sync level.

SYNC-TIP CLAMP AND AUTOMATIC GAIN CONTROL. Transconductance operational amplifier U5410 acts as a sync-tip clamp and controls the gain of U5436 by altering the channel resistance of Q5530. The operational amplifier's gain is determined by the current into pin 5, which is set by R5608. The amplifier is enabled on sync tips when pin 5 is HI (−14.4 V). One input of the operational amplifier is grounded, and the other has the collector signal of U5445C applied through R5525. The operational amplifier, when enabled at the start of a sync pulse by the collector of Q5512 going LO, alters the channel resistance of Q5530, keeping the signal level at the collector of U5445C at about 0.5 V for the duration of the sync pulse. When pin 5 is LO (−15 V), U5410 is off and C5419 acts as a sample and hold to maintain bias on Q5530.

Diode CR5522A reduces amplifier gain when the sync tip is below −0.2 V. If the diode becomes forward biased, Q5518 turns on (if it is not on already). Amplifier U5410 can then increase the channel resistance of Q5530 and thus reduce the amplifier gain.

BACK-PORCH CLAMP. Transconductance operational amplifier U5310 acts as a back-porch clamp to control the level of the video signal during the back-porch period. Its gain is determined by the current into pin 5. When the amplifier is enabled, pin 5 is HI (−14.4 V). When the collector signal of Q5515 goes negative, the resulting pulse coupled through C5726 turns off U5712A. The positive-going signal on the collector of U5712A enables U5310 during the back-porch time. The output of U5310 drives voltage-follower U5634C, which in turn establishes the base voltage of U5445C. The collector signal of U5445C drives U5310 pin 3 through R5525 and R5523. This feedback loop will establish zero volts on pin 3 of U5310 during the back-porch time, with a resulting collector voltage on U5445C of about 4.5 V. When U5310 pin 5 is LO (−15 V), U5310 is turned off and C5631 acts as a sample and hold to maintain the bias on U5445C.

VERTICAL BACK-PORCH CLAMP. The Vertical Back-Porch Clamp clamps the back-porch level of the displayed signal to approximately zero volts.

Input to level comparators U5755 and U5855 is a sample of the signal (CH2 PO) in the Channel 2 vertical preamp. The output of the clamp, CH2 OFFSET, supplies a dc offset to the vertical preamp. The level comparators supply a dc offset of the proper polarity and magnitude to cause CH2 PO to be approximately zero volts during the back-porch interval.

Any color burst on the signal is removed by R5754 and C5755. The signal is then applied to U5755 pin 3 and U5855 pin 2 where it is compared, during the back-porch interval, to a reference voltage from the output of U5468 pin 6. It's then applied to U5755 pin 2 and U5855 pin 3 through R5758. Pin 6 of U5468 ($\overline{\text{IOUT}}$) sinks current that develops a voltage across R5464. The voltage is used as a reference for setting the back-porch reference to approximately zero volts. The voltage reference adjustment is set using TV CAL 61.

When CH 2 VOLTS/DIV is at 2 mV, 5 mV, 10 mV, 100 mV, or 1 V/DIV, FAST/SLOW is LO, turning on Q5720. The channel resistance of Q5442 will then decrease, making C5640 part of the sample-and-hold capacitance. R5812, R5820, C5545, and C5640 control the large signal ac response of the Vertical Back-Porch Clamp during the sampling period.

BACK-PORCH CLAMP SWITCHING. The Back-Porch Clamp Switching circuitry determines when the Vertical Back-Porch Clamp is active and which of its level comparators is used.

When the back-porch clamp is not enabled, CLAMP will be LO, turning U5728D on. The HI on the collector of U5728D turns on U5712B, U5712C, and Q5736. This keeps both comparators (U5755 and U5855) off and the inputs to U5636A and U5636B grounded. With this circuitry disabled, the Channel 2 vertical preamp circuitry does not receive a dc offset voltage from the comparators.

When the back-porch clamp is enabled, CLAMP will be HI, turning U5728D off. The LO on the collector of U5728D turns Q5736 off, enabling U5636A and U5636B. It also allows U5712E and U5712D to turn off either U5712B or U5712C, turning on the corresponding comparator (U5855 or U5755). Either U5755 or U5855 is gated on during the back-porch interval when U5712A turns off. With the Vertical Back-Porch Clamp enabled, the back porch of the displayed signal is clamped to ground. However, when the Phase Locked Loop is not locked, the Vertical Back-Porch Clamp is turned off through R5831.

Comparator selection, either U5755 or U5855, is controlled by the CH2 INVERT signal. The signal from Channel 2 is inverted by U5855, but not by U5755. If the front-panel INVERT is selected, the signal from the preamp must be inverted by U5855. This is because the preamp's signal is sampled after inversion takes place in the preamp. If CH2 INVERT is LO, U5712E is on and U5712D is off. The HI on the collector of U5712E turns on U5712B which turns off U5855. If U5855 is off, the input signal will not be inverted. The LO on the collector of U5712D turns off U5712C, enabling U5755; during the back-porch interval the collector of U5712A will be HI, turning on U5755. If CH2 INVERT is HI, the circuitry operates similarly. However, this time U5755 is turned off and U5855 is turned on, inverting the signal from the preamp.

If the back-porch clamp is enabled during the back-porch interval, transistor U5712A turns on either U5755 or U5855. However, the dc offset generated by U5755 and U5855 must be maintained during the entire horizontal interval. Between back-porch intervals, while U5755 and U5855 are turned off, the required offset is maintained by C5545 and, if Q5442 is on, by C5640.

PULSE STRETCHER, EQUALIZING PULSE REMOVER, AND AUTO BASELINE GENERATOR. The Pulse Stretcher stretches the horizontal sync pulses and the Equalizing Pulse Remover removes alternate equalizing pulses from the input composite sync. The Auto Baseline Generator produces the HORIZ CLK signal used in generating triggers.

The leading edge of each sync pulse turns on U5728B. This reverse biases CR5825B, turning off U5728C. The HI on the collector of U5728C keeps U5728B on and reverse biases CR5735A. The collector of U5728C remains HI until C5830 charges to about 1.4 volts. The resulting square wave passes through CR5772A and is inverted by U5580C.

Auto Baseline Generator U5790D combines (ORs) the horizontal sync, stripped from the input signal and inverted by U5580C, with the $\overline{\text{H}}$ clock produced by the Phase Locked Loop divider U5645B. The $\overline{\text{H}}$ clock is first delayed by R5864 and C5779. The $\overline{\text{H}}$ clock input allows HORIZ CLK to be produced when in LINES TRIGGER COUPLING, both when there is no input signal and during non-serrated vertical sync pulses. Producing HORIZ CLK at these times generates a trigger and therefore a base-line trace.

To avoid passing every equalizing pulse and serrated pulse, the output of Delayed Horizontal Clock U5645A is coupled through R5832, keeping U5728C turned on and its collector LO midway between horizontal sync pulses.

PHASE LOCKED LOOP. The Phase Locked Loop (PLL) generates signals used in identifying individual fields in interlaced scan systems.

PLL U5845 operates at twice the horizontal clock frequency. Its output, 2XH, is divided by two by U5645B, producing both H and $\overline{\text{HORIZ CLK}}$. Horizontal sync from the input signal is input to U5845 at pin 14. The $\overline{\text{HORIZ CLK}}$ generated by the PLL through U5645B is input to U5845 at pin 3. Equalizing pulses and the vertical sync are removed from the PLL inputs by U5838B and U5838C (see Figure 10-14).

Pin 1 of the Phase Locked Loop (U5845) is LO whenever the signals on pin 3 and pin 14 do not coincide (horizontal sync at pin 14 not in phase with $\overline{\text{HORIZ CLK}}$ at pin 3). The PLL error signal at pin 1 is stretched by R5755 and C5865 and then inverted by Q5740. When the collector of Q5740 is HI, Vertical Sync (U5756A) and the Delayed Horizontal Clock (U5645B) are reset, and the equalizing pulses and vertical sync are no longer removed from the inputs by U5838B and U5838C. This lets the Phase Locked Loop see the entire input signal while it's trying to lock on the input.

DELAYED HORIZONTAL CLOCK. The Delayed Horizontal Clock is used to remove equalizing pulses from the horizontal sync. The horizontal clock (H) is clocked through U5645A by $\overline{\text{2XH}}$. This delays the horizontal clock by ¼ of a horizontal clock cycle.

VERTICAL SYNC. The Vertical Sync circuitry outputs a pulse for both the Field 1 and the Field 2 vertical sync pulses. The VERTICAL SYNC signal is produced by clocking $\overline{\text{COMPOSITE SYNC}}$ into U5756A using the inverted two times horizontal clock ($\overline{\text{2XH}}$). During the period of vertical sync, $\overline{\text{COMPOSITE SYNC}}$ will be HI during the rising edge of $\overline{\text{2XH}}$. During the remainder of the field, $\overline{\text{COMPOSITE SYNC}}$ will be LO during the rising edge of $\overline{\text{2XH}}$.

FIELD SYNC GENERATOR. The Field Sync Generator generates FIELD using the Horizontal clock (H) and VERTICAL SYNC signals. (For interlaced scan signals it identifies the field, while for noninterlaced scan signals it identifies vertical sync only.) Counters in the digital section use FIELD in selecting either the Field 1 or Field 2 line counter.

Both U5456B and U5756B generate FIELD ID at the same time. On interlaced scan signals, FIELD ID is produced at pin 8 of U5456B. It is HI during Field 1 and LO during Field 2. The FIELD ID signal generated by U5456B identifies fields of interlaced scan signals.

Both changing FIELD ID signals will be absent in noninterlaced scan systems. This absence, at U5756B, is detected by the interlaced scan detector (U5756B, U5728A, and Q5400). When the FIELD ID signal is static, the interlaced scan detector enables circuitry that generates FIELD at the vertical rate.

During interlaced scan signals, the changing FIELD ID signal from U5756B keeps U5728A and Q5400 on. The LO on the collector of U5728A allows U5456B to continue generating the normal FIELD signal. The HI on the emitter of Q5400 keeps U5456A set, preventing it from affecting the FIELD signal.

During a noninterlaced scan signal, the FIELD ID signals generated by U5756B and U5456B will be static. The dc level on U5756B is blocked by C5651, turning off U5728A and Q5400. The HI on the collector of U5728A resets U5456B, preventing it from affecting the FIELD signal. The LO on the collector of Q5400 allows VERTICAL SYNC to clock U5456A, producing FIELD. The FIELD signal generated by U5456A has no relation to Field 1 and Field 2.

The AND gate composed of CR5653A, CR5653B, and R5652 selects the signal produced by either U5456B or U5456A. The selected signal becomes FIELD.

Digital Circuitry

The TV Option Digital circuitry (see Diagram 24) provides an interface to the microprocessor and generates a trigger to the standard instrument's sweep generator.

MEMORY AND I/O DECODERS. This circuitry decodes the address bus, generating enabling signals and strobes that allow the microprocessor to control the various circuit functions and devices. The TV Option memory space (see Table 2-3) is decoded by programmable logic device U5880 and three-to-eight line decoder U5460.

Enabling signals generated by U5880 select the TV Option EPROM, hardware, and the Data Bus Buffer.

When enabled by U5880, U5460 generates signals to select the TV Counter/Timer IC, TV Control Register, and the TV DAC Register.

Table 2-3
TV Option Memory Map

Address	Description	Device No.
4000-7FFF	Data Bus buffer	U5459
4000-5FFF	ROM	U5565
6000-7F7F	ROM image	U5565
7F80-7F87	Counter/Timer IC registers	U5575
7F88-7F8E	TV Control register image	U5764
7F8F	TV Control register	U5764
7F90	TV DAC register	U5464
7F91-7F97	TV DAC register image	U5464
7F98-7FBF	Unused	
7FC0-7FFE	Option Select register image	U5880
7FFF	Option Select register	U5880

OPTION SELECT REGISTER. The Option Select register is incorporated within programmable logic device U5880. Access to TV option circuitry is enabled and disabled by the Option Select register. Whenever there is an access to address 7FFF, data bus line BD5 is latched into the register. If BD5 is HI, TV option circuitry will be selected for memory and I/O accesses within the paged address space (4000-7FFF). If BD5 is LO, the TV option is deselected. While the TV option is deselected, the Option Select register is the only TV circuitry that can be accessed by the microprocessor. Pin 15 of U5880 is the $\overline{Q}$ output of the Option Select Register. The TV Option is enabled when this pin is LO and disabled when this pin is HI.

DATA BUS BUFFER. The data bus is buffered by bidirectional buffer U5459. It is enabled by BVMA, BA14, $\overline{BE}$, and the Option Select register through programmable logic device U5880. The direction of data is controlled by BR/ $\overline{W}$ DLYD.

EPROM. The EPROM U5565 is enabled by BVMA, $\overline{BE}$, the Option Select register, and one of its addresses being selected through programmable logic device U5880.

TV CONTROL REGISTER. The TV Control register is written to by the microprocessor to:

1. Control the polarity (SLOPE) of the sync tips of the composite video used in the analog section of the circuitry.

2. Control the back-porch clamp circuitry (CH2 INVERT, CLAMP, and FAST/ $\overline{SLOW}$).

3. Enable the TV Option's Auxiliary Trigger generator.

4. Set the Mode Select Logic.

The microprocessor writes to the register whenever the option is selected and the register's address is decoded by U5880 and U5460.

COUNTER/TIMER. Counter/Timer U5575 contains three programmable counters used to determine the maximum number of lines in a given field and to produce a variable delay. The delay is varied to select any specific line in the selected field as the trigger point.

The Counter/Timer is enabled whenever its address is decoded by U5460. Access to the internal registers is controlled by BA0, BA1, BA2, and BR/ $\overline{W}$ DLYD.

Counters 1 and 2 are used in single-shot mode to delay the trigger points by the proper amounts from the Field 1 and Field 2 vertical sync pulses, respectively. Each counter counts $\overline{HORIZ\ CLK}$ (applied to the C inputs) during the respective counter's field. The FIELD pulse is applied to inputs G1 and G3; the pulse is inverted by U5580D and applied to input G2.

The outputs of Counters 1 and 2 provide a LO pulse out to U5775D and U5775A. The pulse out occurs when the sync pulse for the line prior to the one selected is reached. If the desired line is too near the start of its field, the counter for the other field is used, and the counter starts counting at the beginning of its field. Counting continues until the desired sync pulse for the line prior to the one selected is reached; this may mean counting past the start of the next field. Then, the counter generates the output pulse.

Starting the count at the beginning of the previous field is necessary for the first three lines of a field in systems where line 1 is coincident with the field pulse (nonsystem-M), and for the first six lines in systems where line 1 is three lines before the field pulse (system-M). Lines 1 through 3 of system-M signals cannot be delayed from their corresponding field sync pulse because they occur before the field pulse. The following three lines for system-M signals (where line 1 is three lines before the field sync) and the first three lines for nonsystem-M signals (where line 1 is coincident with the field pulse) must be delayed from the previous field because:

1. The horizontal clock coincident with the field pulse does not cause a count to occur; it only starts the counting process.
2. The counters must arm the trigger generator on the line preceding the selected line.
3. The counter will not generate a delay of zero (there must be at least a one count delay).
4. The counter's output goes LO one count (line) after the count reaches zero.

AUXILIARY TRIGGER GENERATOR. The Auxiliary Trigger generator produces the signal that triggers the sweep generator in the standard instrument when the appropriate horizontal line is reached.

Trigger generation in the option and in the standard instrument is similar. Neither is allowed to produce triggers during sweep retrace (holdoff). After holdoff, the trigger circuitry is made ready to produce a trigger (armed). In the standard instrument and for LINES TV TRIGGER COUPLING in the option, the triggers are armed at the end of holdoff. For FLD1, FLD2, and ALT TV TRIGGER COUPLING in the option, the Auxiliary Trigger generator is not armed until the sync pulse for the line prior to the one selected is reached. When the next horizontal sync pulse (the line selected for triggering) is reached, the trigger circuitry produces the trigger.

Trigger holdoff information is provided by AHO through U5580F to U5590A pin 1. When AHO is HI, both U5590A and U5590B are reset, holding off the generation of triggers. After holdoff time has ended (AHO LO), the Mode Selection logic will set U5590A, arming the trigger generator. The next time HORIZ CLK goes HI at U5590B pin 11, U5590B will set, generating a trigger.

MODE SELECT LOGIC. The Mode Select Logic selects the signal used to arm the Auxiliary Trigger generator. The three arming signals used are: the output of Counter 1 at U5575 pin 27 (Field 1 line counter), the output of Counter 2 at U5575 pin 3 (Field 2 line counter), and the A Holdoff at U5580F pin 13 (AHO) going LO.

The arming signal selected is controlled by TV Control register U5764. The register receives the present TV Trigger mode information from the microprocessor. The three select lines are: ALT (U5764 pin 2), DSMODE (U5764 pin 5), and LINES (U5764 pin 6). If LINES TV TRIGGER COUPLING is selected, LINES will be HI. If ALT FLD TV TRIGGER COUPLING is selected, ALT will be HI. In Alternate mode, DSMODE selects Field 1 or Field 2.

A trigger can not occur until after holdoff ends (holdoff ends when AHO goes LO) and the Auxiliary Trigger generator is armed. In the following discussion, it is assumed that holdoff has just ended. This means AHO U5580F pin 13 just went LO and no longer holds the arming flip-flop, U5590A, reset.

In Lines mode, U5764 pin 6 is HI, enabling U5790C. Whenever holdoff ends, AHO goes LO, U5580F pin 12 and U5790C pin 9 go HI, and U5790C pin 8 and U5590A pin 4 go LO, setting arming flip-flop U5590A. With the arming flip-flop set, trigger generator U5590B is no longer held reset. The next HORIZ CLK to U5590B pin 11 sets the flip-flop, generating a trigger.

In Lines mode: a trigger is generated; the sweep runs; holdoff occurs; the trigger generator is armed as soon as holdoff goes LO; and the next trigger occurs when the next horizontal sync pulse arrives. This gives a trace which is stable with respect to horizontal sync pulses (lines), but is not stable with respect to vertical sync pulses (fields) or the video information on any given line.

If Field 1 or Field 2 TV Trigger modes are selected, the ALT, DSMODE, and LINES signals are all LO. With ALT LO, U5775B pin 4 and U5775C pin 10 are both LO. This makes U5775B pin 6, U5775A pin 2, U5775C pin 8, and U5775D pin 12 all HI, enabling U5775A and U5775D. With both gates enabled, either the Field 1 counter or the Field 2 counter can arm the trigger generator.

The counter used is determined by the microprocessor's setup of the Counter/Timer. The output of the unused counter is LO. Depending on which counter is selected, when the trigger count is reached, the output of either U5775A or U5775D will go HI. This will make both inputs of U5790A HI, and its output LO. The LO is inverted to a HI by U5890D, setting arming flip-flop U5590A.

In the field modes: a trigger is generated; the sweep runs; holdoff occurs; holdoff ends; the sync pulse for the line prior to the selected horizontal line occurs, arming the Auxiliary Trigger generator; and the next horizontal sync pulse arrives, generating the next trigger. This gives a trace which is stable with respect to horizontal sync pulses (lines), vertical sync pulses (fields), and the video information on the selected lines.

Alternate TV Trigger mode may be used with Alternate Vertical mode. In Alternate TV Trigger mode, the selected horizontal line of Field 1 triggers the sweep for the first active vertical channel, and the selected horizontal line of Field 2 triggers the sweep for the next active vertical channel.

If Alternate TV Trigger mode is selected, the ALT signal is HI, and the DSMODE signal controls whether or not the $\overline{DS}$ signal is inverted. With ALT HI, both U5775B and U5775C are enabled. With DSMODE LO, the output of U5890A will be the input $\overline{DS}$. $\overline{DS}$ will be HI during the sweep for the first active vertical channel, and LO during the sweep of the next active vertical channel. The $\overline{DS}$ signal through U5775B and U5775C allows only one counter's output at a time to get through to arm the Auxiliary Trigger generator. The state of $\overline{DS}$ changes with each sweep, allowing the opposite counter (field) to arm the trigger generator.

When the DSMODE signal is HI, U5890A inverts $\overline{DS}$. Operation of the circuitry is now the same as stated for Alternate TV Trigger mode except: Counter 2 arms the trigger generator for the first active channel's sweep; and Counter 1 arms the trigger generator for the next active channel's sweep. This reversal of roles is required whenever the line selected for triggering is near the start of the field.

PERFORMANCE CHECK AND ADJUSTMENT PROCEDURES

INTRODUCTION

This section contains the Option 05 (TV) portion of the instrument's performance check and adjustment procedures. The "Performance Check Procedure" is used to check the instrument's performance against the requirements listed in Table 2-1. The "Adjustment Procedure" is used to restore optimum performance or return the option to conformance with its "Performance Requirements" as listed in Table 2-1.

Instrument performance should be checked after every 2000 hours of operation or once each year if used infrequently. A more frequent interval may be necessary if the instrument is subjected to harsh environments or severe usage. The results of these periodic checks will determine the need for recalibration.

Before performing these procedures, ensure that the LINE VOLTAGE SELECTOR switch is set for the ac power source being used (see Section 2 of the standard instrument Service manual). Connect the instrument to be checked and the test equipment to an appropriate power source.

LIMITS AND TOLERANCES

The tolerances given in these procedures are valid for an instrument that has been previously calibrated in an ambient temperature between +20°C and +30°C and is operating in an ambient temperature between −15°C and +55°C. The instrument also must have had at least a 20-minute warm-up period. To assure instrument performance, perform all steps in the following procedures at the same ambient temperature. When performing these checks, it is assumed that the standard instrument meets all of its "Performance Requirements" as stated in Section 1 of the standard instrument Service manual.

TEST EQUIPMENT

The test equipment listed in Table 2-4 is a complete list of the equipment required to accomplish both the "Performance Check Procedure" and the "Adjustment Procedure." To assure accurate measurements, it is important that test equipment used for making these checks meets or exceeds the specifications described in Table 2-4. When considering use of equipment other than that recommended, use the "Minimum Specification" column to determine whether available test equipment will suffice.

The procedures in this section are written using the equipment listed in Table 2-4. When substitute equipment is used, control settings stated in the test setup and in the procedures may need to be altered.

Detailed operating instructions for test equipment are not given in this procedure. If more operating information is required, refer to the appropriate test-equipment instruction manual.

Table 2-4
Test Equipment Required

Item No. and Description	Minimum Specification	Examples of Suitable Test Equipment
1. TV Mainframe	Conforms to TV system requirements.	TEKTRONIX 1410 (NTSC Systems). TEKTRONIX 1211 (PAL Systems). TEKTRONIX 1412 (PAL-M Systems).
2. Sync Generator	Conforms to TV system requirements. Variable amplitude sync.	TEKTRONIX SPG2 (NTSC Systems).[a] TEKTRONIX SPG12 (PAL Systems).[a] TEKTRONIX SPG22 (PAL-M Systems).[a]
3. Linearity Generator	Conforms to TV system requirements.	TEKTRONIX TSG3 (NTSC Systems). TEKTRONIX TSG13 (PAL Systems). TEKTRONIX TSG23 (PAL-M Systems).
4. Sinewave Oscillator	Frequency: Adjustableto 60 Hz. Amplitude: Adjustable to 3 V p-p into 75 Ω.	TEKTRONIX SG 502 RC Oscillator.[b]
5. Leveled Sinewave Generator	Frequency: 250 kHz to 30 MHz. Output amplitude: variable to 5 V p-p. Output impedance: 50 Ω. Reference frequency: 50 kHz. Amplitude accuracy: constant within 3% of a reference frequency as output frequency changes.	TEKTRONIX SG 503 Leveled Sinewave Generator.[b]
6. Pulse Generator	Period: variable to 15 μs. Pulse width: 2 μs	TEKTRONIX PG 502 Pulse Generator.[b]
7. Calibration Generator	Fast-rise signal level: 1 V. Repetition rate: variable to 100 kHz. Rise time: 1 ns or less. Flatness: ±0.5%. Leading edge aberrations: within 2%.	TEKTRONIX PG 506 Calibration Generator.[b]
8. Oscilloscope with P6137 10X Standard Accessory Probe	Bandwidth:400 MHz. General Purpose.	TEKTRONIX 2465B/2467B.
9. Precision Cable	Impedance: 50 Ω.	TEKTRONIX Part No. 012-0482-00.
10. Cable	Impedance: 50 Ω.	TEKTRONIX Part No. 012-0057-01.
11. Cable (2 required)	Impedance: 75 Ω.	TEKTRONIX Part No. 012-0074-00.
12. Termination	Impedance: 50 Ω.	TEKTRONIX Part No. 011-0049-01.
13. Termination	Impedance: 75 Ω.	TEKTRONIX Part No. 011-0055-00.
14. 10X Attenuator (2 required)	Ratio: 10X. Impedance: 50 Ω.	TEKTRONIX Part No. 011-0059-02.
15. 10X Attenuator	Ratio: 10X. Impedance: 75 Ω.	TEKTRONIX Part No. 011-0061-00.

[a]With Option AA.

[b]Requires a TM 5000-Series power-module mainframe.

PERFORMANCE CHECK PROCEDURE

This procedure is used to verify proper operation of the option and may be used to determine the need for readjustment. This check may also be used as an acceptance test and as a preliminary troubleshooting aid. Perform all steps, both in the sequence presented and in their entirety, to ensure that control settings are correct for the following step.

PREPARATION

Removing the wrap-around cabinet is not necessary to perform this procedure. All checks are made using operator accessible controls and connectors.

Turn on the instrument and ensure that no error message is displayed on the CRT. If the instrument displays **"DIAGNSTIC. PUSH A/B TRIG TO EXIT"** at power on, one of the power-up tests has failed. If the error message on the bottom line of the CRT is **"TEST 04 FAIL XX"** where XX is X1, 1X, or 11, the stored calibration data is in error and the instrument should be recalibrated by a qualified service technician before performing the "Performance Check Procedure." If any other error messages occur, the failure is probably not related to calibration and the instrument should be repaired by a qualified service technician before performing either procedure.

Set the TV protocol and format by following these steps:

1. Hold in both the ΔV and Δt buttons and press the Trigger SLOPE button to enter the Diagnostic Menu. The top row of readout will display **"DIAGNSTIC. PUSH A/B TRIG TO EXIT".**

2. Press and hold the lower Trigger MODE button until the message **"TV EXER 61"** appears at the lower left corner of the CRT display.

3. Press the upper Trigger COUPLING button. The currently selected TV protocol will appear at the top of the CRT display. If necessary, change the selected TV protocol by pressing the upper Trigger COUPLING button again. For an NTSC system, select **"LINE 1 OCCURS PRIOR TO FLD SYNC"**; for PAL or SECAM systems, select **"LINE 1 COINCIDENT WITH FLD SYNC"**; for other systems make the appropriate selection.

4. Press the lower Trigger COUPLING button to store the selected protocol and return to the Diagnostic Menu.

5. Press the upper Trigger MODE button. The message **"TV EXER 62"** will be displayed at the lower left corner of the CRT display.

6. Press the upper Trigger COUPLING button. The currently selected format will appear at the top of the CRT display. If necessary, change the selected format by pressing the upper Trigger COUPLING button again. For an NTSC system, select **"LINE NO RESETS ON EACH FIELD"**; for PAL or SECAM systems, select **"LINE NO RESETS ON FLD 1 ONLY"**; for other systems make the appropriate selection.

7. Press the lower Trigger COUPLING button to store the selected format and return to the Diagnostic Menu.

8. Press the A/B TRIG button to exit the Diagnostic Menu and return to normal oscilloscope operation.

TV OPTION CHECKS

Initial Control Settings

Control settings not listed do not affect the procedure.

POSITION Controls	Midrange

NOTE

Select channels to set VOLTS/DIV.

VOLTS/DIV

CH 1	200 mV
CH 2	50 mV
CH 3 and CH 4	0.1 V
CH 1 and CH 2 VAR	In detent

VERTICAL MODE

CH 1	On
CH 2, CH 3, CH 4, ADD and INVERT	Off
ALT/CHOP	ALT
20 MHz BW LIMIT	On

Input Coupling

CH 1 and CH 2	1 MΩ DC

Horizontal

POSITION	Midrange
A SEC/DIV	2 ms
SEC/DIV VAR	In detent
X10 MAG	Off
Sweep	A

Delta Function Controls

ΔV and Δt	Off (turn off readout by pressing associated button)
TRACKING	Off (not lighted)

Trigger

HOLDOFF	MIN (Fully CCW)
LEVEL	Midrange
SLOPE	+
A/B TRIG	A
MODE	AUTO LVL
SOURCE	VERT
COUPLING	DC

1. Check Square-Wave Flatness

a. Connect a fast-rise positive-going square-wave output via a 50-Ω cable and a 50-Ω termination to the CH 1 input connector.

b. Set the generator to produce a 60-Hz, 5-division display.

c. Set CH 1 VOLTS/DIV to 50 mV. Use the CH 1 POSITION control to bring the top of the waveform on screen.

NOTE

As a convenient way to exclude the first 50 ns of the trace in the following parts, reduce the trace intensity until the leading edge of the signal is not visible.

d. CHECK—Display aberrations are within 1% (0.2 division or less). Exclude the first 50 ns following the step transition from the measurement.

e. Set:

CH 1 VERTICAL MODE	Off
CH 2 VERTICAL MODE	On

f. Move the cable from the CH 1 input connector to the CH 2 input connector. Use the CH 2 POSITION control to bring the top of the waveform on screen.

g. CHECK—Display aberrations are within 1% (0.2 division or less). Exclude the first 50 ns following the step transition from the measurement.

h. Set CH 2 VOLTS/DIV to 20 mV.

i. Set the generator to produce a 5-division display.

j. CHECK—Display aberrations are within 1% (0.05 division or less). Exclude the first 50 ns following the step transition from the measurement.

k. Set:

CH 1 VERTICAL MODE	On
CH 2 VERTICAL MODE	Off
CH 1 VOLTS/DIV	20 mV

l. Move the cable from the CH 2 input connector to the CH 1 input connector.

m. CHECK—Display aberrations are within 1% (0.05 division or less). Exclude the first 50 ns following the step transition from the measurement.

n. Set:

CH 1 VOLTS/DIV	200 mV
CH 2 VOLTS/DIV	50 mV
A SEC/DIV	10 μs

o. Set the generator to produce a 15-kHz, 5-division display.

p. Repeat parts c through m.

q. Disconnect the test equipment from the instrument.

2. Check Frequency Bandwidth Limit

a. Set:

CH 1 VOLTS/DIV	10 mV
CH 2 VOLTS/DIV	10 mV
A SEC/DIV	100 μs
A TRIGGER MODE	AUTO

b. Connect the leveled sinewave generator output via a precision 50-Ω cable, two 50-Ω 10X attenuators, and a 50-Ω termination to the CH 1 input connector.

c. Set the generator to produce a 50-kHz, 5-division display.

d. Increase the generator output frequency to 5 MHz.

e. CHECK—Display amplitude is between 4.80 and 5.05 divisions in amplitude.

f. Set the 20 MHz BW LIMIT to Off (not lighted).

g. Repeat parts c and d.

h. CHECK—Display amplitude is between 4.95 and 5.05 divisions in amplitude.

i. Increase the generator output frequency to 10 MHz.

j. CHECK—Display amplitude is between 4.90 and 5.05 divisions in amplitude.

k. Increase the generator output frequency to 30 MHz.

l. CHECK—Display amplitude is between 4.85 and 5.10 divisions in amplitude.

m. Set:

CH 1 VOLTS/DIV	50 mV
20 MHz BW LIMIT	On

n. Remove one of the 10X attenuators from the input signal path.

o. Repeat parts c through l.

p. Set:

CH 1 VOLTS/DIV	200 mV
20 MHz BW LIMIT	On

q. Remove the last 10X attenuator from the input signal path.

r. Repeat parts c through l.

s. Move the cable from the CH 1 input connector to the CH 2 input connector and add the two 10X attenuators back into the signal path.

t. Set:

CH 1 VERTICAL MODE	Off
CH 2 VERTICAL MODE	On
20 MHz BW LIMIT	On

u. Repeat parts c through r using the Channel 2 controls.

v. Disconnect the test equipment from the instrument.

3. Check TV (Back-Porch) Clamp (CH 2 only)

a. Set:

20 MHz BW LIMIT	On
CH 1 VOLTS/DIV	500 mV
CH 2 VOLTS/DIV	50 mV
A SEC/DIV	2 ms
SLOPE	- (minus)
TRIGGER MODE	AUTO LVL
TRIGGER SOURCE	LINE

b. Connect the sinewave oscillator output via a 75-Ω cable to the CH 2 input connector.

c. Connect the composite sync output from the TV mainframe linearity generator via a 75-Ω cable and a 75-Ω termination to the CH 1 input connector.

d. Set the oscillator to produce a 60-Hz, 6-division display. Adjust the oscillator frequency control to produce as stable a display as possible.

e. Set:

CH 2 Input Coupling	TV CLAMP
A SEC/DIV	20 μs
TRIGGER SOURCE	CH 1
TRIGGER COUPLING	LINES

f. CHECK—Display amplitude is 0.75 division or less.

g. Set:

CH 2 VOLTS/DIV	100 mV
CH 2 Input Coupling	1 MΩ DC

h. Set the oscillator to produce a 6-division display.

i. Set the CH 2 Input Coupling to TV CLAMP.

j. CHECK—Display amplitude is 0.75 division or less.

k. Set:

CH 2 VOLTS/DIV	200 mV
CH 2 Input Coupling	1 MΩ DC

l. Repeat parts h through j.

m. Disconnect the test equipment from the instrument.

4. Check Back-Porch Reference

a. Set:

CH 2 Input Coupling	GND
A SEC/DIV	1 μs
TRIGGER SOURCE	VERT

b. Set the trace to the center horizontal graticule line using the CH 2 POSITION control.

c. Connect a 100%-modulated composite video signal from the TV mainframe linearity generator via a 75-Ω cable and a 75-Ω termination to the CH 2 input connector.

d. Set the CH 2 Input Coupling to TV CLAMP.

e. CHECK—That the back-porch level is within 1 division of the center horizontal graticule line.

f. Disconnect the test equipment from the instrument.

5. Check Triggering

a. Set:

CH 2 VOLTS/DIV	10 mV
CH 2 Input Coupling	1 MΩ DC
A SEC/DIV	2 μs
Δt	On
TRACKING	On
TRIGGER MODE	AUTO LVL
TRIGGER COUPLING	DC

b. Use the Δ REF OR DLY POS control to align its cursor with the second vertical graticule line.

c. Use the Δ control to produce a Δt reading of 2 μs.

d. Connect the pulse generator output via a 50-Ω cable, a 50-Ω 10X attenuator, and a 50-Ω termination to the CH 2 input connector.

e. Set the generator to produce a signal that has a negative pulse 3 divisions in amplitude, 2 μs wide, and a period of approximately 15 μs. Use the Δ control to produce a Δt reading of 15 μs.

f. Set TRIGGER COUPLING to LINES.

g. Use the Horizontal POSITION control to align the positive edge of the first pulse with the Δ REF OR DLY POS cursor.

h. Set CH 2 VOLTS/DIV to 100 mV. Use the Δ control to produce a Δt reading of 13 μs.

i. Reduce the generator period to the point at which the display is stably triggered, but any further reduction would result in an unstable display.

j. CHECK—That the positive edge of the second pulse is located in the area between the two cursors.

k. Set:

CH 2 INVERT	On
TRIGGER SLOPE	+

l. Adjust the pulse width so that the negative edge of the second pulse is aligned with the second cursor.

m. Reduce the generator period to the point at which the display is stably triggered, but any further reduction would result in an unstable display.

n. CHECK—That the negative edge of the second pulse is located in the area between the two cursors.

o. Disconnect the test equipment from the instrument.

6. Check Trigger Modes

a. Set:

CH 2 INVERT	Off
CH 2 VOLTS/DIV	500·mV
ΔV and Δt	Off
A SEC/DIV	100 μs
TRIGGER SLOPE	- (minus)
TRIGGER COUPLING	FLD 1

b. Connect the composite sync output from the TV mainframe linearity generator via a 75-Ω cable and a 75-Ω termination to the CH 2 input connector.

c. Rotate the Δ control until the readout indicates that the first line of the video signal is displayed (**"F1:1"**).

d. CHECK—That the oscilloscope is triggered on the first line of Field 1.

e. CHECK—That a slight counterclockwise rotation of the Δ control changes the readout to indicate the highest line number in the previous field for a multifield input signal. For example, using an NTSC signal, the readout would be **"F2:262"**.

f. CHECK—That the oscilloscope is triggered on the last line of Field 2.

g. CHECK—That rotating the Δ control counterclockwise backward through the second field of the signal eventually changes the readout to indicate the highest line number in the previous field for a multifield input signal. For example, using an NTSC signal, the readout would change to **"F1:263"**.

h. CHECK—That the oscilloscope is triggered on the last line of Field 1.

i. Set TRIGGER COUPLING to ALT.

j. Rotate the Δ control until the readout indicates that the first lines of the two frames are displayed (**"ALT:1"**).

k. CHECK—That the oscilloscope is triggered on the correct lines of the two fields.

l. CHECK—That a slight counterclockwise rotation of the Δ control changes the readout to indicate the highest line number common to both fields for a multifield input signal. For example, using an NTSC signal, the readout would be **"ALT:262"**.

m. CHECK—That the oscilloscope is triggered on the correct lines of the two fields.

n. Disconnect the test equipment from the instrument.

7. Check Input Signal Amplitude

a. Set:

CH 1 VOLTS/DIV	1 V
CH 2 VOLTS/DIV	100 mV
A SEC/DIV	200 μs
TRIGGER COUPLING	FLD 1

b. Connect the linearity generator output via a 75-Ω cable and a 75-Ω termination to the CH 2 input connector.

c. Set the generator to produce an output of full field and an IRE level of 0. Set all other generator buttons out. Then remove the color-burst signal by setting the sync generator GEN LOCK button out.

d. Rotate the Δ control until the readout indicates that the first line of the video signal is displayed ("**F1:1**").

e. Set CH 2 VOLTS/DIV to 1 V.

f. CHECK—That the display is triggered and stable.

g. Set:

CH 2 INVERT	On
TRIGGER SLOPE	+

h. CHECK—That the display is triggered and stable.

i. Move the cable from the CH 2 input connector to the CH 1 input connector.

j. Set:

CH 1 VERTICAL MODE	On
CH 2 VERTICAL MODE	Off
TRIGGER SLOPE	- (minus).

k. CHECK—That the display is triggered and stable.

l. Change the generator output to produce a 100 IRE level signal.

m. CHECK—That the display is triggered and stable.

n. Set:

CH 1 VERTICAL MODE	Off
CH 2 VERTICAL MODE	On
CH 2 Input Coupling	TV CLAMP
TRIGGER SLOPE	+

o. Move the cable from the CH 1 input connector to the CH 2 input connector.

p. CHECK—That the display is triggered and stable.

q. Set:

CH 2 INVERT	Off
TRIGGER SLOPE	- (minus)

r. CHECK—That the display is triggered and stable.

s. Disconnect the signal from the CH 2 input connector. Connect the output of the composite sync generator to the CH 3 input connector via a 75-Ω cable, a 75-Ω 10X attenuator, and a 75-Ω termination.

t. Set:

CH 1 VERTICAL MODE	Off
CH 3 VERTICAL MODE	On

u. Adjust the generator output to produce a 1.25-division display.

v. Set CH 3 VOLTS/DIV to 0.5 V.

w. CHECK—That the display is triggered and stable.

x. Set:

CH 3 VERTICAL MODE	Off
CH 4 VERTICAL MODE	On

y. Move the signal input from the CH 3 input connector to the CH 4 input connector.

z. Repeat parts u through w using the Channel 4 controls.

aa. Disconnect the cable from the composite sync output and connect it to the linearity generator output.

bb. Set CH 3 and CH 4 VOLTS/DIV to 0.1 V.

cc. Adjust the generator output to produce a 0.5-division display by varying the signal IRE level.

dd. CHECK—That the display is triggered and stable.

ee. Move the signal input from the CH 4 input connector to the CH 3 input connector.

ff. Set:

CH 3 VERTICAL MODE	On
CH 4 VERTICAL MODE	Off

gg. Repeat parts cc and dd.

hh. Disconnect the test equipment from the instrument.

ADJUSTMENT PROCEDURE

The "Adjustment Procedure" is used to restore optimum performance or to return the option to conformance with its "Performance Requirements" as listed in Table 2-1. The TV Option should only be adjusted when the standard instrument is known to meet its "Performance Requirements" as stated in Section 1 of the standard instrument Service manual.

Adjustment of the instrument must be done at an ambient temperature between +20°C and +30°C, and the instrument must have had a warm-up period of at least 20 minutes. Performing this procedure while the temperature is drifting or before the standard instrument is calibrated may cause erroneous calibration settings.

To perform this procedure, it is necessary to remove the wrap-around cabinet from the instrument. See the standard instrument "Maintenance" section for instructions on removing the cabinet.

Equipment Required (see Table 2-4)

Leveled Sinewave Generator (Item 5)

Calibration Generator (Item 7)

Precision 50-Ω Cable (Item 8)

50-Ω Termination (Item 11)

Two 50-Ω 10X Attenuators (Item 13)

Initial Control Settings

Vertical

CH 1 POSITION	Midrange

MODE

CH 1	On
CH 2, CH 3, and CH 4	Off
20 MHz BW LIMIT	On

VOLTS/DIV

CH 1	10 mV
CH 1 VAR	In detent

Input Coupling

CH 1	1 MΩ DC

Horizontal

POSITION	Midrange
A SEC/DIV	1 μs
SEC/DIV VAR	In detent
X10 MAG	Off
Sweep	A

Trigger

HOLDOFF	MIN (Fully CCW)
LEVEL	Midrange
SLOPE	+
A/B TRIG	A
MODE	AUTO LVL
SOURCE	VERT
COUPLING	DC

Adjust Flatness

a. Connect a fast-rise, positive-going squarewave output from the calibration generator via a precision 50-Ω cable, a 50-Ω 10X attenuator, and a 50-Ω termination to the CH 1 input connector.

b. Set the generator to produce a 100-kHz, 5-division display.

c. ADJUST—Coil L644 for as flat a response as possible. This coil is located on the Main circuit board, which is part of the standard instrument. See the standard instrument Service manual for coil location.

d. Disconnect the test equipment from the instrument.

e. Set the A SEC/DIV control to 100 μs.

f. Connect the leveled sine-wave generator output via a precision 50-Ω cable, two 50-Ω 10X attenuators, and a 50-Ω termination to the CH 1 input connector.

g. Set the generator to produce a 50-kHz, 5-division display.

h. Increase the generator output frequency to 5 MHz.

i. CHECK—Display amplitude is between 4.80 and 5.05 divisions in amplitude.

j. Set the A SEC/DIV control to 1 μs and disconnect the test equipment from the instrument.

k. Repeat parts a through j until no further improvement is noted.

Equipment Required (see Table 2-4)

- TV Mainframe (Item 1)
- Sync Generator (Item 2)
- Linearity Generator (Item 3)
- Oscilloscope with 10X Probe (Item 8)
- BNC Cable (Item 10)
- 75-Ω Termination (Item 11)

Initial Control Settings

VERTICAL MODE

CH 2	On
CH 1, CH 3, and CH 4	Off
20 MHz BW LIMIT	On
CHOP/ALT	ALT

VOLTS/DIV

CH 1 and CH 2	100 mV
CH 1 and CH 2 VAR	In detent
CH 3 and CH 4	0.1 V

Input Coupling

CH 1 and CH 2	1 MΩ DC

Horizontal

A SEC/DIV	2 µs (knob in)
SEC/DIV VAR	In detent
X10 MAG	Off
Sweep	A

Trigger

HOLDOFF	MIN (Fully CW)
LEVEL	Midrange
SLOPE	- (+ if signal is a positive-going sync)
A/B TRIG	A
MODE	AUTO
SOURCE	VERT
COUPLING	LINES

Δ Controls

ΔV and Δt	Off (turn off by pressing associated button)
TRACKING	OFF

2. Adjust Loop Gain (R5608)

a. Connect the full field output of the TV mainframe generator via a 75-Ω cable and a 75-Ω terminator to the CH 2 input connector of the instrument under test.

b. Set the TV mainframe generator to produce a 100 IRE pedestal output on all lines.

c. At this point you should have the sync tip and color burst (if burst is on) of one line of video displayed on screen.

d. Bench scope initial control settings:

VERTICAL MODE

CH 1	On
CH 2, CH 3, and CH 4	Off
20 MHz BW LIMIT	On
CHOP/ALT	ALT

VOLTS/DIV

CH 1 and CH 2	1 V (with X10 probe)
CH 1 and CH 2 VAR	In detent
CH 3 and CH 4	0.1 V

Input Coupling

CH 1 and CH 2	1 MΩ DC

Horizontal

A SEC/DIV	2 µs (knob in)
SEC/DIV VAR	In detent
X10 MAG	Off
Sweep	A

Trigger

HOLDOFF	MIN (Fully CW)
LEVEL	Midrange
SLOPE	- (minus)
A/B TRIG	A
MODE	AUTO
SOURCE	VERT
COUPLING	DC

Δ Controls

ΔV and Δt	Off (turn off by pressing associated button)

e. Connect the X10 probe to the CH 1 input of the bench scope.

f. Attach the X10 probe to TP5008 which is located close to U5445 on the TV board (Option 05).

g. Adjust the trigger level on the bench scope if necessary to get a clear trigger on the falling edge of the sync pulse. The waveform displayed on the bench scope should look very similar to those shown in Figures 2-1 and 2-2.

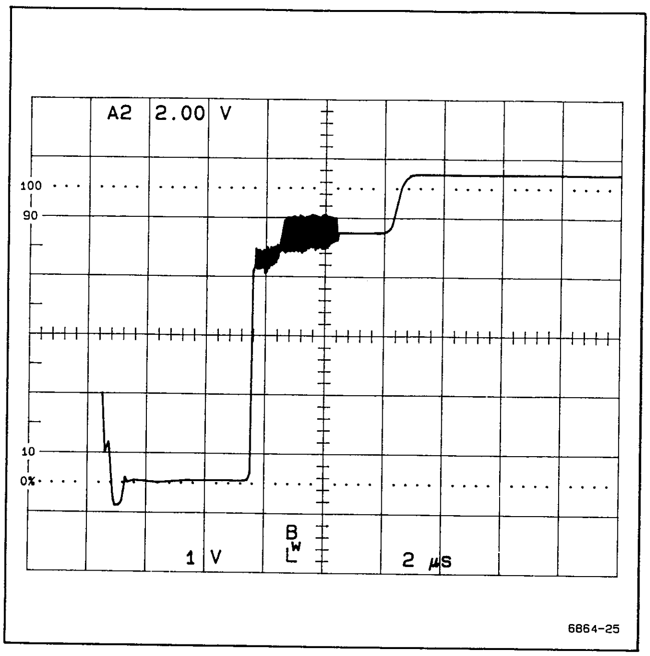

Figure 2-1. Loop Gain Adjustment.

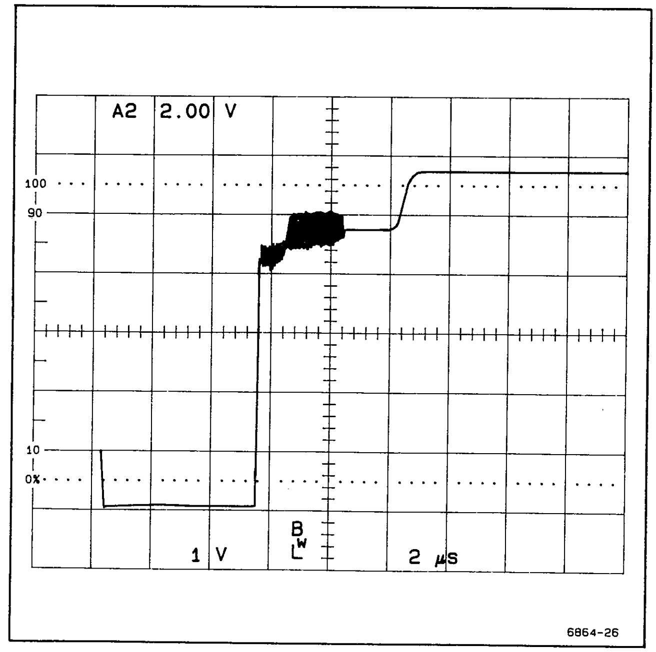

Figure 2-2. Loop Gain Over-Adjustment.

h. While watching the waveform displayed on the bench scope, turn R5608 on the TV board and observe the waveform. As you decrease the resistance of R5608 you will see the aberrations in the bottom of the sync pulse decrease. The pot should be adjusted to the point where the bottom of the pulse just starts to move down, as shown in Figure 2-1. If you continue to decrease the resistance, the back portion (closest to the rising edge of the sync pulse) will move down and the bottom of the sync pulse will flatten out completely, as shown in Figure 2-2. This indicates an overdriven condition. When the pot is properly adjusted it should be somewhere in the middle of its range.

i. When the adjustment is complete, reinstall the board by reversing the steps used in Section 5, *Options Maintenance*, under subsections "Instrument Troubleshooting with Options" and "Removal and Replacement Instructions."

Equipment Required (see Table 2-4)

TV Mainframe (Item 1)	BNC Cable (Item 10)
Sync Generator (Item 2)	75-Ω Termination (Item 11)
Linearity Generator (Item 3)	

NOTE

Before performing the Back-Porch Reference Adjustment (TV CAL 61), the user must complete TV EXER 61, TV EXER 62, and TV EXER 63 to setup the proper TV Protocol, Line-Numbering Format, and Automatic Sync Selection, page 2-5.

No initial control settings are needed for this adjustments procedure.

3. Adjust Back-Porch Clamp Reference

a. Connect the full field output of the 1410/1411/1412 TV generator via a 75-Ω cable and a 75-Ω terminator to the CH 2 input connector of the instrument under test.

b. Set the 1410/1411/1412 TV generator to produce a 100 IRE pedestal output on all lines.

c. At this point you should have the sync tip and color burst (if burst is on) of one line of video displayed on screen.

d. Hold both the ΔV and ΔT buttons and press the trigger SLOPE button to access the Diagnostic Menu.

NOTE

IF the calibration feature is disabled (the CAL/NO CAL jumper is in the NO CAL position), CAL messages will not appear in the Diagnostic Menu of the CRT readout.

e. Press the lower Trigger MODE button until the message "TV CAL 61" appears in the lower left corner of the CRT.

f. Press the upper Trigger COUPLING button. The instrument will automatically perform a DC Balance routine.

g. CHECK—Readout indicates "SET CH2 POSITION TO MID-SCREEN.".

h. Adjust CH2 POSITION control to set trace to the center graticule.

i. Press the upper Trigger COUPLING button.

j. CHECK—Readout indicates "ADJ Δ FOR MINIMUM OFFSET.".

k. Adjust Δ control to minimize offset between the center graticule and the Back-porch reference.

l. Press the upper Trigger COUPLING button. This will change the CH 2 VOLTS/DIV setting.

m. Repeat steps i-k for all CH 2 VOLTS/DIV settings.

n. Repeat steps f-l for CH 2 INVERT setting.

o. CHECK—"DIAGNSTIC. PUSH A/B TRIG TO EXIT" message appears in the Diagnostic Menu of the CRT readout.

p. Press the A/B TRIG button to exit the Diagnostic Menu.

q. Disconnect the test equipment from the instrument.

r. Return the CAL/NO CAL jumper to the NO CAL position and reinstall the instrument cabinet.

SPECIFICATION

INTRODUCTION

The HDTV Option (Option 5H) to the TEKTRONIX 2467B Oscilloscope provides additional hardware and software to simplify triggering and viewing of television signals. The option adds TV (Back Porch) Clamp circuitry to the Channel 2 input and provides TV trigger coupling modes that allow a user to select either horizontal or vertical sync pulses to obtain horizontal-line-sync or field-sync pulse triggering. This option also permits the user to trigger on a specific line number within a TV field and provides tri-level sync triggering capability as well as sync polarity switching for either sync-negative or sync-positive composite video signals.

NOTE

Composite video is the picture waveform complete with vertical and horizontal blanking and sync. Composite sync is vertical and horizontal sync combined as a single waveform, but without video (picture) waveforms.

All three major HDTV standard protocols are supported (1125/60, 1250/50, and 1050/59.4) as well as conventional system-M and nonsystem-M protocols. This provides compatibility with most television signal line-numbering protocols.

Stable video rejection and sync separation are obtained from sync-positive or sync-negative composite video signals having interlaced or non-interlaced scan, 525 to 1280 horizontal lines per frame, and 50- or 60-Hz field rates.

ACCESSORIES

Standard Accessories

In addition to the standard accessories listed in the oscilloscope manuals, the following TV Option accessories are provided:

1 CCIR Graticule CRT Filter
1 NTSC Graticule CRT Filter
1 Polarized Collapsible Viewing Hood
3 75 Ω Terminators

Optional Accessories

The following optional accessories are also available:

24X5B/2467B Options Service Manual
Protective Waterproof Vinyl cover

The optional accessories can be ordered from Tektronix, Inc. A local Tektronix Field Office, representative, or the Tektronix Product catalog can provide ordering and product information.

PERFORMANCE CONDITIONS

Except as noted in Tables 2A-1 and 2A-2 of this manual, the electrical, environmental, and mechanical characteristics of HDTV Option instruments are identical to those specified for standard instruments in the 2467B Oscilloscope manual.

Table 2A-1
Option 5H Electrical Characteristics

Characteristics	Performance Requirements
VERTICAL DEFLECTION SYSTEM—CHANNEL 1 AND CHANNEL 2	
Frequency Response	For VOLTS/DIV switch settings between 5 mV and 200 mV/div with VAR control in calibrated detent. Five-division, 50-kHz reference signal from a 50-Ω system with external 50-Ω termination on 1-MΩ input.
Full Bandwidth	
50 kHz to 10 MHz	Within ±1%.
>10 MHz to 20 MHz	Within +1%, -2%.
>20 MHz to 30 MHz	Within +2%, -2%.
50 MHz Bandwidth Limit	
50 kHz to 10 MHz	Within +1%, -4%.
>10 MHz to 20 MHz	Within +1%,. -10%.
>20 MHz to 30 MHz	Within +1%, -20%.
Square Wave Flatness	With fast-rise step (rise time ≤1 ns), 1-MΩ dc input coupling, an external 50-Ω termination, and VAR VOLTS/DIV control in calibrated detent. Exclude the first 50 ns following the step transition. For signals with rise times ≤10 ns, add 2% p-p between 155 ns and 165 ns after step transition.
Field Rate	
5 mV/div to 10 mV/div	1.5% p-p at 60 Hz with input signal of 0.1 V.[a]
20 mV/div	1% p-p at 60 Hz with input signal of 0.1 V.
50 mV/div	1% p-p at 60 Hz with input signal of 1.0 V.
Line Rate	
5 mV/div to 10 mV/div	1.5% p-p at 30 kHz with input signal of 0.1 V.[a]
20 mV/div	1% p-p at 30 kHz with input signal of 0.1 V.
50 mV/div	1% p-p at 30 kHz with input signal of 1.0 V.
TV (Back-Porch) Clamp (CH 2 only)	For VOLTS/DIV switch settings between 5mV and 200 mV with VAR control in calibrated detent. Six-division reference signal.
60-Hz Attenuation	≥18 dB.
Back-Porch Reference	Within 1.0 division of ground reference (adjustable).

[a]Performance requirement not checked in manual.

Table 2A-1 (cont)

Characteristics	Performance Requirements
TRIGGERING	
Sync Separation	Stable video rejection and sync separation from tri-level sync and bi-level sync-positive or sync-negative composite video, 525 to 1280 lines, 50 Hz or 60 Hz, interlaced or noninterlaced systems. For noninterlaced scan systems, the video signal source must start and end with full lines of video for correct line identification in the field trigger modes.
Line Selection Range in FLD 1, FLD 2, or Both Coupling Modes (ALT)	The lesser of 1280 or the number of lines in the field.
Input Signal Amplitude for Stable Triggering	
Channel 1 or Channel 2	Minimum sync-pulse amplitude within 18 divisions of input ground reference.
Composite Video	1 division.
Composite Sync	0.3 division.
Channel 3 or Channel 4	Minimum sync-pulse amplitude within 9 divisions of input ground reference.
Composite Video	0.5 division.
Composite Sync	0.25 division.

Table 2A-2
Option 5H Mechanical Characteristics

Characteristics	Performance Requirements
Weight	
With Power Cord, Cover, Pouch, Probes, Operators Manual, and Options	≤12.0 kg (26.4 lb).
Domestic Shipping Weight	≤17.6 kg (38.8 lb).

PREPARATION FOR USE

This part of the manual contains information related to the power-up of the standard instrument containing the HDTV Option. The power up sequence of the oscilloscope is described, along with explanations of potential option-related error messages that may occur if the instrument is not functioning properly. Also included is initial setup information for the selection of the TV protocol and the line number format parameters.

FILTER/GRATICULE REPLACEMENT

The plastic filter or graticule over the CRT faceplate can be removed by sliding the filter or graticule up until the bottom edge is exposed. Pull the bottom edge out and slide the filter or graticule down.

POWER-UP SEQUENCE

Before initially turning on power to the instrument, read Section 2 in the standard oscilloscope Service manual and follow the safety and precautionary information described there.

The power-up tests, automatically performed each time the oscilloscope is turned on, test both the standard oscilloscope circuitry and the HDTV Option circuitry. The HDTV Kernel test is integrated into the power-up tests for the host oscilloscope.

Kernel Test

Operation of the HDTV Option memory (ROM) is checked by the standard instrument Kernel test. Kernel test failures will result in an attempt to flash the front-panel A SWP TRIG'D indicator.

Even with a Kernel failure, pressing the A/B TRIG button may still place the instrument in an operating mode. However, if the operating mode is successfully entered, instrument operation may be unpredictable. If the instrument then functions adequately for your particular measurement requirement, it can be used; but refer it to a qualified service technician for repair of the problem as soon as possible.

Successful Power-Up Sequencing

When the power-up routine is successfully completed without a failure indication, the oscilloscope enters the normal operating state. The oscilloscope parameters are set to correspond with the current front-panel settings and functions that were established before instrument that were established before instrument power was last turned off. The instrument is now ready to make measurements as required.

POWER-DOWN SEQUENCE

When the POWER switch is set to OFF, the instrument powers down and the instrument front panel settings that were established prior to power off will be stored for use the next time power is applied to the instrument.

TV PROTOCOL AND LINE-NUMBERING FORMAT SELECTION

The following procedures are used to select a particular protocol or line-numbering format. Both involve access to Diagnostic monitor routines (HD EXER 61 and HD EXER 62) and affect field triggering only (FLD 1, Alternate FLD 1 — FLD 2 or FLD 2). TV protocol selection allows the user to choose between system-M, nonsystem-M, and HDTV 1X50 (1050/59.4 and 1250/50) television protocols. Selecting the incorrect system for a given TV protocol will not affect the ability to trigger on a given TV waveform. It will, however, cause the line number displayed to be inaccurate. Line-numbering format selection allows the user to select a preferred line-numbering scheme. Format 1 references line one from the beginning of the field being used for trigger reference. Format 2 always references line one from the first line of Field 1.

Exercise procedure HD EXER 61, accessed via the oscilloscope Diagnostic Menu, allows the user to select between system-M, nonsystem-M or HDTV 1125/60, and HDTV 1X50 (1050/59.4 and 1250/50) television protocols. When system-M is selected, the line count begins three lines before the field-sync pulse is encountered. If nonsystem-M is selected, the line count begins with the field-sync pulse. When HDTV 1X50 is selected, the line count begins one line after the field-sync pulse is encountered. This exercise procedure also provides Auto-Format selection as an option. If Auto-Format mode is selected, the oscilloscope automatically chooses the correct line numbering protocol depending on the TV signal input to the oscilloscope.

Exercise procedure HD EXER 62, accessed via the oscilloscope Diagnostic Menu, allows the user to select one of two line-number formats. When Format 1 is selected, the line count is reset at the beginning of each field. When Format 2 is selected, the line count is only reset at the beginning of field 1. For example, taking a 525, 2:1 interlaced TV signal when Format 1 is selected, field 1 uses line numbers 1 through 263 and field 2 uses line numbers 1 through 262. When Format 2 is selected, field 1 uses line numbers 1 through 263 and field 2 uses line numbers 264 through 525. Clockwise rotation of the FLD LINE # control increases the line number. Counterclockwise rotation of the FLD LINE # control decreases the line number.

To choose or determine the TV protocol:

1. Hold in both the ΔV and Δt buttons and press the Trigger SLOPE button to enter the Diagnostic Menu. The top row of the readout will display" **DIAGNSTIC. PUSH A/B TRIG TO EXIT.**"
2. Press and hold the upper or lower Trigger MODE button to sequence through the TEST and EXER routine labels until the message **"HD EXER 61"** appears at the lower left corner of the CRT.
3. Press the upper Trigger COUPLING button, causing the currently selected protocol to appear at the top of the CRT display. The message meanings are as follows:

   LINE1 OCCURS PRIOR TO FLD SYNC—System-M protocol is currently selected.

   LINE1 COINCIDENT WITH FLD SYNC—Nonsystem-M or HDTV 1125/60 protocol is currently selected.

   LINE1 OCCURS AFTER FLD SYNC—HDTV 1X50 protocol is currently selected.

   LINE1 AUTO FORMATS TO FLD SYNC—Automatic format selection is currently selected.

4. If the desired protocol is not displayed, press the upper Trigger COUPLING button until the desired protocol message is displayed.
5. When the desired protocol message is displayed on the CRT. Press the lower Trigger COUPLING button to store the selected protocol and return the oscilloscope to the Diagnostic Menu.

To choose or determine the line number format:

6. Briefly press the upper Trigger MODE button, causing the message **"HD EXER 62"** to appear at the lower left corner of the CRT.
7. Press the upper Trigger COUPLING button to display the currently selected format at the top of the CRT. The message meanings are as follows:

   LINE NO RESETS ON EACH FIELD -- Format 1 is selected; line numbering begins with the first line of both field 1 and field 2.

   LINE NO RESETS ON FLD 1 ONLY -- Format 2 is selected; line numbering begins at the first line of field 1 and continues through field 2.

8. If the desired line format message is displayed, exit the Diagnostic Menu by pressing the A/B TRIG button to resume normal oscilloscope operation.
9. If the desired line format message is not displayed, press the upper Trigger COUPLING button. The desired line format message should now be displayed.
10. Press the lower Trigger COUPLING button to store the selected line format and return to the Diagnostic Menu.
11. Press the A/B TRIG button to exit the Diagnostic Menu and resume normal oscilloscope operation.

AUTOMATIC SYNC SELECTION

Automatic sync selection allows the user to preselect the polarity of sync used most often. Automatic sync selection will change the sync to the preselected polarity when the user enters a TV trigger coupling selection. Once TV trigger has been activated, the user may change the polarity as desired. Changing trigger coupling selections within the TV Option area will not cause the sync selection to be changed. There are three possible sync selections:

POSITIVE:	TV Option will select sync positive when entering TV trigger coupling mode.
NEGATIVE:	TV Option will select sync negative when entering TV trigger coupling mode.
SLOPE DEFAULT:	TV Option will default to the A trigger slope.

To choose or determine automatic sync polarity, enter the Diagnostic Monitor and choose HD EXER 63 (see instructions 1 and 2 under "TV Protocol and Line-Numbering Format Selection"). After entering HD EXER 63, the top line of the CRT display will read:

"TVSYNC:POSITIVE"

or

"TVSYNC:NEGATIVE"

or

"TVSYNC:SLOPE DEFAULT"

Press the upper Trigger COUPLING button to cycle through these states. When the desired state is displayed, press the lower Trigger COUPLING button to store the selection and return to the Diagnostic Menu. Press the A/B TRIG button to return to normal oscilloscope operation.

THEORY OF OPERATION

INTRODUCTION

SECTION ORGANIZATION

This section contains a functional circuit description of the Option 5H (HDTV Option) circuitry for the 2467B Oscilloscope. The discussion begins with an overview of option functions and continues with detailed explanations of each major circuit. Reference is made to supporting schematic and block diagrams, which aid in understanding the text. These diagrams show interconnections between parts of the circuitry, identify circuit components, list specific component values, and show interrelationships with the standard oscilloscope.

The block and schematic diagrams are located in the tabbed "Diagrams" section at the rear of this manual. The particular schematic diagram associated with each circuit description is identified by number in the text. The diagram number, enclosed within a diamond symbol, also appears on the tab of the appropriate foldout page. For optimum understanding of the circuit being described, refer to both the applicable schematic and block diagrams.

DIGITAL LOGIC CONVENTIONS

Digital logic circuits perform many functions within the instrument. The operation of these circuits is represented by specific logic symbology and terminology. Logic function descriptions contained in this manual use the positive-logic convention. The specific voltages which constitute a HI or a LO vary among individual devices. For specific device characteristics, refer to the manufacturer's data book.

GENERAL CIRCUIT DESCRIPTION

INTRODUCTION

Before individual circuits are discussed in detail, a general block-level discussion is provided to aid in understanding overall operation of the option circuitry. A simplified block diagram of the option, showing basic interconnections, is shown in Figure 10-5. The diamond-enclosed numbers in the blocks refer to the schematic diagrams at the rear of this manual in which the corresponding circuitry is located. Throughout this discussion, standard oscilloscope refers to the 2467B Oscilloscope without option circuitry.

The activities of the option are directed by the microprocessor contained in the standard oscilloscope. The microprocessor, under the control of firmware present in the option, monitors the option's functions and sets up the operating modes according to instructions received.

While executing the control program, the microprocessor retrieves previously stored calibration constants and front-panel settings and, as necessary, places program-generated data in temporary storage for later use. The random access memory (RAM) in the base instrument, and ultraviolet erasable programmable read only memory (EPROM) contained in the option circuit boards provide these storage locations.

The microprocessor control bus, address bus, and data bus are buffered by Control board circuitry. Microprocessor bus timing for the options is modified by buffers on the Control board to make bus timing compatible with the options. These signal paths are used for communication between the HDTV option and the standard oscilloscope and involve both data and control signals. The main oscilloscope circuitry uses them to control the option. The option uses them to send information to the standard oscilloscope for display and to control the standard oscilloscope. Address bus decoding allows individual circuits to be addressed.

HDTV BOARD

The HDTV option adds hardware and software to the standard oscilloscope that make it possible to trigger on and view complex television signals. The HDTV board is divided into analog and digital sections.

Circuitry in the analog section of the HDTV board processes composite video from the selected trigger source. If enabled, the TV (Back Porch) Clamp acts as a dc restorer to eliminate waveform tilt and prevent level changes due to changes in average picture level (APL). Sync pulses are extracted from the composite video by the Sync Pickoff comparator. The horizontal and vertical sync pulses are separated and used to produce the horizontal clock and field signals used by the digital circuitry.

The digital section of the HDTV board contains the microprocessor interface, which allows the microprocessor to control the option. It includes the Data Bus buffer, the Memory and I/O decoders, the Option Select register, and the EPROM. The TV Control register stores the option's control information. Sync pulses for TV field(s) are counted by counters in the Counter/Timer integrated circuit (IC). The Mode Select logic selects the proper signal to arm the Auxiliary Trigger generator. The Auxiliary Trigger generator triggers the standard instrument's sweep generator when sweep holdoff has ended and the selected horizontal sync pulse arrives.

DETAILED CIRCUIT DESCRIPTION

INTRODUCTION

The following discussion provides detailed information concerning the electrical operation and circuit relationships of the 2467B High-Definition Television circuitry. Unique circuitry is described in detail, while circuits common in the electronics industry are not. The descriptions are supported by the associated detailed block diagram (Figure 10-19) and schematic diagrams located at the rear of this manual in the tabbed foldout pages.

HIGH DEFINITION TELEVISION OPTION CIRCUIT BOARD

The HDTV Option circuit board adds hardware and firmware that make it possible to trigger on and view television signals. The HDTV board is divided into analog and digital sections. The following descriptions are supported by the circuit timing diagram (Figures 10-21a and 10-21b) located in the tabbed foldout pages in the rear of the manual.

The analog section contains the composite video signal processing circuitry. It includes signal amplification, automatic gain control, back-porch clamping, sync pickoff, and sync separation circuitry. Clocks at the horizontal (line) rate and a field indicator are sent to the digital section. The digital section contains the microprocessor interface and circuitry that triggers the standard instrument's sweep generator. The trigger is generated when the selected horizontal sync pulse (line) occurs.

Analog Circuitry

The HDTV option Analog circuitry (see Diagrams 33 and 34) processes the composite video. Back-porch level control, horizontal clock, and vertical field signals are produced for other circuitry in the instrument.

VARIABLE GAIN AMPLIFIER. The Variable Gain Amplifier stage amplifies the input composite video signal. The front-panel SLOPE selector determines whether the amplifier is inverting or noninverting.

Differential amplifier U5436 amplifies the input composite video signal. It contains two pairs of switching transistors that provide signal inversion when desired. The Sync Tip Clamp and Automatic Gain Control circuitry controls the channel resistance of Q5530, which in parallel with R5530 determines the gain of the amplifier. The gain is automatically adjusted to maintain proper sync-tip level. With no input signal, the gain is maximum.

The composite video signal is applied to one input of the differential amplifier (U5436, pin 3) and to its dc offset amplifier (U5634B). The input to the dc offset amplifier is low-pass filtered by R5433 and C5630, so that its output is the dc component of the composite video signal. This filtered output is then applied to the other input of the differential amplifier (U5436, pin 11).

Four transistors of U5436 are controlled by the SLOPE signal from U5764. When SLOPE is HI, the transistors connected to pins 2 and 6 will be biased on, and the collector signal at pin 7 will drive Q5528. When SLOPE is LO, the transistors connected to pins 13 and 9 will be biased on, and the collector signal at pin 14, which is inverted with respect to both the input signal and the signal at pin 7, will drive Q5528.

Common-base transistor Q5528 level shifts the signal from U5436 and provides voltage gain to drive Q5532. For stable triggering, the composite video signal which drives Q5532 must be sync-negative; if the displayed input signal is sync-positive, the SLOPE button must be pushed to invert the signal.

FIXED GAIN AMPLIFIER AND BACK-PORCH CLAMP. The second-stage amplifier circuitry provides additional gain to the video signal from the Variable Gain Amplifier. Also, additional start-up circuitry is used to set amplifier parameters when a signal is first applied.

Additional amplification is provided by U5445. Transistors U5445A and U5445B form a differential amplifier, with U5445C supplying their emitter current. The output of U5445A drives the input of the Sync Pickoff Comparator.

When a signal is first applied, the amplifier operating levels are established by feedback. The channel resistance of Q5530 is minimum when no signal is applied. This will set up the circuitry for maximum gain to enable the feedback circuits, the Back Porch clamp, and the Sync Tip clamp and Automatic Gain Control. Once a signal is applied, U5445D and associated circuitry will increase the dc level associated with the input signal if any of the signal is below ground. When the signal is below ground, diode CR5526A will forward bias, shutting off U5445D and forward biasing CR5623B. This reduces the output voltage of U5634A and decreases the base drive voltage on U5445A. This raises the transistor's collector voltage and turns off CR5526A.

SYNC PICKOFF COMPARATOR. The comparator, composed of Q5515 and Q5512, is switched by the sync pulse. The switching threshold is adjusted by the Trigger LEVEL control on the front panel. The Trigger LEVEL control allows positioning of the trigger at any point on the falling edge of the sync pulse. When entering the HDTV Option or when pushing the Init @50% button on the front-panel, the switching is set at about 50% of the sync level.

SYNC-TIP CLAMP AND AUTOMATIC GAIN CONTROL. Transconductance operational amplifier U5410 acts as a sync-tip clamp and controls the gain of U5436 by altering the channel resistance of Q5530. The operational amplifier's gain is determined by the current into pin 5, which is set by R5608. The amplifier is enabled on sync tips when pin 5 is HI (-14.4 V). One input of the operational amplifier is grounded, and the other has the collector signal of U5445A applied through R5525. The operational amplifier, when enabled at the start of a sync pulse by the collector of Q5512 going LO, alters the channel resistance of Q5530, keeping the signal level at the collector of U5445A at about 0.5 V for the duration of the sync pulse. When pin 5 is LO (-15 V), U5410 is off and C5419 acts as a sample and hold to maintain bias on Q5530.

Diode CR5522A reduces amplifier gain when the sync tip is below -0.2 V. If the diode becomes forward biased, Q5518 turns on (if it is not on already). Amplifier U5410 can then increase the channel resistance of Q5530 and thus reduce the amplifier gain.

BACK-PORCH CLAMP. Transductance operational amplifier (U5310) acts as a back-porch clamp to control the level of the video during the back-porch period. Its gain is determined by the current into pin 5. When the amplifier is enabled, pin 5 is HI (-14.4 V). When the collector signal of Q5515 goes positive, signaling the start of a composite sync interval, the programmable logic device (U5750) creates an inverted version of this signal (RAMP DRIVE). This signal is buffered by U5890C and its output drives U5721B configured as a Miller Integrator. The output of U5721B is an increasing voltage ramp. CR5722A, CR5722B, and VR5721 limit the maximum and minimum voltage output by U5721B. The voltage on this ramp is directly related to the width of the incoming composite sync. The voltage comparators U5724 and U5723 are configured to sample the voltage on this ramp. The output of U5724 ($\overline{\text{HDTV}}$) will be HI for composite sync intervals approximately 1 μs or longer. R5710 is used to adjust the timing associated with the output of U5721B. The output of U5723 is also used to drive U5721A configured as a Miller Integrator. Again, CR5723A, CR5723B, and VR5722 limit the maximum and minimum voltage output by U5721A. The output of U5721A drives the base of Q5751 through R5753 and is used to create an accumulated hold (ACC HOLD) signal. These signals ($\overline{\text{HDTV}}$, HOLD, and ACC HOLD) are all used by the programmable logic drive (U5750) to determine whether the incoming composite sync system is a tri-level sync system or a bi-level sync system.

When the collector of Q5515 goes negative, the RAMP DRIVE signal changes polarity and the output of U5721B becomes a decreasing voltage ramp. If the programmable logic device (U5750) determines that the incoming composite sync signal is a tri-level sync system, then its output pin 17 (FAST DISCHARGE) remains HI. This causes U5721B to produce a decreasing voltage ramp with approximately the same slope as its respective increasing voltage ramp. If the programmable logic device (U5750) determines that the incoming composite sync signal is a bi-level sync system, then its output through pin 17 (FAST DISCHARGE) is set LO. This signal turns on Q5721 and through R5714 it causes U5721B to produce a decreasing voltage ramp with approximately 10 times faster slope.

The output of U5721B is sampled by voltage comparator U5722 and its output (RAMP) is HI whenever an increasing or decreasing voltage ramp is being generated. The output of U5722 (RAMP) will be HI for the duration of the composite sync interval, regardless of the input video signal (bi-level/tri-level). When the output of U5722 (RAMP) goes LO or the output of U5750 pin 17 (FAST DISCHARGE) goes LO, the resulting pulse coupled through C5726 turns off Q5519. The positive going signal on the collector of Q5519 enables U5310 during the back-porch time. The output of U5310 drives voltage-follower U5634A, which in turn establishes the base voltage of U5445A. The collector signal of U5445A drives U5310 pin 3 through R5310 during the back-porch time, with a resulting collector voltage on U5445A of about 4.5 V. C5631 acts as a sample and hold to maintain the bias on U5445A.

When the collector of Q5512 goes low, indicating the start of a sync pulse, Q5521 and Q5520 are turned on and U5310 is turned off. This insures that the back-porch clamp is not enabled during a composite sync interval.

VERTICAL BACK-PORCH CLAMP. The Vertical Back-Porch Clamp clamps the back-porch level of the displayed signal to approximately zero volts.

Input to level comparators U5755 and U5855 is a sample of the signal (CH2 PICKOFF) in the Channel 2 vertical preamp. The output of the clamp, CH2 OFFSET, supplies a dc offset to the vertical preamp. The level comparators supply a dc offset of the proper polarity and magnitude to cause CH2 PICKOFF to be approximately zero volts during the back-porch interval.

Any color burst on the signal is removed by R5754 and C5755. The signal is then applied to U5755 pin 3 and U5855 pin 2 where it is compared, during the back-porch interval, to a reference voltage from the output of U5468 pin 6. It is then applied to U5755 pin 2 and U5855 pin 3 through R5758. Pin 6 of U5468 ($\overline{\text{IOUT}}$) sinks current that develops a voltage across R5464. The voltage is used as a reference for setting the back-porch reference to approximately zero volts. The voltage reference adjustment is set using HD CAL 61.

When CH 2 VOLTS/DIV is at 2 mV, 5 mV, 10 mV, 100 mV, or 1 V/DIV; FAST/SLOW is LO, turning on Q5720. The channel resistance of Q5442 will then decrease, making C5640 part of the sample-and-hold capacitance. R5812, R5820, C5545, and C5640 control the large signal ac response of the Vertical Back-Porch Clamp during the sampling period.

BACK-PORCH CLAMP SWITCHING. The Back-Porch Clamp Switching circuitry determines when the Vertical Back-Porch Clamp is active and which of its level comparators is used.

When the back-porch clamp is not enabled, CLAMP will be LO, turning Q5712 on. The HI on the collector of Q5712 turns on U5712B, 5712C, and Q5736. This keeps both comparators (U5755 and U5855) off and the inputs to U5636A and U5636B grounded. With this circuitry disabled, the Channel 2 vertical preamp circuitry does not receive a dc offset voltage from the comparators.

When the back-porch clamp is enabled, CLAMP will be HI, turning Q5712 off. The LO on the collector of Q5712 turns Q5736 off, enabling U5636A and U5636B. It also allows U5712E and U5712D to turn off either U5712B or U5712C, turning on the corresponding comparator (U5855 or U5755). Either U5755 or U5855 is gated on during the back-porch interval when Q5519 turns off. With the Vertical Back-Porch Clamp enabled, the back porch of the displayed signal is clamped to ground. However, when the Phase Locked Loop is not locked, the Vertical Back-Porch Clamp is turned off through R5831.

Comparator selection, either U5755 or U5855, is controlled by the CH2 INVERT signal. The signal from Channel 2 is inverted by U5855, but not by U5755. If the front-panel INVERT is selected, the signal from the preamp must be inverted by U5855. This is because the preamp's signal is sampled after inversion takes place in the preamp. If CH2 INVERT is LO, U5712E is on and U5712D is off. The HI on the collector of U5712E turns on U5712B which turns off U5855. If U5855 is off, the input signal will not be inverted. The LO on the collector of U5712D turns off U5712C, enabling U5755; during the back-porch interval the collector of Q5519 will be HI, turning on U5755. If CH2 INVERT is HI, the circuitry operates similarly. However, this time U5755 is turned off and U5855 is turned on, inverting the signal from the preamp.

If the back-porch clamp is enabled during the back-porch interval, transistor Q5519 turns on either U5755 or U5855. However, the dc offset generated by U5755 and U5855 must be maintained during the entire horizontal interval. Between back-porch intervals, while U5755 and U5855 are turned off, the required offset is maintained by C5545 and, if Q5442 is on, by C5640.

When the collector of Q5512 goes low, indicating the start of a sync pulse, Q5521 is turned on and through diodes CR5712A and CR5712B, Q5712C and Q5712B are turned on. This turns off U5755 and U5855 and insures that the vertical back-porch clamp circuitry is not enabled during a composite sync interval.

AUTO BASELINE GENERATOR. The Auto Baseline Generator producers the horizontal clock signal used in generating triggers. The programmable logic device (U5750) takes the digital signal ($\overline{\text{COMP SYNC}}$) generated by the SYNC

PICKOFF COMPARATOR circuitry and generates an equivalent output signal (HTRIG) after removing all equalizing pulses. Auto Baseline Generator combines (ORs) this horizontal sync signal (HTRIG) with the $\overline{\text{HCLK}}$ produced by the Phase Locked Loop divide by two circuitry found in the programmable logic device (U5750). The $\overline{\text{HCLK}}$ is first delayed by R5864 and C5779. The $\overline{\text{HCLK}}$ input allows horizontal clocks to be produced when in LINES TRIGGER COUPLING, both when there is no input signal and during non-serrated vertical sync pulses. Producing a horizontal clock at these times generates a trigger and therefore a baseline trace.

PHASE LOCKED LOOP. The Phase Locked Loop (PLL) generates signals used in identifying individual fields in interlaced scan systems.

PLL, U5845, operates at twice the horizontal clock frequency. Its output (2XH) is divided by two by the programmable logic device (U5750) producing $\overline{\text{HCLK}}$. Horizontal sync (RAMP DRIVE) from the input signal is input to U5845 at pin 14. The $\overline{\text{HCLK}}$ generated by the PLL through U5750 is input to U5845 at pin 3. The vertical sync is removed from the PLL inputs by U5838A and U5838B. (See Figure 10-21a and 10-21b).

Pin 1 of the Phase Locked Loop (U5845) is LO whenever the signals on pin 3 and pin 14 do not coincide (horizontal sync at pin 14 not in phase with $\overline{\text{HCLK}}$ at pin 3). The PLL error signal at pin 1 is stretched by R5755 and C5865 and then inverted by Q5740. When the collector of Q5740 is HI, the equalizing pulses and vertical sync are no longer removed from the inputs by U5750, U5838A and U5838B. This lets the Phase Locked Loop see the entire input signal while it's trying to lock on the input.

FIELD SYNC GENERATOR. The Field Sync Generator circuitry (U5750 and U5756) generates the FIELD ID and VERT SYNC signals used by the counters in the digital section. The FIELD ID signal selects either the Field 1 or Field 2 line counter. The VERT SYNC signal is used by the vertical sync line counter. (For interlaced scan signals it identifies the field, while for noninterlaced scan signals it identifies vertical sync only.) The programmable logic device (U5750) uses the incoming $\overline{\text{COMP SYNC}}$, 2XH, and PLL_LOCK signals to generate the output signals HTRIG, VERT SYNC, $\overline{\text{HCLK}}$, FIELD ID, FAST DISCHARGE, and RAMP DRIVE.

The interlaced scan detector (U5756) detects whether the incoming video signal is interlaced or noninterlaced. Two signals generated by the programmable logic device (U5750) are monitored by U5756. U5756A monitors the INTERLACE output of U5750. On interlaced scan signals, except 1050/59.4 and 1250/50 signals, this output will be LO for Field 1 and HI for Field 2. U5756B monitors the 1X50 output of U5750. On 1050/59.4 and 1250/50 interlaced scan signals, this output will be LO for Field 1 and HI for Field 2. Both INTERLACE and 1X50 signals will be absent in noninterlaced scan systems. The output of U5756A and U5756B are input to the programmable logic device (U5750) and are used to determine the proper field identification algorithm.

Digital Circuitry

The HDTV Option Digital circuitry (see Diagrams 35 and 36) provides an interface to the microprocessor and generates a trigger to the standard instrument's sweep generator.

MEMORY AND I/O DECODERS. This circuitry decodes the address bus, generating enabling signals and strobes that allow the microprocessor to control the various circuit functions and devices. The HDTV Option memory space (see Table 2A-3) is decoded by programmable logic device U5880 and three-to-eight line decoder U5460.

Enabling signals generated by U5880 select the HDTV Option EPROM, hardware, and the Data Bus Buffer.

When enabled by U5880, U5460 generates signals to select the TV Counter/Timer IC, TV Control Register, and the TV DAC Register.

Table 2A-3
HDTV Option Memory Map

Address	Description	Device No.
4000-7FFF	Data Bus buffer	U5459
4000-5FFF	ROM	U5565
6000-7F7F	ROM image	U5565
7F80-7F87	Counter/Timer IC registers	U5575
7F88-7F8E	TV Control register image	U5764
7F8F	TV Control register	U5764
7F90	TV DAC register	U5464
7F91-7F97	TV DAC register image	U5464
7F98-7FBF	Unused	
7FC0-7FFE	Option Select register image	U5880
7FFF	Option Select register	U5880

OPTION SELECT REGISTER. The Option Select register is incorporated within programmable logic device U5880. Access to TV option circuitry is enabled and disabled by the Option Select register. Whenever there is an access to address 7FFF, data bus line BD5 is latched into the register. If BD5 is HI, TV option circuitry will be selected for memory and I/O accesses within the paged address space (4000-7FFF). If BD5 is LO, the TV option is deselected. While the TV option is deselected, the Option Select register is the only TV circuitry that can be accessed by the microprocessor. Pin 15 of U5880 is the $\overline{Q}$ output of the Option Select Register. The TV Option is enabled when this pin is LO and disabled when this pin is HI.

DATA BUS BUFFER. The data bus is buffered by bidirectional buffer U5459. It is enabled by BVMA, BA14, $\overline{BE}$, and the Option Select register through programmable logic device U5880. The direction of data is controlled by BR/$\overline{W}$ DLYD.

EPROM. The EPROM U5565 is enabled by BVMA, $\overline{BE}$, the Option Select register, and one of its addresses being selected through programmable logic device U5880.

TV CONTROL REGISTER. The TV Control register is written to by the microprocessor to:

1. Control the polarity (SLOPE) of the sync tips of the composite video used in the analog section of the circuitry.
2. Control the back-porch clamp circuitry (CH2 INVERT, CLAMP, and FAST/ $\overline{SLOW}$).
3. Enable the TV Option's Auxiliary Trigger generator.
4. Set the Mode Select Logic.

The microprocessor writes to the register whenever the option is selected and the register's address is decoded by U5880 and U5460.

COUNTER/TIMER. Counter/Timer U5575 contains three programmable counters used to determine the maximum number of lines in a given field and to produce a variable delay. The delay is varied to select any specific line in the selected field as the trigger point.

The Counter/Timer is enabled whenever its address is decoded by U5460. Access to the internal registers is controlled by BA0, BA1, BA2, and BR/$\overline{W}$ DLYD.

Counters 1 and 2 are used in single-shot mode to delay the trigger points by the proper amounts from the Field 1 and Field 2 vertical sync pulses, respectively. Each counter counts $\overline{HCLK}$ (applied to the C inputs) during the respective counter's field. The FIELD ID pulse is applied to input G1; the pulse is inverted by U5580D and applied to input G2. The VERT SYNC signal is inverted by U5580C and applied to input G3.

The outputs of Counters 1 and 2 provide a LO pulse out to U5775D and U5775A. The pulse out occurs when the sync pulse for the line prior to the one selected is reached. If the desired line is too near the start of its field, the counter for the other field is used, and the counter starts counting at the beginning of its field. Counting continues until the desired sync pulse for the line prior to the one selected is reached; this may mean counting past the start of the next field. Then, the counter generates the output pulse.

Starting the count at the beginning of the previous field is necessary for the first two lines of a field in systems where line 1 occurs after the field pulse (HDTV 1X50), for the first three lines of a field in systems where line 1 is coincident with the field pulse (nonsystem-M), and for the first six lines in systems where line 1 is three lines before the field pulse (system-M). Lines 1 through 3 of system-M signals cannot be delayed from their corresponding field sync pulse because they occur before the field pulse. The following three lines for system-M signals (where line 1 is three lines before the field sync), the first three lines for nonsystem-M signals (where line 1 is coincident with the field pulse), and the first two lines for HDTV 1X50 signals (where line 1 occurs after the field pulse) must be delayed from the previous field because:

1. The horizontal clock coincident with the field pulse does not cause a count to occur; it only starts the counting process.
2. The counters must arm the trigger generator on the line preceding the selected line.
3. The counter will not generate a delay of zero (there must be at least a one count delay).
4. The counter's output goes LO one count (line) after the count reaches zero.

AUXILIARY TRIGGER GENERATOR. The Auxiliary Trigger generator produces the signal that triggers the sweep generator in the standard instrument when the appropriate horizontal line is reached.

Trigger generation in the option and in the standard instrument is similar. Neither is allowed to produce triggers during sweep retrace (holdoff). After holdoff, the trigger circuitry is made ready to produce a trigger (armed). In the standard instrument and for LINES TV TRIGGER COUPLING in the option, the triggers are armed at the end of holdoff. For FLD1, FLD2, and ALT TV TRIGGER COUPLING in the option, the Auxiliary Trigger generator is not armed until the sync pulse for the line prior to the one selected is reached. When the next horizontal sync pulse (the line selected for triggering) is reached, the trigger circuitry produces the trigger.

Trigger holdoff information is provided by AHO through U5580F to U5590A pin 1. When AHO is HI, both U5590A and U5590B are reset, holding off the generation of triggers. After holdoff time has ended (AHO LO), the Mode Selection logic will set U5590A, arming the trigger generator. The next time HCLK goes HI at U5590B pin 11, U5590B will set, generating a trigger.

MODE SELECT LOGIC. The Mode Select Logic selects the signal used to arm the Auxiliary Trigger generator. The three arming signals used are: the output of Counter 1 at U5575 pin 27 (Field 1 line counter), the output of Counter 2 at U5575 pin 3 (Field 2 line counter), and the A Holdoff at U5580F pin 13 (AHO) going LO.

The arming signal selected is controlled by TV Control register U5764 and $\overline{\text{GTLINES}}$ signal (U5464 pin 2). The registers receive the present TV Trigger mode information from the microprocessor. The three select lines are: ALT (U5764 pin 2), DSMODE (U5764 pin 5), and LINES (U5764 pin 6). If LINES TV TRIGGER COUPLING is selected, LINES and $\overline{\text{GTLINES}}$ will be HI. If ALT FLD TV TRIGGER COUPLING is selected, ALT and $\overline{\text{GTLINES}}$ will be HI. In Alternate mode, DSMODE selects Field 1 or Field 2.

A trigger can not occur until after holdoff ends (holdoff ends when AHO goes LO) and the Auxiliary Trigger generator is armed. In the following discussion, it is assumed that holdoff has just ended. This means AHO U5580F pin 13 just went LO and no longer holds the arming flip-flop, U5590A, reset.

In Lines mode, U5764 pin 6 is HI, enabling U5790. Whenever holdoff ends, AHO goes LO, U5580F pin 12 and U5790C pin 9 go HI, and U5790C pin 8 and U5590A pin 4 go LO, setting arming flip-flop U5590A. With the arming flip-flop set, trigger generator U5590B is no longer held reset. The next HCLK to U5590B pin 11 sets the flip-flop, generating a trigger.

In Lines mode: a trigger is generated; the sweep runs; holdoff occurs; the trigger generator is armed as soon as holdoff goes LO; and the next trigger occurs when the next horizontal sync pulse arrives. This gives a trace which is stable with respect to horizontal sync pulses (lines), but is not stable with respect to vertical sync pulses (fields) or the video information on any given line.

If Field 1 or Field 2 TV Trigger modes are selected, the ALT, DSMODE, and LINES signals are all LO (counter 3 output is also held LO) and $\overline{\text{GTLINES}}$ signal is HI. With ALT LO, U5775B pin 4 and U5775C pin 10 are both LO. This makes U5775B pin 6, U5775A pin 2, U5775C pin 8, and U5775D pin 12 all HI, enabling U5775A and U5775D. With both gates enabled, either the Field 1 counter or the Field 2 counter can arm the trigger generator.

The counter used is determined by the microprocessor's setup of the Counter/Timer. The output of the unused counter is LO. Depending on which counter is selected, when the trigger count is reached, the output of either U5775A or U5775D will go HI. This will make both inputs of U5790A HI, and its output LO. The LO is inverted to a HI by U5890D, setting arming flip-flop U5590A.

In the field modes: a trigger is generated; the sweep runs; holdoff occurs; holdoff ends; the sync pulse for the line prior to the selected horizontal line occurs, arming the Auxiliary Trigger generator; and the next horizontal sync pulse arrives, generating the next trigger. This gives a trace which is stable with respect to horizontal sync pulses (lines), vertical sync pulses (fields), and the video information on the selected lines.

Alternate TV Trigger mode may be used with Alternate Vertical mode. In Alternate TV Trigger mode, the selected horizontal line of Field 1 triggers the sweep for the first active vertical channel, and the selected horizontal line of Field 2 triggers the sweep for the next active vertical channel.

If Alternate TV Trigger mode is selected, the ALT signal is HI, and the DSMODE signal controls whether or not the $\overline{\text{DS}}$ signal is inverted. With ALT HI, both U5775B and U5775C are enabled. With DSMODE LO, the output of U5890A will be the input $\overline{\text{DS}}$. $\overline{\text{DS}}$ will be HI during the sweep for the first active vertical channel, and LO during the sweep of the next active vertical channel. The $\overline{\text{DS}}$ signal through U5775B and U5775C allows only one counter's output at a time to get through to arm the Auxiliary Trigger generator. The state of $\overline{\text{DS}}$ changes with each sweep, allowing the opposite counter (field) to arm the trigger generator.

When the DSMODE signal is HI, U5890A inverts $\overline{\text{DS}}$. Operation of the circuitry is now the same as stated for Alternate TV Trigger mode except: Counter 2 arms the trigger generator for the first active channel's sweep, and Counter 1 arms the trigger generator for the next active channel's sweep. This reversal of roles is required whenever the line selected for triggering is near the start of the field.

If gated lines trigger mode is selected, the ALT, DSMODE, and $\overline{\text{GTLINES}}$ signals are LO and LINES signal is HI. With ALT LO, U5775B pin 4 and U5775C pin 10 are both LO. As in Field 1 or Field 2 mode, this enables both U5775A and U5775D. With both gates enabled, both the Field 1 counter and Field 2 counter are passed to arm the trigger generator. In this mode, the output of the counter 3 is inverted and delayed by U5875B. The output of U5875B is combined with the Field 1 and Field 2 counter outputs by NOR gate U5838D. When the output of U5838D is HI, then U5590B is enabled through U5838C and U5890B. Whenever holdoff ends, AHO goes LO, U5580F pin 12 and U5790C pin 9 go HI, and U5790C pin 8 and U5590A pin 4 go LO, setting arming flip-flop U5590A. With the arming flip-flop set, trigger generator U5590B is no longer held reset. The next valid $\overline{\text{HCLK}}$ to U5590B pin 11 sets the flip-flop generating a trigger.

In the gated lines trigger mode: a trigger is generated; the sweep runs; holdoff occurs; the trigger generator is armed as soon as holdoff goes low and the next trigger occurs when a valid horizontal sync pulse arrives. A horizontal sync pulse is valid if the pulse occurs after the selected start horizontal line (Field 1 or Field 2) and prior to the selected stop horizontal line (counter 3). If the above condition is not met then the trigger is held off until the condition is satisfied.

The start and stop horizontal lines are determined by the microprocessor's setup of the counter/timer. In active video (ACTVID) mode the starting line of active video is written to counters 1 and 2. The last line of active video is written into counter 3. This gives a trace which is stable with horizontal sync pulses (lines), but is not stable with respect to vertical sync pulses (fields), or the video information on any given line. This does limit the trigger event to only horizontal lines with active video information. This removes triggers during the vertical blanking interval.

PERFORMANCE CHECK AND ADJUSTMENT PROCEDURES

INTRODUCTION

This section contains the Option 5H (HDTV) portion of the instrument's performance check and adjustment procedures. The "Performance Check Procedure" is used to check the instrument's performance against the requirements listed in Table 2A-1. The "Adjustment Procedure" is used to restore optimum performance or return the option to conformance with its "Performance Requirements" as listed in Table 2A-1.

Instrument performance should be checked after every 2000 hours of operation or once each year if used infrequently. A more frequent interval may be necessary if the instrument is subjected to harsh environments or severe usage. The results of these periodic checks will determine the need for recalibration.

Before performing these procedures, ensure that the LINE VOLTAGE SELECTOR switch is set for the ac power source being used (see Section 2 of the standard instrument Service manual). Connect the instrument to be checked and the test equipment to an appropriate power source.

LIMITS AND TOLERANCES

The tolerances given in these procedures are valid for an instrument that has been previously calibrated in an ambient temperature between +20°C and +30°C and is operating in an ambient temperature between -15°C and +55°C. The instrument also must have had at least a 20-minute warm-up period. To assure instrument performance, perform all steps in the following procedures at the same ambient temperature. When performing these checks, it is assumed that the standard instrument meets all of its "Performance Requirements" as stated in Section 1 of the standard instrument Service manual.

TEST EQUIPMENT

The test equipment listed in Table 2A-4 is a complete list of the equipment required to accomplish both the "Performance Check Procedure" and the "Adjustment Procedure." To assure accurate measurements, it is important that test equipment used for making these checks meets or exceeds the specifications described in Table 2A-1. When considering use of equipment other than that recommended, use the "Minimum Specification" column to determine whether available test equipment will suffice.

The procedures in this section are written using the equipment listed in Table 2A-4. When substitute equipment is used, control settings stated in the test setup and in the procedures may need to be altered.

Detailed operating instructions for test equipment are not given in this procedure. If more operating information is required, refer to the appropriate test-equipment instruction manual.

Table 2A-4
Test Equipment Required

Item No. and Description	Minimum Specification	Examples of Suitable Test Equipment
1. TV Mainframe	Conforms to TV system requirements.	TEKTRONIX 1410 (NTSC Systems). TEKTRONIX 1411 (PAL Systems). TEKTRONIX 1412 (PAL-M Systems). HDTV: TEKTRONIX TSG1250 TEKTRONIX TSG1125 TEKTRONIX TSG1050
2. Sync Generator	Conforms to TV system requirements. Variable amplitude sync.	TEKTRONIX SPG2 (NTSC Systems).[a] TEKTRONIX SPG12 (PAL Systems).[a] TEKTRONIX SPG22 (PAL-M Systems).[a]
3. Linearity Generator	Conforms to TV system requirements.	TEKTRONIX TSG3 (NTSC Systems). TEKTRONIX TSG13 (PAL Systems). TEKTRONIX TSG23 (PAL-M Systems).
4. Sinewave Oscillator	Frequency: Adjustable to 60 Hz. Amplitude: Adjustable to 3 V p-p into 75 Ω.	TEKTRONIX SG 502 RC Oscillator.[b]
5. Leveled Sinewave Generator	Frequency: 250 kHz to 30 MHz. Output amplitude: variable to 5 V p-p. Output impedance: 50 Ω. Reference frequency: 50 kHz. Amplitude accuracy: constant within 3% of a reference frequency as output frequency changes.	TEKTRONIX SG 503 Leveled Sinewave Generator.[b]
6. Pulse Generator	Period: variable to 15 μs. Pulse width: 2 μs.	TEKTRONIX PG 502 Pulse Generator.[b]
7. Calibration Generator	Fast-rise signal level: 1 V. Repetition rate: variable to 100 kHz. Rise time: 1 ns or less. Flatness: ±0.5%. Leading edge aberrations: within 2%.	TEKTRONIX PG 506 Calibration Generator.[b]
8. Oscilloscope with 2 P6137 10X Standard Accessory Probes	Bandwidth: 400 MHz. General Purpose.	TEKTRONIX 2465B/2467B.
9. Precision Cable	Impedance: 50 Ω.	TEKTRONIX Part No. 012-0482-00.
10. Cable	Impedance: 50 Ω.	TEKTRONIX Part No. 012-0057-01.
11. Cable (2 required)	Impedance: 75 Ω.	TEKTRONIX Part No. 012-0074-00.
12. Termination	Impedance: 50 Ω.	TEKTRONIX Part No. 011-0049-01.
13. Termination	Impedance: 75 Ω.	TEKTRONIX Part No. 011-0055-00.
14. 10X Attenuator (2 required)	Ratio: 10X. Impedance: 50 Ω.	TEKTRONIX Part No. 011-0059-02.
15. 10X Attenuator	Ratio: 10X. Impedance: 75 Ω.	TEKTRONIX Part No. 011-0061-00.

[a]With Option AA.

[b]Requires a TM 5000-Series power-module mainframe.

PERFORMANCE CHECK PROCEDURE

This procedure is used to verify proper operation of the option and may be used to determine the need for readjustment. This check may also be used as an acceptance test and as a preliminary troubleshooting aid. Perform all steps, both in the sequence presented and in their entirety, to ensure that control settings are correct for the following step.

PREPARATION

Removing the wrap-around cabinet is not necessary to perform this procedure. All checks are made using operator accessible controls and connectors.

Turn on the instrument and ensure that no error message is displayed on the CRT. If the instrument displays **"DIAGNSTIC. PUSH A/B TRIG TO EXIT"** at power on, one of the power-up tests has failed. If the error message on the bottom line of the CRT is **"TEST 04 FAIL XX"** where XX is X1, 1X, or 11, the stored calibration data is in error and the instrument should be recalibrated by a qualified service technician before performing the "Performance Check Procedure." If any other error messages occur, the failure is probably not related to calibration and the instrument should be repaired by a qualified service technician before performing either procedure.

Set the TV protocol and format by following these steps:

1. Hold in both the ΔV and Δt buttons and press the Trigger SLOPE button to enter the Diagnostic Menu. The top row of readout will display **"DIAGNSTIC. PUSH A/B TRIG TO EXIT".**

2. Press and hold the lower Trigger MODE button until the message **"HD EXER 61"** appears at the lower left corner of the CRT display.

3. Press the upper Trigger COUPLING button. The currently selected TV protocol will appear at the top of the CRT display. If necessary, change the selected TV protocol by pressing the upper Trigger COUPLING button again. For an NTSC system, select **"LINE1 OCCURS PRIOR TO FLD SYNC"**; for PAL, SECAM or 1125 HDTV systems , select **"LINE1 COINCIDENT WITH FLD SYNC"**; for 1050 and 1250 HDTV systems, select **"LINE1 OCCURS AFTER FLD SYNC"**; for other systems make the appropriate selection.

NOTE

*For most systems "**LINE1 AUTO FORMATS TO FLD SYNC**" is the recommended selection.*

4. Press the lower Trigger COUPLING button to store the selected protocol and return the Diagnostic Menu.

5. Press the upper Trigger MODE button. The message **"HD EXER 62"** will be displayed at the lower left corner of the CRT display.

6. Press the upper Trigger COUPLING button. The currently selected format will appear at the top of the CRT display. If necessary, change the selected format by pressing the upper Trigger COUPLING button again. For an NTSC system, select **"LINE NO RESETS ON EACH FIELD"**; for HDTV, PAL or SECAM systems, select **"LINE NO RESETS ON FLD 1 ONLY"**; for other systems make the appropriate selection.

7. Press the lower Trigger COUPLING button to store the selected format and return to the Diagnostic Menu.

8. Press the A/B TRIG button to exit the Diagnostic Menu and return to normal oscilloscope operation.

HDTV OPTION CHECKS

Initial Control Settings

Control settings not listed do not affect the procedure.

POSITION Controls	Midrange

NOTE

Select channels to set VOLTS/DIV.

VOLTS/DIV

CH 1	200 mV
CH 2	50 mV
CH 3 and CH 4	0.1 V
CH 1 and CH 2 VAR	In detent

VERTICAL MODE

CH 1	On
CH 2, CH 3, CH 4, ADD and INVERT	Off
ALT/CHOP	ALT
50 MHz BW LIMIT	On

Input Coupling

CH 1 and CH 2	1 MΩ DC

Horizontal

POSITION	Midrange
A SEC/DIV	2 ms
SEC/DIV VAR	In detent
X10 MAG	Off
Sweep	A

Delta Function Controls

ΔV and Δt	Off (turn off readout by pressing associated button)
TRACKING	Off (not lighted)

Trigger

HOLDOFF	MIN (Fully CCW)
LEVEL	Midrange (INIT@50%)
SLOPE	+
A/B TRIG	A
MODE	AUTO LVL
SOURCE	VERT
COUPLING	DC

1. Check Squarewave Flatness

a. Connect a fast-rise positive-going squarewave output from the calibration generator via a 50-Ω cable and a 50-Ω termination to the CH 1 input connector.

b. Set the generator to produce a 60-Hz, 5-division display.

c. Set CH 1 VOLTS/DIV to 50 mV. Use the CH 1 POSITION control to bring the top of the waveform on screen.

NOTE

As a convenient way to exclude the first 50 ns of the trace in the following parts, reduce the trace intensity until the leading edge of the signal is not visible.

d. CHECK—Display aberrations are within 1% (0.2 division or less). Exclude the first 50 ns following the step transition from the measurement.

e. Set:

CH 1 VERTICAL MODE	Off
CH 2 VERTICAL MODE	On

f. Move the cable from the CH 1 input connector to the CH 2 input connector. Use the CH 2 POSITION control to bring the top of the waveform on screen.

g. CHECK—Display aberrations are within 1% (0.2 division or less). Exclude the first 50 ns following the step transition from the measurement.

h. Set CH 2 VOLTS/DIV to 20 mV.

i. Set the generator to produce a 5-division display.

j. CHECK—Display aberrations are within 1% (0.05 division or less). Exclude the first 50 ns following the step transition from the measurement.

k. Set:

CH 1 VERTICAL MODE	On
CH 2 VERTICAL MODE	Off
CH 1 VOLTS/DIV	20 mV

l. Move the cable from the CH 2 input connector to the CH 1 input connector.

m. CHECK—Display aberrations are within 1% (0.05 division or less). Exclude the first 50 ns following the step transition from the measurement.

n. Set:

CH 1 VOLTS/DIV	200 mV
CH 2 VOLTS/DIV	50 mV
A SEC/DIV	5 μs

o. Set the generator to produce a 30-kHz, 5-division display.

p. Repeat parts c through m.

q. Disconnect the test equipment from the instrument.

2. Check Frequency Bandwidth Limit

a. Set:

CH 1 VOLTS/DIV	10 mV
CH 2 VOLTS/DIV	10 mV
A SEC/DIV	100 μs
A TRIGGER MODE	AUTO

b. Connect the leveled sinewave generator output via a precision 50-Ω cable, two 50-Ω 10X attenuators, and a 50-Ω termination to the CH 1 input connector.

c. Set the generator to produce a 50-kHz, 5-division display.

d. Increase the generator output frequency to 10 MHz.

e. CHECK—Display amplitude is between 4.80 and 5.05 divisions in amplitude.

f. Increase the generator output frequency to 20 MHz.

g. CHECK—Display amplitude is between 4.50 and 5.05 divisions in amplitude.

h. Increase the generator output frequency to 30 MHz.

i. CHECK—Display amplitude is between 4.00 and 5.05 divisions in amplitude.

j. Set the 50 MHz BW LIMIT to Off (not lighted).

k. Repeat parts c and d.

l. CHECK—Display amplitude is between 4.95 and 5.05 divisions in amplitude.

m. Repeat part f.

n. CHECK—Display amplitude is between 4.90 and 5.05 divisions in amplitude.

o. Repeat part h.

p. CHECK—Display amplitude is between 4.9 and 5.10 divisions in amplitude.

q. Set:

CH 1 VOLTS/DIV	50 mV
50 MHz BW LIMIT	On

r. Remove one of the 10X attenuators from the input signal path.

s. Repeat parts c through p.

t. Set:

CH 1 VOLTS/DIV	200 mV
50 MHz BW LIMIT	On

u. Remove the last 10X attenuator from the input signal path.

v. Repeat parts c through p.

w. Move the cable from the CH 1 input connector to the CH 2 input connector and add the two 10X attenuators back into the signal path.

x. Set:

CH 1 VERTICAL MODE	Off
CH 2 VERTICAL MODE	On
50 MHz BW LIMIT	On

y. Repeat parts c through v using the Channel 2 controls.

z. Disconnect the test equipment from the instrument.

3. Check TV (Back-Porch) Clamp (CH 2 only)

a. Set:

50 MHz BW LIMIT	On
CH 1 VOLTS/DIV	500 mV
CH 2 VOLTS/DIV	50 mV
A SEC/DIV	2 µs
SLOPE	- (minus)
TRIGGER MODE	AUTO LVL
TRIGGER SOURCE	LINE

b. Connect the sinewave oscillator output via a 75-Ω cable to the CH 2 input connector.

c. Connect the composite sync output from the TV mainframe linearity generator via a 75-Ω cable and a 75-Ω termination to the CH 1 input connector.

d. Set the oscillator to produce a 60-Hz, 6-division display. Adjust the oscillator frequency control to produce as stable a display as possible.

e. Set:

CH 2 Input Coupling	TV CLAMP
A SEC/DIV	20 µs
TRIGGER SOURCE	CH 1
TRIGGER COUPLING	LINES

f. CHECK—Display amplitude is 0.75 division or less.

g. Set:

CH 2 VOLTS/DIV	100 mV
CH 2 Input Coupling	1 MΩ DC

h. Set the oscillator to produce a 6-division display.

i. Set the CH 2 Input Coupling to TV CLAMP.

j. CHECK—Display amplitude is 0.75 division or less.

k. Set:

CH 2 VOLTS/DIV	200 mV
CH 2 Input Coupling	1 MΩ DC

l. Repeat parts h through j.

m. Disconnect the test equipment from the instrument.

4. Check Back-Porch Reference

a. Set:

CH 2 Input Coupling	GND
A SEC/DIV	1 µs
TRIGGER SOURCE	VERT

b. Set the trace to the center horizontal graticule line using the CH 2 POSITION control.

c. Connect a 100%-modulated composite video signal from the TV mainframe linearity generator via a 75-Ω cable and a 75-Ω termination to the CH 2 input connector.

d. Set the CH 2 Input Coupling to TV CLAMP.

e. CHECK—That the back-porch level is within 1 division of the center horizontal graticule line.

f. Connect a white flat field HDTV video signal via a 75-Ω cable and a 75-Ω terminator to the CH2 input connector.

g. Repeat part e.

h. Disconnect the test equipment from the instrument.

5. Check Triggering

a. Set:

CH 2 VOLTS/DIV	10 mV
CH 2 Input Coupling	1 MΩ DC
A SEC/DIV	2 µs
Δt	On
TRACKING	On
TRIGGER MODE	AUTO LVL
TRIGGER COUPLING	DC

b. Use the Δ REF OR DLY POS control to align its cursor with the second vertical graticule line.

c. Use the Δ control to produce a Δt reading of 1 µs.

d. Connect the pulse generator output via a 50-Ω cable, a 50-Ω 10X attenuator, and a 50-Ω termination to the CH 2 input connector.

e. Set the generator to produce a signal that has a negative pulse 3 divisions in amplitude, 1 µs wide, and a period of approximately 15 µs. Use the Δ control to produce a Δt reading of 15 µs.

f. Set TRIGGER COUPLING to LINES.

g. Use the Horizontal POSITION control to align the positive edge of the first pulse with the Δ REF OR DLY POS cursor.

h. Set CH 2 VOLTS/DIV to 100 mV. Use the Δ control to produce a Δt reading of 13 µs.

i. Reduce the generator period to the point at which the display is stably triggered, but any further reduction would result in an unstable display.

j. CHECK—That the positive edge of the second pulse is located in the area between the two cursors.

k. Set:

CH 2 INVERT	On
TRIGGER SLOPE	+

l. Adjust the pulse width so that the negative edge of the second pulse is aligned with the second cursor.

m. Reduce the generator period to the point at which the display is stably triggered, but any further reduction would result in an unstable display.

n. CHECK—That the negative edge of the second pulse is located in the area between the two cursors.

o. Remove the X10 attenuator from the input signal path.

p. Set:

CH 2 INVERT	OFF
TRIGGER SLOPE	- (minus)
CH 2 VOLTS/DIV	1 V

q. Repeat parts i through n.

r. Disconnect the test equipment from the instrument.

6. Check Trigger Modes

a. Set:

CH 2 INVERT	Off
CH 2 VOLTS/DIV	500 mV
ΔV and Δt	Off
A SEC/DIV	100 µs
TRIGGER SLOPE	- (minus)
TRIGGER COUPLING	FLD 1

b. Connect the composite sync output from the TV mainframe linearity generator via a 75-Ω cable and a 75-Ω termination to the CH 2 input connector.

c. Rotate the Δ control until the readout indicates that the first line of the video signal is displayed (**"F1:1"**).

d. CHECK—That the oscilloscope is triggered on the first line of Field 1.

e. CHECK—That a slight counterclockwise rotation of the Δ control changes the readout to indicate the highest line number in the previous field for a multifield input signal. For example, using an NTSC signal, the readout would be **"F2:262"**; and using a 1050 HDTV signal, the readout would be **"F2:1050"**.

f. CHECK—That the oscilloscope is triggered on the last line of Field 2.

g. CHECK—That rotating the Δ control counterclockwise backward through the second field of the signal eventually changes the readout to indicate the highest line number in the previous field for a multifield input signal. For example, using an NTSC signal, the readout would change to **"F1:263"**; and using a 1050 HDTV signal, the readout would be **"F2:525"**.

h. CHECK—That the oscilloscope is triggered on the last line of Field 1.

i. Set TRIGGER COUPLING to ALT.

j. Rotate the Δ control until the readout indicates that the first lines of the two frames are displayed (**"ALT:1"**).

k. CHECK—That the oscilloscope is triggered on the correct lines of the two fields.

l. CHECK—That a slight counterclockwise rotation of the Δ control changes the readout to indicate the highest line number common to both fields for a multifield input signal. For example, using an NTSC signal, the readout would be **"ALT:262"**; and using a 1050 HDTV signal, the readout would be **"F2:525"**.

m. CHECK—That the oscilloscope is triggered on the correct lines of the two fields.

n. Disconnect the test equipment from the instrument.

7. Check Input Signal Amplitude

a. Set:

CH 1 VOLTS/DIV	1 V
CH 2 VOLTS/DIV	100 mV
A SEC/DIV	200 µs
TRIGGER COUPLING	FLD 1

b. Connect the TV mainframe linearity generator output via a 75-Ω cable and a 75-Ω termination to the CH 2 input connector.

c. Set the generator to produce an output of full field and an IRE level of 0. Set all other generator buttons out. Then remove the color-burst signal by setting the sync generator GEN LOCK button out.

d. Rotate the Δ control until the readout indicates that the first line of the video signal is displayed ("**F1:1**").

e. Set CH 2 VOLTS/DIV to 1 V.

f. CHECK—That the display is triggered and stable.

g. Set:

CH 2 INVERT	On
TRIGGER SLOPE	+

h. CHECK—That the display is triggered and stable.

i. Move the cable from the CH 2 input connector to the CH 1 input connector.

j. Set:

CH 1 VERTICAL MODE	On
CH 2 VERTICAL MODE	Off
TRIGGER SLOPE	- (minus)

k. CHECK—That the display is triggered and stable.

l. Change the generator output to produce a 100 IRE level signal.

m. CHECK—That the display is triggered and stable.

n. Set:

CH 1 VERTICAL MODE	Off
CH 2 VERTICAL MODE	On
CH 2 Input Coupling	TV CLAMP
TRIGGER SLOPE	+

o. Move the cable from the CH 1 input connector to the CH 2 input connector.

p. CHECK—That the display is triggered and stable.

q. Set:

CH 2 INVERT	Off
TRIGGER SLOPE	- (minus)

r. CHECK—That the display is triggered and stable.

s. Disconnect the signal from the CH 2 input connector. Connect the output of the composite sync generator to the CH 3 input connector via a 75-Ω cable, a 75-Ω 10X attenuator, and a 75-Ω termination.

t. Set:

CH 1 VERTICAL MODE	Off
CH 3 VERTICAL MODE	On

u. Adjust the generator output to produce a 1.25-division display.

v. Set CH 3 VOLTS/DIV to 0.5 V.

w. CHECK—That the display is triggered and stable.

x. Set:

CH 3 VERTICAL MODE	Off
CH 4 VERTICAL MODE	On

y. Move the signal input from the CH 3 input connector to the CH 4 input connector.

z. Repeat parts u through w using the Channel 4 controls.

aa. Disconnect the cable from the composite sync output and connect it to the linearity generator output.

bb. Set CH 3 and CH 4 VOLTS/DIV to 0.1 V.

cc. Adjust the generator output to produce a 0.5-division display by varying the signal IRE level.

dd. CHECK—That the display is triggered and stable.

ee. Move the signal input from the CH 4 input connector to the CH 3 input connector.

ff. Set:

CH 3 VERTICAL MODE	On
CH 4 VERTICAL MODE	Off

gg. Repeat parts cc and dd.

hh. Disconnect the test equipment from the instrument.

8. Check TV Autoset and Active Video Preset

a. Set:

CH 3 VERTICAL MODE	Off
CH 2 VERTICAL MODE	On
TRIGGER COUPLING	DC

b. Connect the TV mainframe linearity generator output via a 75-Ω cable and 75-Ω terminator to the CH 2 input connector.

c. Set the generator to produce a 100 IRE flat field level signal.

d. Press AUTO SETUP button.

e. CHECK— that the display is triggered and stable.

f. Set:

CH 2 INVERT

g. Repeat parts d and e.

h. Press RECALL button twice followed by ADD button.

i. CHECK— that the display does not show lines from the vertical sync pulse interval.

j. Disconnect the linearity generator from the CH 2 input connector. Connect the output of an HDTV generator to the CH 2 input connector via a 75-Ω cable and a 75-Ω terminator.

k. Set the generator to produce a white flat field signal.

l. Repeat parts d through i.

m. Disconnect the test equipment from the instrument.

ADJUSTMENT PROCEDURE

The "Adjustment Procedure" is used to restore optimum performance or to return the option to conformance with its "Performance Requirements" as listed in Table 2A-1. The HDTV Option should only be adjusted when the standard instrument is known to meet its "Performance Requirements" as stated in Section 1 of the standard instrument Service manual.

Adjustment of the instrument must be done at an ambient temperature between +20°C and +30°C, and the instrument must have had a warm-up period of at least 20 minutes. Performing this procedure while the temperature is drifting or before the standard instrument is calibrated may cause erroneous calibration settings.

To perform this procedure, it is necessary to remove the wrap-around cabinet from the instrument. See the standard instrument "Maintenance" section for instructions on removing the cabinet.

Equipment Required (see Table 2A-4)

Leveled Sinewave Generator (Item 5)

Calibration Generator (Item 7)

Precision 50-Ω Cable (Item 9)

50-Ω Termination (Item 12)

Two 50-Ω 10X Attenuators (Item 14)

Initial Control Settings

Vertical

CH 1 POSITION	Midrange

MODE

CH 1	On
CH 2, CH 3, and CH 4	Off
50 MHz BW LIMIT	On

VOLTS/DIV

CH 1	10 mV
CH 1 VAR	In detent

Input Coupling

CH 1	1 MΩ DC

Horizontal

POSITION	Midrange
A SEC/DIV	1 μs
SEC/DIV VAR	In detent
X10 MAG	Off
Sweep	A

Trigger

HOLDOFF	MIN (Fully CCW)
LEVEL	Midrange
SLOPE	+
A/B TRIG	A
MODE	AUTO LVL
SOURCE	VERT
COUPLING	DC

Adjust Flatness

a. Connect a fast-rise, positive-going square-wave output via a precision 50-Ω cable, a 50-Ω 10X attenuator, and a 50-Ω termination to the CH 1 input connector.

b. Set the generator to produce a 100-kHz, 5-division display.

c. ADJUST—Coil L644 for as flat a response as possible. This coil is located on the Main circuit board, which is part of the standard instrument. See the standard instrument Service manual for coil location.

d. Disconnect the test equipment from the instrument.

e. Set the A SEC/DIV control to 100 μs.

f. Connect the leveled sine-wave generator output via a precision 50-Ω cable, two 50-Ω 10X attenuators, and a 50-Ω termination to the CH 1 input connector.

g. Set the generator to produce a 50-kHz, 5-division display.

h. Increase the generator output frequency to 10 MHz.

i. CHECK—Display amplitude is between 4.80 and 5.05 divisions in amplitude.

j. Set the A SEC/DIV control to 1 μs and disconnect the test equipment from the instrument.

k. Repeat parts a through j until no further improvement is noted.

Equipment Required (see Table 2A-4)

TV Mainframe (Item 1)	Oscilloscope with 10X Probe (Item 8)
Sync Generator (Item 2)	BNC Cable (Item 11)
Linearity Generator (Item 3)	75-Ω Termination (Item 13)

Initial Control Settings

VERTICAL MODE

CH 2	On
CH 1, CH 3, and CH 4	Off
50 MHz BW LIMIT	On
CHOP/ALT	ALT

VOLTS/DIV

CH 1 and CH 2	100 mV
CH 1 and CH 2 VAR	In detent
CH 3 and CH 4	0.1 V

Input Coupling

CH 1 and CH 2	1 MΩ DC

Horizontal

A SEC/DIV	2 µs (knob in)
SEC/DIV VAR	In detent
X10 MAG	Off
Sweep	A

Trigger

HOLDOFF	MIN (Fully CW)
LEVEL	Midrange
SLOPE	- (+ if signal is a positive-going sync)
A/B TRIG	A
MODE	AUTO
SOURCE	VERT
COUPLING	LINES

Δ Controls

ΔV and Δt	Off (turn off by pressing associated button)
TRACKING	OFF

2. Adjust Loop Gain (R5608)

a. Connect the full field output of the TV mainframe linearity generator via a 75-Ω cable and a 75-Ω terminator to the CH 2 input connector of the instrument under test.

b. Set the TV mainframe linearity generator to produce a 100 IRE pedestal output on all lines.

c. At this point you should have the sync tip and color burst (if burst is on) of one line of video displayed on screen.

d. Bench scope initial control settings:

VERTICAL MODE

CH 1	On
CH 2, CH 3, and CH 4	Off
20 MHz BW LIMIT	On
CHOP/ALT	ALT

VOLTS/DIV

CH 1 and CH 2	1 V (with X10 probe)
CH 1 and CH 2 VAR	In detent
CH 3 and CH 4	0.1 V

Input Coupling

CH 1 and CH 2	1 MΩ DC

Horizontal

A SEC/DIV	2 µs (knob in)
SEC/DIV VAR	In detent
X10 MAG	Off
Sweep	A

Trigger

HOLDOFF	MIN (Fully CW)
LEVEL	Midrange
SLOPE	- (minus)
A/B TRIG	A
MODE	AUTO
SOURCE	VERT
COUPLING	DC

Δ Controls

ΔV and Δt	Off (turn off by pressing associated button)

e. Connect the X10 probe to the CH 1 input of the bench scope.

f. Attach the X10 probe to TP5008 which is located close to U5445 on the HDTV board (Option 5H).

g. Adjust the trigger level on the bench scope if necessary to get a clear trigger on the falling edge of the sync pulse. The waveform displayed on the bench scope should look very similar to those shown in Figures 2A-1 and 2A-2.

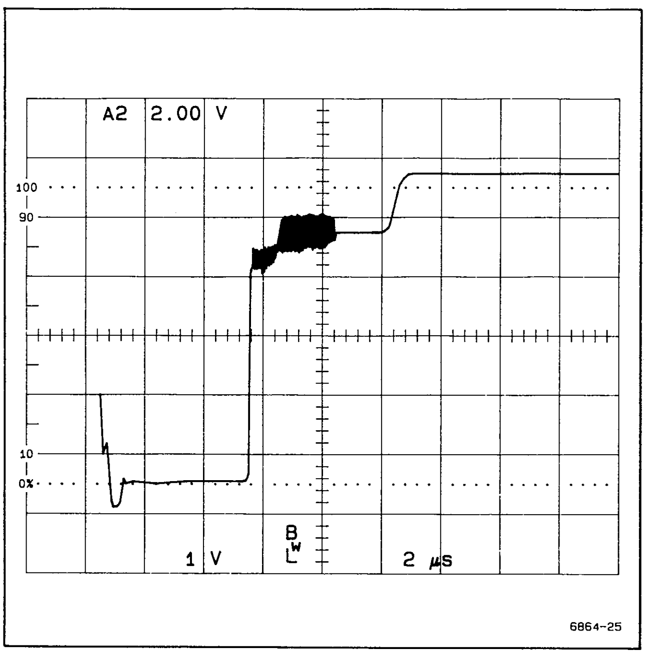

Figure 2A-1. Loop Gain Adjustment.

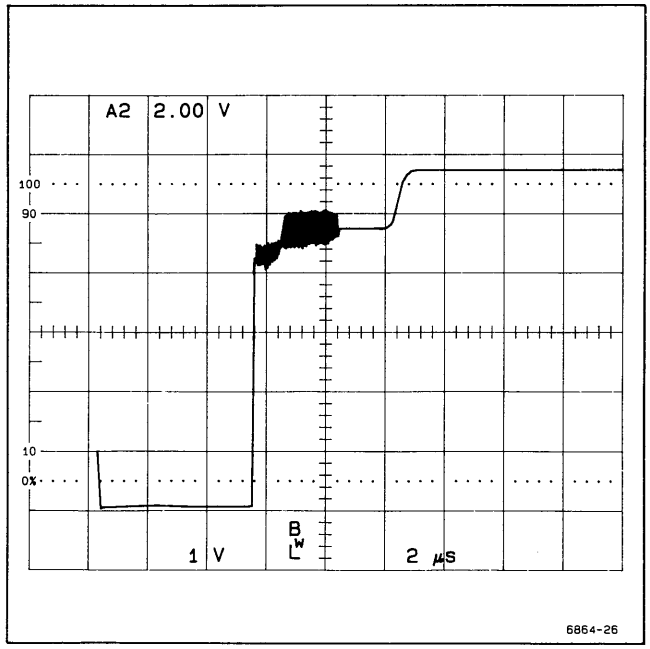

Figure 2A-2. Loop Gain Over-Adjustment.

h. While watching the waveform displayed on the bench scope, turn R5608 on the TV board and observe the waveform. As you decrease the resistance of R5608 you will see the aberrations in the bottom of the sync pulse decrease. The pot should be adjusted to the point where the bottom of the pulse just starts to move down, as shown in Figure 2A-1. If you continue to decrease the resistance, the portion closest to the rising edge of the sync pulse will move down and the bottom of the sync pulse will flatten out completely, as shown in Figure 2A-2. This indicates an overdriven condition. When the pot is properly adjusted it should be somewhere in the middle of its range.

Equipment Required (see Table 2A-4)

TV Mainframe (Item 1)	Oscilloscope with 10X Probe (Item 8)
Sync Generator (Item 2)	BNC Cable (Item 11)
Linearity Generator (Item 3)	75-Ω Termination (Item 13)

Initial Control Settings

VERTICAL MODE

CH 2	On
CH 1, CH 3, and CH 4	Off
50 MHz BW LIMIT	On
CHOP/ALT	ALT

VOLTS/DIV

CH 1 and CH 2	100 mV
CH 1 and CH 2 VAR	In detent
CH 3 and CH 4	0.1 V

Input Coupling

CH 1 and CH 2	1 MΩ DC

Horizontal

A SEC/DIV	2 µs (knob in)
SEC/DIV VAR	In detent
X10 MAG	Off
Sweep	A

Trigger

HOLDOFF	MIN (Fully CW)
LEVEL	Midrange
SLOPE	– (+ if signal is a positive-going sync)
A/B TRIG	A
MODE	AUTO
SOURCE	VERT
COUPLING	LINES

Δ Controls

ΔV and Δt	Off (turn off by pressing associated button)
TRACKING	Off

3. Adjust Back Porch Clamp Timing (R5710)

a. Connect the full field output of the TV mainframe linearity generator via a 75-Ω cable and a 75-Ω terminator to the CH 2 input connector of the instrument under test.

b. Set the TV mainframe linearity generator to produce a 100 IRE pedestal output on all lines.

c. At this point you should have the sync tip and color burst (if burst is on) of one line of video displayed on screen.

d. Bench scope initial settings are:

VERTICAL MODE

CH 1 and CH 2	On
CH 3 and CH 4	Off
20 MHz BW LIMIT	On
CHOP/ALT	ALT

VOLTS/DIV

CH 1 and CH 2	1 V (with X10 probe)
CH 1 and CH 2	In detent
CH 3 and CH 4	0.1 V

Input Coupling

CH 1 and CH 2	1 MΩ DC

Horizontal

A SEC/DIV	1 µs (knob in)
SEC/DIV VAR	In detent
X10 MAG	Off
Sweep	A

Trigger

HOLDOFF	MIN (Fully CW)
LEVEL	Midrange
SLOPE	– (minus)
A/B TRIG	A
MODE	AUTO
SOURCE	CH 1
COUPLING	DC

Δ Controls

Δt	On (turn off by pressing associated button)
TRACKING	On

e. Use the Δ REF or DLY POS control to align its cursor with the second vertical graticule line.

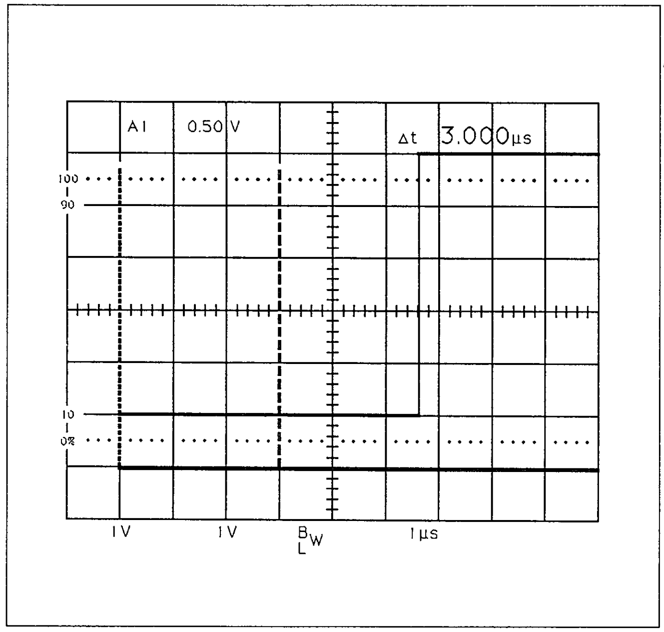

Figure 2A-3. Back Porch Clamp timing adjustment.

f. Use Δ control to produce a Δt reading of 3 μs.

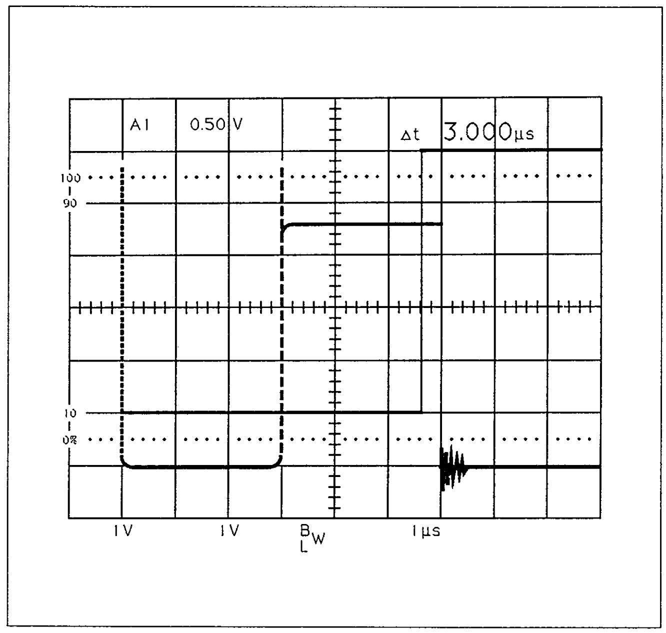

Figure 2A-4. Correct Back Porch Clamp timing adjustment.

g. Connect the X10 probes to the CH 1 and CH 2 inputs of the bench scope.

h. Attach CH 1 X10 probe to pin 8 of U5890 on the HDTV board (Option 5H).

i. Adjust the trigger level on the bench scope if necessary to get a clear trigger on the falling edge of the sync pulse. Align the falling edge of the pulse with the Δ REF cursor. The waveform displayed on the bench scope should look very similar to the one illustrated in Figure 2A-3.

j. Attach CH 2 X10 probe to pin 7 of U5723 on the HDTV board (Option 5H).

k. While watching the waveform displayed on the bench scope, turn R5710 on the HDTV board and observe the waveform. As you decrease R5710 the time between the falling edge on CH 1 and the rising edge on the CH2 waveforms will decrease. The pot should be adjusted to the point at which the rising edge on the CH 2 waveform coincides with the Δ cursor. The correct adjustment is illustrated in Figure 2A-4.

l. When the adjustment is complete, reinstall the board by reversing steps used in Section 5, "Options Maintenance", under subsections "Instrument Troubleshooting with Options" and "Removal and Replacement Instructions".

Equipment Required (See Table 2A-4)	
TV Mainframe (Item 1)	BNC cable (item 11)
Sync Generator (Item 2)	75-Ω Termination (Item 13)
Linearity Generator (Item 3)	

NOTE

Before performing the Back-Porch Reference Adjustment (HD CAL 61), the user must complete TV EXER 61, HD EXER 62, and TV EXER 63 to setup the proper HD Protocol, Line-Numbering Format, and Automatic Sync Selection, page 2A-5.

No initial control settings are needed for this adjustments procedure.

4. Adjust Back-Porch Clamp Reference

a. Connect the full field output of the TV mainframe linearity generator via a 75-Ω cable and a 75-Ω terminator to the CH 2 input connector of the instrument under test.

b. Set the TV mainframe linearity generator to produce a 100 IRE pedestal output on all lines.

c. At this point you should have the sync tip and color burst (if burst is on) of one line of video displayed on screen.

d. Hold both the ΔV and ΔT buttons and press the trigger SLOPE button to access the Diagnostic Menu.

NOTE

IF the calibration feature is disabled (the CAL/NO CAL jumper is in the NO CAL position), CAL messages will not appear in the Diagnostic Menu of the CRT readout.

e. Press the lower Trigger MODE button until the message **"HD CAL 61"** appears in the lower left corner of the CRT.

f. Press the upper Trigger COUPLING button. The instrument will automatically perform a DC Balance routine.

g. CHECK—Readout indicates **"SET CH2 POSITION TO MID-SCREEN"**.

h. Adjust CH2 POSITION control to set trace to the center graticule.

i. Press the upper Trigger COUPLING button.

j. CHECK—Readout indicates **"ADJ Δ FOR MINIMUM OFFSET"**.

k. Adjust Δ control to minimize offset between the center graticule and the Back-porch reference.

l. Press the upper Trigger COUPLING button. This will change the CH 2 VOLTS/DIV setting.

m. Repeat steps i-k for all CH 2 VOLTS/DIV settings.

n. Repeat steps f-l for CH 2 INVERT setting.

o. CHECK—**"DIAGNSTIC. PUSH A/B TRIG TO EXIT"** message appears in the Diagnostic Menu of the CRT readout.

p. Press the A/B TRIG button to exit the Diagnostic Menu.

q. Disconnect the test equipment from the instrument.

r. Return the CAL/NO CAL jumper to the NO CAL position and reinstall the instrument cabinet.

Section 3

CTT, WR & EFR

SPECIFICATION

NOTE

The External Frequency Reference Option (Option 1E) is only available to instruments that have Counter/Timer/Trigger (Option 06) or Counter/Timer/Trigger with Word Recognizer (Option 09).

INTRODUCTION

The Counter/Timer/Trigger (Option 06), Counter/-Timer/Trigger with Word Recognizer (Option 09), and the Counter/Timer/Trigger with External Frequency Reference (Option 1E) add the following four capabilities to the TEKTRONIX 24X5B and 2467B Oscilloscopes:

1. Precision time-interval measurement.
2. Event and frequency counting.
3. Delay-by-events triggering.
4. Logic triggering.

The 17-bit Word Recognizer probe of Option 09 extends the capabilities of these functions. The functions described in this manual which use the Word Recognizer require the Word Recognizer Option 09 and the 17-bit Word Recognizer probe.

The External Frequency Reference (Option 1E) changes only the accuracy and resolution of the above frequency measurement mode. All other measurements of the CTT are not affected.

The External Frequency Reference signal input connector takes the place of the "Word Recognizer Out" connector. No Word Recognizer Out signal is available with the External Frequency Reference option. All other aspects of the Word Recognizer function remain the same.

The Counter/Timer/Trigger (CTT), the Counter/-Timer/Trigger with Word Recognizer (WR), and the Counter/Timer/Trigger with External Frequency Reference (EFR) options use the standard instrument's alphanumeric CRT readout to display configuration menus and function results.

The oscilloscope Operators manual should be consulted for operating information regarding the standard instrument. The operation and specifications of functions not described in this manual remain unchanged.

There are currently no options available for the CTT, WR, or EFR. Also, Option 11 (rear panel probe-power connectors) described in the 24X5B and 2467B manuals, and Option 09 (Word Recognizer) described in this manual, are not available in the same instrument.

ACCESSORIES

Standard Accessories

In addition to the standard accessories listed in the oscilloscope manuals, the following are provided with each instrument containing the Counter/Timer/Trigger (Option 06), including CTT with EFR (Option 1E):

20 grabber tips
2 10-inch, 10-wide combs

Each instrument containing the Word Recognizer (Option 09) is provided with the following standard accessory in addition to those mentioned for the Counter/Timer/Trigger:

1 Word Recognizer probe

Optional Accessories

The following optional accessories are also available:

24X5B/2467B Options Service manual

Protective Waterproof Vinyl Cover

The optional accessories can be ordered from Tektronix, Inc. A local Tektronix Field Office, representative, or the Tektronix Product catalog can provide ordering and product information.

DESCRIPTION OF FUNCTIONS

Precision Time-Interval Measurements

Precision delay and precision delta-time measurements are made possible by a precision timer which directly measures the time interval between the start of the A Sweep and the start of the B Sweep. Direct measurement capability operates when the B Sweep is triggerable after delay as well as in RUN AFTER DLY. Direct measurement increases resolution and accuracy.

Only one of the four functions provided by the Counter/Timer/Trigger Option (Precision Time-Interval Measurement, Event Counting, Delay-by-Events Triggering, and Logic Triggering) can be active at a given time with the exception that precision time measurements are available with the Logic Trigger function when the B Sweep is triggered by the Word Recognizer.

When timing measurements are requested while a conflicting Counter/Timer/Trigger (CTT) function is operating, the timing measurement is displayed with the accuracy and resolution associated with the standard oscilloscope not equipped with the CTT Option. The word **"SET"** following the time measurement indicates this condition.

Pulse-width measurement is made easier by using the B TRIG Δ DLY mode. When this mode is selected, pressing the lower Trigger MODE button alternates between TRIG AFT DLY and TRIG Δ DLY and the trigger controls are alternately directed to the two triggers. Direct pulse-width timing measurements are made by selecting opposite slopes for TRIG AFT DLY and TRIG Δ DLY and adjusting trigger levels accordingly.

Event Counting (COUNT)

The Event-Counting function has three modes: Frequency, Period, and Totalize. Either the A-Trigger events or the 17-bit Word Recognizer (WR) events (if the Option 09 Word Recognizer is present) can be counted.

Delay-by-Events (DLY/EVTS)

The Delay-by-Events function adds the ability to delay a sweep by a number of events, rather than by an absolute time interval. Either the A or the B Sweep can be delayed; the delay period begins when a "Start" event occurs, and the duration of the delay is determined by a number of occurrences of a "Delaying" event. The sweep to be delayed, the "Start" event, the "Delaying" event, and the number of occurrences of the "Delaying" event are all operator selected.

Logic Trigger (LOGIC-TRIG)

This function adds logic-triggering capabilities. The A Sweep can trigger on any of the following:

1. The logical AND of the A and the B triggers going TRUE.
2. The logical OR of the A and the B triggers going TRUE.
3. The occurrence of a word recognized by the Word Recognizer.

The B Sweep can trigger on the word recognized by the Word Recognizer.

Word Recognizer

The 17-bit Word Recognizer detects any 17-bit digital word, either synchronously with an external clock, or asynchronously. Word occurrences may be counted for frequency, period, or totalize measurements. A word can trigger either the A or B Sweep, or the word can be a delaying event in the Delay-by-Events function. The Word Recognizer probe is shown in Figure 3-1.

External Frequency Reference

The External Frequency Reference (EFR) allows Counter/Timer/Trigger (CTT, Option 06 or 09) frequency measurements with 8 digits of resolution and accuracy instead of the 7 digits available in the standard CTT. This is accomplished by having the user connect an external frequency reference to the rear panel connector. The CTT automatically recognizes the presence of the external

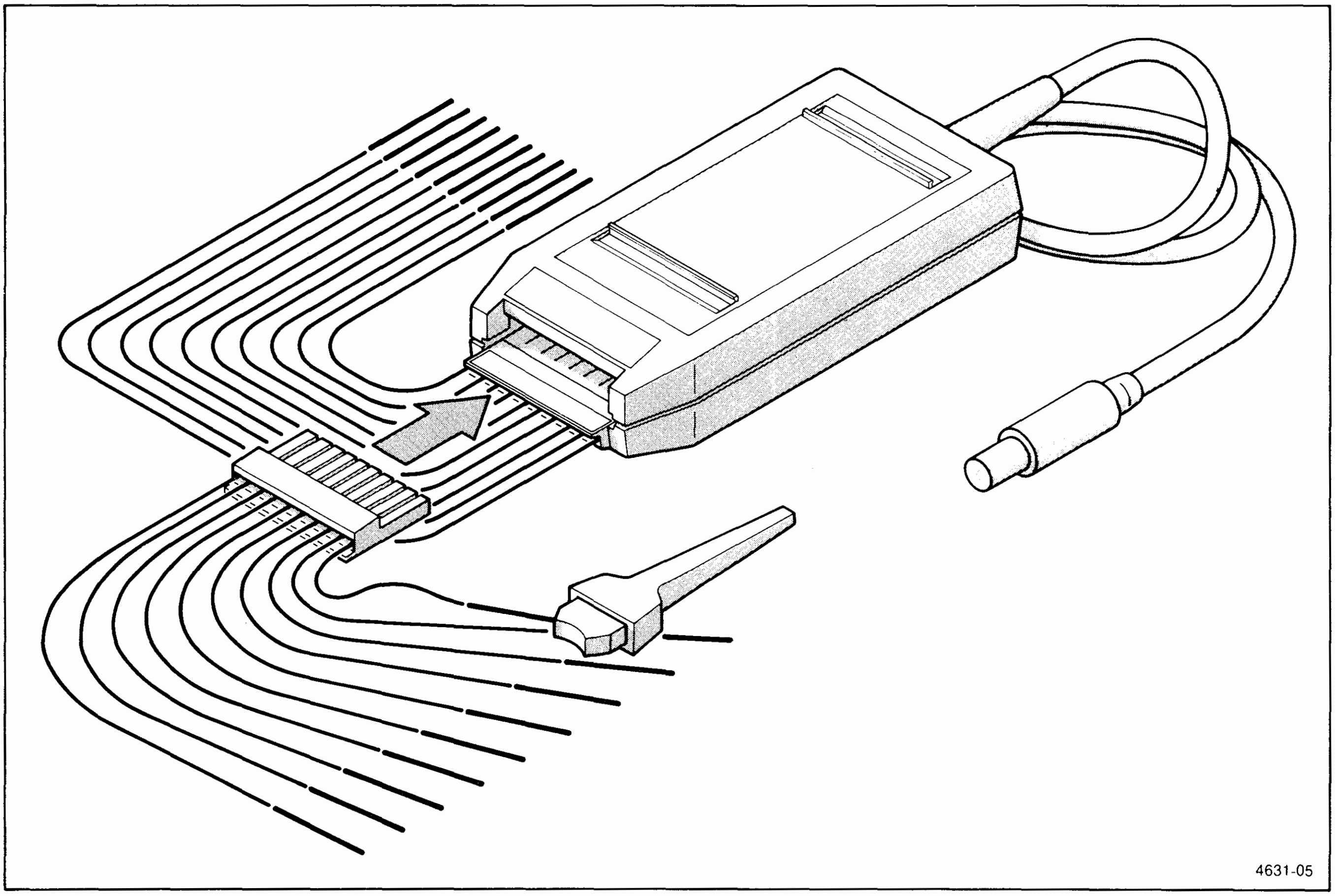

Figure 3-1. The Word Recognizer Probe.

reference and makes all frequency measurements relative to the external reference. The accuracy of the measurement is then limited to the accuracy of the external reference or one count in the least significant digit of the 8 digit readout, whichever is greater.

PERFORMANCE CONDITIONS

Except as noted in Tables 3-1 through 3-3 of this manual, the electrical, environmental, and mechanical characteristics of Option 06, 09, and 1E instruments are identical to those specified in the respective 24X5B and 2467B Oscilloscope Operators manuals.

The electrical characteristics are valid when the instrument has been adjusted at an ambient temperature between +20 °C and +30 °C, has had a warm-up period of at least 20 minutes, and is operated at an ambient temperature between −15 °C and +55 °C (unless otherwise noted).

Items listed in the "Performance Requirements" column are verifiable qualitative or quantitative limits that define the measurement capabilities of the instrument.

Table 3-1
Counter/Timer/Trigger Electrical Characteristics

Characteristics	Performance Requirements		
SIGNAL INPUT			
	For Count and Delay-by-Events with DC Coupling of A Trigger and B Trigger.		
Maximum Input Frequency	≥150 MHz.		
Minimum Width of High or Low State of Input Signal	≤3.3 ns.		
Sensitivity	For Count, Delay-by-Events, and Logic Trigger Functions Excluding Word Recognizer.		
DC to 50 MHz (0.5 Hz to 50 MHz for Frequency and Period) CH 1 and CH 2	1.5 divisions.[a]		
CH 3 and CH 4	0.75 division.[a]		
50 MHz to 150 MHz CH 1 and CH 2	4.0 divisions.[a]		
CH 3 and CH 4	2.0 divisions.[a]		
FREQUENCY			
Ranges	**RANGE**	**LSD[bc] INTERNAL REFERENCE**	**LSD EXTERNAL REFERENCE[g]**
	1 Hz	100 nHz	10 nHz
	10 Hz	1 μHz	100 nHz
	100 Hz	10 μHz	1 μHz
	1 kHz	100 μHz	10 μHz
	10 kHz	1 mHz	100 μHz
	100 kHz	10 mHz	1 mHz
	1 MHz	100 mHz	10 mHz
	10 MHz	1 Hz	100 mHz
	100 MHz	10 Hz	1 Hz
	150 MHz	100 Hz	10 Hz
Automatic Ranging	Upranges at 100% of full scale; downranges at 9% of full scale. Downrange occurs at 90 MHz on 150 MHz range.[c] Full scale corresponds to the value given in the Range column. The maximum displayed value for any range is the Range value minus the LSD value.		
Accuracy	±[Resolution + (Frequency × TBE)] Hz.		
Time Base Error (TBE) Internal Reference	10 ppm with less than 5 ppm per year drift.[c]		
External Reference[g]	Determined by external reference.[c]		

[a]Performance requirement not checked in manual (except Frequency using CH 1).

[b]Least significant digit.

[c]Performance Requirement not checked in manual.

[g]Refers to instruments with External Frequency Reference option (Option 1E) installed.

Table 3-1 (cont)

Characteristics	Performance Requirements	
Resolution	$\frac{1.4 \times \text{Frequency}^2 \times \text{TJE}}{N} + \text{LSD}$.[c]	
Display Update Rate		
Internal Reference	Twice per second or twice the period of the input signal, whichever is slower.[c]	
External Reference[g]	Twice per 1.5 seconds or twice the period of the input signal, whichever is slower.[c]	
PERIOD		
Ranges	**RANGE**	**LSD[bc]**
	10 ns	1 fs
	100 ns	10 fs
	1 μs	100 fs
	10 μs	1 ps
	100 μs	10 ps
	1 ms	100 ps
	10 ms	1 ns
	100 ms	10 ns
	1 s	100 ns
	2 s	1 μs
Minimum Period	≤6.7 ns.[c]	
Automatic Ranging	Upranges at 100% of full scale; downranges at 9% of full scale.[c] Full scale corresponds to the value given in the Range column. The maximum displayed value for any range is the Range value minus the LSD value.	
Accuracy	±[Resolution + (TBE × Period)].[c]	
Resolution	±[LSD + (1.4 × TJE)/N].[c]	
Display Update Rate	Twice per second or twice the period of the input signal, whichever is slower.[c]	
TOTALIZE		
Maximum Count	9999999.[c]	
Display Update Rate	Twice per second or once per event, whichever is slower.[c]	
DELAY BY EVENTS		
Maximum Event Count	4194303.[c]	
Minimum Time from Start Signal to Any Delay Event	4 ns.[c]	
LOGIC TRIGGER		
Minimum Function-True Time	4 ns.	
Minimum Function-False Time	4 ns.[c]	

[b]Least significant digit.

[c]Performance requirement not checked in manual.

[g]Refers to instruments with External Frequency Reference option (Option 1E) installed.

Table 3-1 (cont)

Characteristics	Performance Requirements
ADDED DELAY TIME CHARACTERISTICS WITH CTT	
Run After Delay	
Accuracy	LSD[d] + [0.0012 × (A SEC/DIV)] + [0.03 × (B Time/Div)[e] + A Trigger Level Error + 50 ns.[c] When the A Sweep is triggered by the Word Recognizer in synchronous mode, add 100 ns for probe delay; in asynchronous mode, add 200 ns for probe delay. *NOTE* ***"SET"** in the readout indicates an indirect measurement, inferred from the control settings. The delay time measured by the CTT will be slightly different, as explained under "Precision Timing" in Section 2 of the Operators manual for the instrument.*
Triggerable After Delay	
Accuracy	LSD[d] + [10 ppm × (measured interval)] + TJE + A-Trigger Level Error + B-Trigger Level Error + 0.5 ns.[c] If the A and B Sweeps are triggered from different channels, then add 0.5 ns for channel-to-channel mismatch. When the A Sweep is triggered by the Word Recognizer in synchronous mode, add 100 ns for probe delay; in asynchronous mode, add 200 ns for probe delay.
Minimum Measurable Delay Time	≤70 ns.
Display Update Rate	In Auto Resolution, twice per second or once for every sweep, whichever is slower.[c] In 1 ns, 100 ps, and 10 ps resolution modes, the update rate depends on the A SEC/DIV setting and the trigger repetition rate.

[c]Performance requirement not checked in manual.

[d]See Tables 3-4 and 3-5.

Table 3-1 (cont)

Characteristics	Performance Requirements
ADDED DELTA-DELAY-TIME CHARACTERISTICS WITH CTT	
Run After Delay	
Accuracy	LSD[d] + [0.008 × (A SEC/DIV)] + [0.01 × (B Time/Div)[e]] + 83 ps.[c] When the A Sweep is triggered by the Word Recognizer in synchronous mode, add 1 ns for probe jitter; in asynchronous mode, add 20 ns for probe jitter.
Triggerable After Delay	
Accuracy	Both delays are within 70 ns to 10 times the A-SEC/DIV setting.
Superimposed Delta Time	LSD[d] + [0.01 × (B Time/Div)[e]] + [10 ppm × (A SEC/DIV)] + [10 ppm × (measured interval)] + 50 ps + TJE.[c] If CH 3 or CH 4 is one channel of a two-channel measurement, add 0.5 ns for channel-to-channel delay mismatch.
Nonsuperimposed Delta Time	LSD[d] + [absolute value[($t_{r_{REF}} - t_{r_{DELT}}$)][f] + TJE + [(0.0005 div) × ($1/SR_{REF} + 1/SR_{DELT}$)] + [10 ppm × (A SEC/DIV)] + [10 ppm × (measured interval)] + 50 ps. If A and B sweeps are triggered from different channels, add 0.5 ns for channel-to-channel mismatch + [0.5 div × ($1/SR_{REF}+1/SR_{DELT}$)] for trigger offset.
Display Update Rate	In Auto Resolution, twice per second or once for every four sweeps, whichever is slower.[c] In 1 ns, 100 ps, and 10 ps resolution modes, the update rate depends on the A SEC/DIV setting and the trigger repetition rate.

[c]Performance requirement not checked in manual.

[d]See Tables 3-4 and 3-5.

[e]B Time/Div includes SEC/DIV, X10 MAG, and VAR.

[f]This term assumes the trigger points are between the 10% and 90% points of the waveforms. Fall time is expressed as a negative risetime.

[g]Refers to instruments with External Frequency Reference option (Option 1E) installed.

Table 3-1 (cont)

Characteristics	Performance Requirements
DEFINITIONS	

A Trigger Level Error = (A Trigger Level Readout Error)/SR_A.

B Trigger Level Error = (B Trigger Level Readout Error)/SR_B.

$t_{r_{REF}}$ = risetime, reference trigger signal.

$t_{r_{DELT}}$ = risetime, delta trigger signal.

SR_A = slew rate at trigger point, A Sweep trigger signal in div/sec.

SR_B = slew rate at trigger point, B Sweep trigger signal in div/sec.

SR_{REF} = slew rate at trigger point, reference trigger signal in div/sec.

SR_{DELT} = slew rate at trigger point, delta trigger signal in div/sec.

TJE = trigger jitter error.

For delay or delta time, disregarding noise in the signal, this term contributes <1 LSD if the slew rate is greater than 0.03 vertical div/ns or if the slew rate is greater than 30000 vertical div/horizontal div.

Trigger Jitter=[(Reference Trigger Signal Jitter)^2 + (Delta Trigger Signal Jitter)^2 + (A Sweep Trigger Signal Jitter)^2]$^{1/2}$.

Reference Trigger Signal Jitter = $(e_{n_S} + e_{n_{REF}})/SR_{REF}$.
= 0 for Frequency mode.

e_{n_S} = scope noise in div.

= 0.05 div for HF REJ trigger coupling.

= 0.1 div for DC trigger coupling, 5 mV to 5 V sensitivity.

= 0.15 div for DC trigger coupling, 2 mV sensitivity.

$e_{n_{REF}}$ = reference signal rms noise in div.

Delta Trigger Signal Jitter = $(e_{n_S} + e_{n_{DELT}})/SR_{DELT}$.

= 0 for Frequency or Delay mode.

$e_{n_{DELT}}$ = delta signal rms noise in div.

A Trigger Signal Sweep Jitter = $(e_{n_S} + e_{n_A})/SR_A$.

e_{n_A} = A sweep trigger signal rms noise in div.

Table 3-1 (cont)

Characteristics	Performance Requirements
DEFINITIONS (cont)	

When the Word Recognizer supplies a trigger in synchronous mode, the trigger jitter of the associated trigger signal is <1 ns; in asynchronous mode, the associated trigger signal jitter is <20 ns.

N = number of averages during measurement interval.

= see Table 3-4 for Delay or Delta Time.

= (measured frequency) × (measurement interval) for Frequency or Period.

Measurement Interval = 0.5 s or two periods of measured signal, whichever is greater.

[a]Performance requirement not checked in manual (except Frequency using CH 1).

[b]Least significant digit.

[c]Performance Requirement not checked in manual.

[d]See Tables 3-4 and 3-5.

[e]B Time/Div includes SEC/DIV, X10 MAG, and VAR.

[f]This term assumes the trigger points are between the 10% and 90% points of the waveforms. Fall time is expressed as a negative risetime.

[g]Refers to instruments with External Frequency Reference option (Option 1E) installed.

Table 3-2
Word Recognizer Electrical Characteristics

Characteristics	Performance Requirements
SYNCHRONOUS MODE	
Data Setup Time D_0—D_{15} and Q	25 ns.
Data Hold Time D_0—D_{15} and Q	0 ns.
Minimum Clock Pulse Width	
High	20 ns.
Low	20 ns.
Minimum Clock Period	50 ns.[a]
Delay from Selected Clock Edge to Word Out from CTT	≤55 ns.
ASYNCHRONOUS MODE	
Minimum Coincidence Between Data Inputs (D_0—D_{15} & Q) Resulting in a Trigger	<85 ns.
Maximum Coincidence (D_0—D_{15} & Q) Between Data Inputs Without Producing a Trigger	>20 ns.
Delay from Input Word Coincidence to Word Out	≤140 ns.
INPUTS AND OUTPUTS	
Input Voltages	
Minimum Input Voltage	−0.5 V.[a]
Maximum Input Voltage	5.5 V.[a]
Maximum Input Low Voltage	0.6 V.[a]
Minimum Input High Voltage	2.0 V.[a]
WORD RECOG OUT	
High	>2.5 V LSTTL output.[a]
Low	<0.5 V LSTTL output.[a]
Input High Current	≤20 μA.[a]
Input Low Current	≥−0.6 mA source.[a]

[a]Performance Requirement not checked in manual.

Table 3-3
Mechanical Characteristics

Characteristics	Performance Requirements
Weight	
With Power Cord, Cover, Pouch, Test Leads, Probes, Operators Manual, and Options, Including Word Recognizer Probe	<12.0 kg (26.4 lb).
Word Recognizer Probe	0.27 kg (0.6 lb).
Domestic Shipping Weight	<17.6 kg (38.8 lb).
P6407 Probe Dimensions	
Length	
Body	11.4 cm (4.5 in).
Cable	2 m (6.6 ft).
Width	5.6 cm (2.2 in).
Height	2.21 cm (0.87 in).

Table 3-4
Resolution Selections

A SEC/DIV	Selection	Least Digit	N for Average
10 ns to 500 ms	AUTO	See Table 3-5	See Table 3-5
10 ns to 5 μs	10 ps	10 ps	$> 10^6$
	100 ps	100 ps	$> 10^4$
	1 ns	1 ns	> 100
10 μs to 50 μs	10 ps or 100 ps	100 ps	$> 10^4$
	1 ns	1 ns	> 100
100 μs to 500 μs	10 ps to 1 ns	1 ns	> 100
1 ms to 5 ms	Any	10 ns	> 1
10 ms to 50 ms	Any	100 ns	> 1
100 ms to 500 ms	Any	1 μs	> 1

Table 3-5
Auto Resolution

A SEC/DIV	Trigger Rate	Least Digit	N for Average
10 ns to 2 μs	$>$ 20 kHz	100 ps	$> 10^4$
10 ns to 2 μs	200 Hz to 20 kHz	1 ns	> 100
5 μs to 200 μs	$>$ 200 Hz	1 ns	> 100
10 ns to 200 μs	$<$ 200 Hz	10 ns	> 1
500 μs to 5 ms	Any	10 ns	> 1
10 ms to 50 ms	Any	100 ns	> 1
100 ms to 500 ms	Any	1 μs	> 1

PREPARATION FOR USE

OPERATING CONSIDERATIONS

A GATE OUT Termination

To prevent measurement errors, of as much as ±2.0 ns in Precision Delay and ±0.5 ns in Precision Delta Time, the A GATE OUT signal must not be terminated in less than 10 kΩ.

POWER-UP TESTS

Before initially turning on power to the instrument, read Section 2 in the oscilloscope Service manual and follow the safety and precautionary information described there.

The power-up tests, automatically performed each time the oscilloscope is turned on, examine both the oscilloscope circuitry and the option circuitry. Tests that apply to the CTT Option are integrated into the power-up tests for the host oscilloscope; they include the CTT Kernel test and Confidence tests.

A power-up test failure will either flash the A SWP TRIG'D indicator or display a diagnostic message in the CRT readout. Pressing the A/B TRIG button may place the instrument into a usable mode. Even if the instrument then functions adequately for your particular requirement, it should be referred to a qualified service technician for repair of the problem as soon as possible.

THEORY OF OPERATION

INTRODUCTION

SECTION ORGANIZATION

This section contains a functional circuit description of the Option 06 Counter/Timer/Trigger (CTT), Option 09 Counter/Timer/Trigger with Word Recognizer (WR), and Option 1E Counter/Timer/Trigger with External Frequency Reference (EFR) circuitry for the 24X5B and 2467B Oscilloscopes. The discussion begins with an overview of option functions and continues with detailed explanations of each major circuit. Reference is made to supporting schematic and block diagrams, which aid in understanding the text. These diagrams show interconnections between parts of the circuitry, identify circuit components, list specific component values, and show interrelationships with the standard oscilloscope.

The block and schematic diagrams are located in the tabbed "Diagrams" section at the rear of this manual. The particular schematic diagram associated with each circuit description is identified in the text, and the diagram number is shown (enclosed within a diamond symbol) on the tab of the appropriate foldout page. For the best understanding of the circuit being described, refer to both the applicable schematic and block diagrams.

DIGITAL LOGIC CONVENTIONS

Digital logic circuits perform many functions within the instrument. The operation of these circuits is represented by specific logic symbology and terminology. Logic-function descriptions contained in this manual use the positive-logic convention. The specific voltages which constitute a HI or a LO vary among individual devices. For specific device characteristics, refer to the manufacturer's data book.

GENERAL CIRCUIT DESCRIPTION

INTRODUCTION

Before individual circuits are discussed in detail, a general block-level discussion is provided to aid in understanding overall operation of the option circuitry. A simplified block diagram of the option, showing basic interconnections, is shown in Figure 10-6. The diamond-enclosed numbers in the blocks refer to the schematic diagrams at the rear of this manual in which the corresponding circuitry is located. Throughout this discussion, "standard oscilloscope" refers to the 24X5B and 2467B Oscilloscopes without option circuitry.

The activities of the options are directed by the microprocessor contained in the standard oscilloscope. The microprocessor, under the control of firmware present in the options, monitors each option's functions and sets up the operating modes according to instructions received.

While executing the control program, the microprocessor retrieves previously stored calibration constants and front-panel settings and, as necessary, places program-generated data in temporary storage for later use. The random access memory (RAM), and ultraviolet erasable programmable read only memory (EPROM) contained in option circuit boards provide these storage locations.

The microprocessor control bus, address bus, and data bus are buffered by Control board circuitry. Microprocessor bus timing for the options is modified by buffers on the Control board to make bus timing compatible with the options. Address bus decoding allows individual circuits to be addressed.

These signal paths are used for communications between the options and the standard oscilloscope and involve both data and control signals. The standard oscilloscope circuitry uses them to control the options. The options use them to send information to the standard oscilloscope for display and to control the standard oscilloscope.

CTT BOARD

The CTT board utilizes signals from the standard instrument and the Word Recognizer to produce accurate measurements for display. Functionally the CTT circuitry is divided into four blocks:

1. Microprocessor interface.
2. Time base.
3. Counters and gating.
4. Word Recognizer interface and control.

The microprocessor interface contains the bus buffers, memory, registers, and address decoding that allows the microprocessor in the standard oscilloscope to control the option.

The time base contains the Oscillator and Phase-Locked Loop circuitry which provide the 131-MHz reference clock for the counters and the 5.24-MHz clock used by the counter-reloading state machine for the Delay-By-Events functions.

The Complex Counter integrated circuit (IC) is configured as three counters. The least significant bits of each counter are contained in the gate array.

For the counting and timing functions, the microprocessor initializes the circuitry by writing to registers. The contents of the registers, in turn, cause the proper input signals to be selected and applied to the counters through level shifting and multiplexing circuitry. Once the system is initialized, the microprocessor allows the counters to start when they see the proper edge of the selected start signal. When the selected edge of the stop signal is detected, the counters stop and the microprocessor reads the counters, calculates, and then displays the measurement. The process is then repeated.

The procedure just described is different in Totalize mode. In Totalize, the count is read and displayed by the microprocessor while counting is actively occurring. The count is reset from the front panel.

Logic Trigger functions use the Gate Array to perform logic functions on the A and B triggers. The result of the logical combination is used to trigger the standard instrument.

WORD RECOGNIZER

The Word Recognizer provides an external 17-bit combinational trigger input to the CTT. Input data matching states are individually selectable via the oscilloscope front panel to match either a logic 0, 1, or don't care (X). Either a rising or falling clock edge may be selected as the active edge in synchronous mode.

Control Register

The Control Register is a serial input, parallel output register controlled by the microprocessor that in turn controls the circuitry in the Word Recognizer probe. Desired input match bits (WDATA) are clocked into the Control Register by WCLOCK. Forty clocks after a data bit is shifted into the Control Register, it appears on the DATA RTRN output. This output is used to:

1. Detect if the WR is plugged into the oscilloscope.
2. Detect if the shift register was clocked extra times by static or other transients.
3. Perform diagnostic tests of WR circuitry.

Seventeen control register bits (don't cares) determine if the input gating will allow the 17 input signals to reach the Comparator. Seventeen other control register bits determine whether the Comparator will look for a matching HI or LO on the corresponding input from the input gating. When all data inputs from the input gating match the control register bits, the Comparator sends a LO to the Synchronizer and the Output Multiplexer.

Synchronizer and Output Multiplexer

The Synchronizer synchronizes the Comparator's output with the external clock input (C). A control bit selects the active edge of the Synchronizer's clock input.

The Output Multiplexer selects either the Synchronizer's output or the Comparator's output to pass on to the CTT. One bit of the Control Register selects either synchronous or asynchronous mode. If asynchronous mode is selected, the Output Multiplexer transfers the Comparator's output via the $\overline{\text{WORD}}$ signal to the CTT. If synchronous mode is selected, the Output Multiplexer selects the Synchronizer's output instead of the Comparator's output to pass on to the CTT. In the CTT, the $\overline{\text{WORD}}$ signal is sent to the WORD RECOG OUT connector and also to the Level Shifting and Multiplexing circuitry where it can be selected as one of the trigger events.

EXTERNAL FREQUENCY REFERENCE

The External Frequency Reference Option (Option 1E) provides increased accuracy and resolution by comparing the average frequency of the internal 131 MHz oscillator against the known reference frequency supplied from the rear panel EXT REF input. This calibration factor is then applied to all frequency measurements made by the CTT. The calibration factor for the external reference is continually updated so that the accuracy and resolution remain valid over long periods of time.

When the frequency measurement is initiated, the external reference is characterized for 100 measurements. This characterization takes approximately 1 minute. This is why the frequency display shows 7 digits initially and then changes to 8 digits after the characterization. The sample size of 100 is needed to achieve the 10X improvement in resolution. If the external reference frequency is not within 10 ppm of one of the expected reference frequencies, the reference will be ignored and normal frequency measurements will be made with 7 digits of resolution.

DETAILED CIRCUIT DESCRIPTION

INTRODUCTION

The following discussion provides detailed information concerning the electrical operation and circuit relationships of the Counter/Timer/Trigger, the External Frequency Reference, and the Word Recognizer circuitry in the 24X5B and 2467B Oscilloscopes. Unique circuitry is described in detail, while circuits common to the electronics industry are not. The descriptions are supported by the associated detailed block diagram (Figure 10-15) and schematic diagrams located at the rear of this manual in the tabbed foldout pages.

CTT CIRCUITRY

Counter/Timer/Trigger circuitry is divided functionally into the microprocessor interface, time base, counters and gating, and the Word Recognizer interface and control. The circuitry is shown on Diagram 25.

Microprocessor Interface

The microprocessor interface contains the circuitry that allows the microprocessor in the standard oscilloscope to control the option.

DATA BUS BUFFER. Bi-directional buffer U5940 buffers the data bus and has two control inputs. Direction control (pin 1) is provided by the microprocessor's buffered read/write signal BR/$\overline{\text{W}}$. The buffer is enabled at pin 19 whenever the CTT is selected and an address in the 4000-7FFF range is generated.

MEMORY AND I/O DECODERS. This circuitry decodes the address bus, generating enabling signals and strobes that allow the microprocessor to control the various circuit functions and devices. The CTT Option memory space is decoded by a programmable logic device (U5942) and a three-to-eight line decoder (U5950).

Programmable logic device U5942 generates enabling signals to select the CTT Option EPROM, CTT Option hardware, and the CTT Option Data Bus Buffer.

Decoder U5950, when enabled by U5942, generates signals to allow addressing of individual CTT I/O devices.

OPTION SELECT REGISTER. The Option Select Register is incorporated within programmable logic device U5942 and enables/disables access to CTT Option circuitry. Whenever there is an access to address 7FFF, data bus line BD7 is latched into the register. If BD7 is HI, CTT option circuitry will be selected for memory and I/O accesses within the paged address space (4000-7FFF). If BD7 is LO, the CTT option is deselected. While the CTT Option is deselected, the Option Select Register is the only CTT circuitry that can be accessed by the microprocessor. Pin 15 of U5942 is the $\overline{Q}$ output of the Option Select Register. The CTT Option is enabled when this pin is LO and disabled when this pin is HI.

Table 3-6
CTT And WR Memory Map

ADDRESS	DEVICE DESCRIPTION
4000-7F7F	ROM
7F80-7F83	Gate Array register 2 (MCA-2), write only
7F84-7F87	Gate Array register 1 (MCA-1), write only
7F88-7F8B	Gate Array register 3 (MCA-3), write only
7F8C-7F8F	CTT Page Register
7F90-7F91	Complex Counter data register (AM-RD), read only
7F92-7F93	Complex Counter status register (AM-RS), read only
7F94-7F95	Complex Counter data register (AM-WD), write only
7F96-7F97	Complex Counter command register (AM-WC), write only
7F98-7F9B	Gate Array status, read only
7F9C-7F9F	Hardware Control register 1 (HW-1), write only
7FA0-7FBF	Images of the above registers
7FC0-7FFF	Option Select register

HARDWARE REGISTER 1. Hardware Register 1 (U5952) is written to by the microprocessor. Four of its outputs control multiplexing of signals to the Gate Array. The other four outputs are control data inputs to the Gate Array.

STATUS REGISTER. Register U6250 is a 3-state bus driver. This register is read by the microprocessor to determine the status of the WR and the Gate Array. The Gate Array status (O0, O1, O2) is first converted to TTL by U6290 before being sent to U6250.

PAGED EPROM. A 64k-byte EPROM (U5930) provides storage for CTT firmware. Since the option is allowed only 16k-bytes of address space, a 4 X 16k X 8 paged EPROM is used. The EPROM is enabled (pin 20) when the Option Select flip-flop is set and addresses from 4000-7FFF appear on the address bus. Except for the top 128 bytes of CTT address space (the address space used by the Option Select Register), the EPROM outputs are enabled over the same address range (4000-7F7F).

Time Base

The Time Base consists of an oscillator, divider, and phase-locked loop. It generates the clocks used by the rest of the circuitry.

OSCILLATOR. The TTL-compatible 13.10669-MHz oscillator (Q5921 and Q5920) performs two functions:

1. It provides a clock for the Delay-By-Events End-Of-Sweep Counter-Reloading state machine in the Gate Array.
2. It provides a 1.310669-MHz reference to the Phase-Locked Loop through divider U5910.

DIVIDER. Divider U5910A divides the 13.10669-MHz clock by 2.5, 5, and 10. Complex Counter U6140 uses the 2.62134-MHz (U5910, pin 6), while the Phase-Locked Loop uses the 1.310669-MHz output (U5910, pin 3) as a reference. The 5.24267-MHz output goes to the Gate Array as the state machine clock.

PHASE-LOCKED LOOP. The Phase-Locked Loop consists of phase comparator U6010, loop filter U6230, voltage controlled oscillator (VCO) U6120, and divider(s) U6130 (or U6131 and U5910B).

Phase comparator U6010 has two 1.310669-MHz inputs. The first (pin 1) is the divided output of the 13.10669-MHz oscillator, while the second (pin 3) is the divided output of the VCO. The output of the phase comparator (pins 5 and 10) goes to the loop filter. A voltage reference (pin 8) is also supplied by the phase comparator to the loop filter. The phase comparator adjusts the frequency of the VCO so that the falling edges of the reference and feedback inputs of the phase comparator are coincident.

Loop filter U6230 is an active filter. Resistors R6122, R6123, and capacitor C6223 make up the filter's feedback path. Buffered address bit 0, through R6222, injects about one cycle of phase jitter into the loop to reduce aliasing effects.

Voltage-controlled oscillator U6120 provides a 131.0669-MHz reference to the Gate Array for frequency and time measurements. The output is also divided by 100 by U6130 (or U6131 and U5910B) and fed back to the phase comparator. Voltage-variable-capacitor CR6210 and inductor L6210 are the external tank circuit for the oscillator, with CR6210 also being the oscillator's tuning element.

Counters and Gating

The Counters and Gating Circuitry contains the level shifting, signal selection (multiplexing), counters (Gate Array and the Complex Counter), and trigger driver circuitry of the option. The circuitry is discussed as it applies to each input signal; then the counters are discussed.

The A Trigger Status ($\overline{\text{TSA}}$) comes from the standard oscilloscope (J4232, pin 3) as an active LO signal driven from a current sink. The standard oscilloscope either sinks 10 mA or presents an open circuit on the line. The signal path to the CTT is approximately 75 Ω. Termination on the line is controlled by register HW-1 (U5952, pin 19). If pin 19 of U5952 is HI, the termination is 75 Ω to +2.3 V. If pin 19 is LO, the termination is 22 kΩ to +5 V.

The 75-Ω termination results in $\overline{\text{TSA}}$ being converted to ECL levels (with ECL powered between +5 V and ground) and sent to the Gate Array. For 75 Ω, pin 19 of U5952 is HI and holds off Q5980. Diode CR5970A is reverse biased putting +3 V on the base of Q5981. With +3 V on its base, Q5981 is allowed to conduct. Resistor R5970 and the emitter resistance of Q5981 combine to provide the 75 Ω termination to +2.3 volts. The drive from $\overline{\text{TSA}}$ makes the base of Q5982 swing between +4 V and +5 V. Emitter follower Q5982 provides the ECL drive to the Gate Array (U6190, pin 36) and to the multiplexer (U6070, pin 17). The output of U5990A is also kept HI by the HI at pin 19 of U5952. This blocks the return path to the standard instrument for $\overline{\text{TSA}}$ (J4232, pin 3 to pin 1). The 22 kΩ termination results in $\overline{\text{TSA}}$ being looped through the CTT and sent back to the standard oscilloscope (J4232, pin 1). As far as the standard oscilloscope is concerned, the CTT does not affect the $\overline{\text{TSA}}$ signal.

For 22 kΩ termination, pin 19 of U5952 is LO. This turns on Q5980, terminating $\overline{\text{TSA}}$ through 22 kΩ. Diode CR5970A is now on, keeping Q5981 off (the 470 kΩ resistor on its emitter prevents Q5981 from turning completely off), preventing $\overline{\text{TSA}}$ from reaching the Gate Array and multiplexer. With a LO on pin 19 of U5952, U5990A allows $\overline{\text{TSA}}$ to return to the standard oscilloscope.

The B Trigger Status ($\overline{\text{TSB}}$) also comes from the standard oscilloscope (J4232, pin 6). This signal is treated basically the same as $\overline{\text{TSA}}$ except:

1. It doesn't go to multiplexer U6070.

2. It has its own multiplexer consisting of Q6091 and Q6092 which selects either $\overline{\text{TSB}}$ or $\overline{\text{WORD}}$ from the WR, and sends one of them to the Gate Array.

3. There is a 10-kΩ pull-up to +15 V on the collector of Q5983 to compensate for the drop through Q6092.

The A Sweep Gate ($\overline{\text{SGA}}$) is an active LO TTL signal from the standard oscilloscope (J4234, pin 1). A voltage divider converts it to ECL before it reaches the Gate Array (U6190, pin 33).

The B Sweep Gate ($\overline{\text{SGB}}$) is also an active LO TTL signal from the standard oscilloscope (J4234, pin 3). It is also converted to ECL by a voltage divider before it reaches the Gate Array (U6190, pin 8).

The A Hold Off (AHO) and the B Hold Off (BHO) come to the CTT (J4232, pin 15 and pin 11) as ECL signals requiring no level shifting. However, AHO is pulled up and clamped to +5 V to compensate for the loading of U6070. Both AHO and BHO go to multiplexer U6070. The AHO signal also goes to the multiplexer through an RC delay (C5961 and R6060). The multiplexer sends the selected hold off signal to the hold off (HO) input of the Gate Array

(U6190, pin 2). The HO input of the Gate Array can be forced HI by the microprocessor through pin 44 of U6140 and Q6292 to reset the Gate Array trigger hardware.

Delay Select ($\overline{DS}$) is an active LO TTL signal from the standard oscilloscope (J4232, pin 20). Resistors R6172, R6052, and R6277 convert $\overline{DS}$ to ECL and balance currents through CR5930. Balancing the currents reduces cross talk from $\overline{DS}$ on the Gate Array inputs, improving the accuracy of delta-time measurements.

Because gate array U6190 uses emitter coupled logic (ECL), most signals that leave the Gate Array are converted to TTL, and signals entering the Gate Array are converted to ECL. The Gate Array has 9 ECL inputs controlled by the microprocessor: D0, D1, D2, D3, D4, D5, G1, G2, and G3. Each input signal is shifted to ECL by a resistive divider.

Complex counter U6140 has 5 outputs. Three of the outputs (O3, O4, and O5) are controlled by the microprocessor independently of the rest of the IC. The outputs control hold off selection, enabling of the B trigger status, and the WR clock respectively. Output O1 is used in Delay-By-Events modes to tell the Gate Array that the terminal count (TC) has been reached. To make certain TC is seen by the Gate Array, TC is latched by U6252A until HO arrives.

GATE ARRAY AND COMPLEX COUNTER. Both the Gate Array (U6190) and the Complex Counter (U6140) are complex multi-function microprocessor-controlled devices. The discussion that follows will describe the basic interconnection of the Gate Array and the Complex Counter. Specific setups for each CTT mode are located in accompanying tables.

The circuitry is connected to form three counters. Counter A contains a total of 38 bits, Counter B 37 bits, and Counter C 17 bits. Counter use for each mode is shown in Table 3-7. The least significant bit of each counter is in the Gate Array. The emitter coupled pair (Q6290 and Q6291 for counter A) between the ICs connects the least significant bits of the counters in the Gate Array to the most significant bits of the counters in the Complex Counter. The emitter coupled pair also converts the Gate Array's ECL signals to TTL for the Complex Counter.

Both the Gate Array and the Complex Counter contain registers which the microprocessor uses to set up the desired operating mode. Hardware Register 1 (HW-1) and two of the Gate Array registers (MCA-1 and MCA-2) are used to select the desired input signals and function. In all modes the microprocessor will initialize the hardware before the function starts. For each function, the content of each register is shown in Table 3-8. The values are hexadecimal except for register MCA-1 where only bits 3 and 2 are shown. Bit 3 enables A AUX TRIG and bit 2 enables B AUX TRIG.

Table 3-7
Counter Use

MODE	A	B	C	START	STOP
Frequency	131-MHz clock	Frequency being counted		A and B start on selected edge of B	A and B stop on selected edge of B
Totalize		Frequency being counted		MODE button	Count is reset by pressing of any front-panel button
Delay Time	131-MHz clock		Sweeps	A starts with the A sweep gate	A stops with the B sweep gate
Delta Time	131-MHz clock during delay 0	131-MHz clock during delay 1	Sweeps	A and B start with the A sweep gate	A and B stop with the B sweep gate
Delay by-Events	Events			Hardware controlled	Hardware controlled

Table 3-8
Control Register Setup

HW-1	MCA-1	MCA-2	CTT MODE
00	00	00	Inactive
C0	08	10	Boolean AND
C0	04	10	Boolean AND, free run
C0	08	00	Boolean OR
C0	04	00	Boolean OR, free run
01	08	08	Word Recognizer, A Sweep
01	04	08	Word Recognizer, A Sweep, free run
03	04	08	Word Recognizer, B Sweep
C0	08	05	A Delay-by-Events (ADBE), start= A, events= B
80	08	05	ADBE, start= A, events=WR
41	08	05	ADBE, start=WR, events= B
01	08	0D	ADBE, start=WR, events=WR
C2	04	04	B Delay-by-Events (BDBE), start= A, events= B
82	04	0C	BDBE, start= A, events=WR
40	00	00	Freq/Totalize A (actually B)
01	08	09	Freq/Totalize WR
00	00	02	Precision Delay
00	00	13	Precision 1/Delta Time
00	00	03	Precision 1/Delta Time with ALT SLOPE

The input signals selected and applied to the Gate Array for each function are shown in Table 3-9. (Irrelevant inputs for each mode are not shown.) If one of the clocks is used in a particular mode, an "x" appears in its column. After passing through an RC delay, AHO becomes AHOD.

Table 3-10 shows the signals used by and buffered by the CTT Option for each particular mode. Signals used or buffered by the CTT are shown in the "From WR" and "From Standard Instrument" columns. Those signals that are buffered by but not used by the CTT in a particular mode and affect the standard instrument are denoted by an *. Signals being produced by or buffered by the CTT for each particular mode are shown in the "To Standard Instrument" column.

In Delta Time all three counters are used. Counter A counts cycles of the 131 MHz clock during delay 0. Counter B counts cycles of the 131 MHz clock during delay 1. Counter C counts the number of sweeps that occur. All three counters start counting on the leading edge of the A Sweep Gate $(\overline{\text{SGA}})$. On the leading edge of the B Sweep Gate all counters stop counting. When the counters stop, the microprocessor reads the counters and calculates the Delta Time. The microprocessor can then reinitialize the hardware and restart the procedure.

Delay-By-Events mode differs from the other modes by having the Delay-By-Events Counter-Reloading State machine in the Gate Array reload and reenable counter A (the only counter used in Delay-By-Events) at the end of the A sweep. At the end of the delay, the Gate Array also generates $\overline{\text{A AUX TRG}}$ or $\overline{\text{B AUX TRG}}$ to trigger the selected sweep.

Frequency mode uses Counter A and Counter B. Counter A counts the 131 MHz clock while Counter B counts cycles of the unknown signal. Both counters are started and stopped on the selected edge of the unknown signal being measured.

Totalize mode only uses Counter B. The unknown signal is counted by Counter B. The count in B is displayed after being read while counting is actively occurring. When counting is started or restarted, the B Trigger level is run to both its minimum and maximum levels to force a clock edge to enable the count circuitry. This may generate an extra count. If an extra count occurs, it is removed by the microprocessor.

Boolean Trigger mode uses the Gate Array to perform the selected logic function on the A and B triggers. The result of the logical combination of the triggers is sent to the standard instrument as the signal $\overline{\text{A AUX TRG}}$.

Table 3-9
Gate Array Inputs

131 MHz	5.24 MHz	$\overline{\text{EXT}}$	$\overline{\text{ATS}}$	$\overline{\text{BTS}}$	$\overline{\text{ASG}}$	$\overline{\text{BSG}}$	HO	$\overline{\text{DS}}$	CTT MODE
									Inactive
			$\overline{\text{TSA}}$	$\overline{\text{TSB}}$			AHOD		Boolean AND
			$\overline{\text{TSA}}$	$\overline{\text{TSB}}$			AHOD		Boolean OR
		$\overline{\text{WORD}}$					AHOD		Word trig, A Sweep
		$\overline{\text{WORD}}$					BHO		Word trig, B Sweep
	x	$\overline{\text{TSA}}$		$\overline{\text{TSB}}$			AHOD		ADBE, start=A, events= B
	x	$\overline{\text{TSA}}$		$\overline{\text{WORD}}$			AHOD		ADBE, start=A, events=WR
	x	$\overline{\text{WORD}}$		$\overline{\text{TSB}}$			AHOD		ADBE, start=WR, events= B
	x	$\overline{\text{WORD}}$					AHOD		ADBE, start=WR, events=WR
	x		$\overline{\text{TSA}}$	$\overline{\text{TSB}}$			AHO		BDBE, start=A, events= B
	x	$\overline{\text{WORD}}$	$\overline{\text{TSA}}$				AHO		BDBE, start=A, events=WR
x				$\overline{\text{TSB}}$					Frequency A (actually B)[a]
				$\overline{\text{TSB}}$					Totalize A (actually B)[a]
x		$\overline{\text{WORD}}$							Frequency WR
		$\overline{\text{WORD}}$							Totalize WR
x					$\overline{\text{SGA}}$	$\overline{\text{SGB}}$			Precision Delay Time
x					$\overline{\text{SGA}}$	$\overline{\text{SGB}}$		$\overline{\text{DS}}$	Precision Delta Time
x					$\overline{\text{SGA}}$	$\overline{\text{SGB}}$		$\overline{\text{DS}}$	Precision 1/Delta Time
x					$\overline{\text{SGA}}$	$\overline{\text{SGB}}$		$\overline{\text{DS}}$	Precision Delta Time, ALT SLP
x					$\overline{\text{SGA}}$	$\overline{\text{SGB}}$		$\overline{\text{DS}}$	Precision 1/Delta Time, ALT SLP

[a]B trigger is the same as A trigger and the B events are counted in this mode.

Table 3-10
Signals To/From CTT for CTT Modes

From WR	From Standard Instrument							To Standard Instrument				CTT Mode
$\overline{WORD}$	$\overline{TSA}$	$\overline{TSB}$	$\overline{SGA}$	$\overline{SGB}$	AHO	BHO	$\overline{DS}$	$\overline{AAT}$[a]	$\overline{BAT}$[a]	$\overline{TSA}$	$\overline{TSB}$	
	*	*								x	x	Inactive
	x	x			x			x				Boolean AND
	x	x			x				x			Boolean AND, free run
	x	x			x			x				Boolean OR
	x	x			x				x			Boolean OR, free run
x	*	*			x			x		x	x	Word trig, A Sweep
x	*	*			x				x	x	x	Word trig, A Sweep, free run
x	*	*				x			x	x	x	Word trig, B Sweep
	x	x			x			x				ADBE, start=A, events=B
x	x	*			x			x			x	ADBE, start=A, events=WR
x	*	x			x			x		x		ADBE, start=WR, events=B
x	*	*			x			x		x	x	ADBE, start=WR, events=WR
	x	x			x				x			BDBE, start=A, events=B
x	x	*			x				x		x	BDBE, start=A, events=WR

Table 3-10 (cont)
Signals To/From CTT for CTT Modes

From WR	From Standard Instrument							To Standard Instrument				CTT Mode
$\overline{\text{WORD}}$	$\overline{\text{TSA}}$	$\overline{\text{TSB}}$	$\overline{\text{SGA}}$	$\overline{\text{SGB}}$	AHO	BHO	$\overline{\text{DS}}$	$\overline{\text{AAT}}$[a]	$\overline{\text{BAT}}$[a]	$\overline{\text{TSA}}$	$\overline{\text{TSB}}$	
	*	x								x		Freq/ Totalize A (actually B)[b]
x	*	*								x	x	Freq/ Totalize WR
	*	*	x	x						x	x	Precision Delay Time
	*	*	x	x			x			x	x	Precision Delta Time
	*	*	x	x			x			x	x	Precision 1/ Delta Time
	*	*	x	x			x			x	x	Precision Delta Time, ALT SLP
	*	*	x	x			x			x	x	Precision 1/Delta Time, ALT SLP

[a] $\overline{\text{AAT}}$ and $\overline{\text{BAT}}$ are actually $\overline{\text{A AUX TRG}}$ and $\overline{\text{B AUX TRG}}$.

[b] B trigger is the same as A trigger, and the B events are counted in this mode.

WORD RECOGNIZER CIRCUITRY

Word Recognizer circuitry is divided into the following functional blocks: Control Register, Input Gating, Comparator, Output Multiplexer, and Synchronizer. The circuitry is located on Diagram 27. Connector P2732 connects the CTT and the WR probe.

Control Register

This 40-bit register consists of five cascaded eight bit serial input, parallel output shift registers (U6330, U6325, U6420, U6430, and U6425). Pin 2 of U6330 is the Word Recognizer serial data (WDATA) input. The WR clock (WCLOCK) connects to pin 8 of each IC making up the register. Pull-up resistor R6443 converts WCLOCK to CMOS input levels. The Control Register's first 36 bits are control bits. The last four control register bits are used to detect extra shifts. The last bit of the Control Register is always set HI, while the preceding three control register bits are set LO. If there are one, two, or three extra control clocks, DATA RTRN (U6425, pin 13) will be LO. A LO DATA RTRN signal indicates, to the microprocessor, an erroneous setup. Table 3-11 lists the function, setup states, and location of each bit of the Control Register.

Input Gating

The Input Gating circuitry determines whether or not an input reaches the Comparator.

When don't care is selected for an input, that input is prevented from reaching the Comparator by the Input Gating circuitry. Input gating is performed on data inputs D0-D15 by NAND gates U6310, U6315, U6405, and U6409. Input gating on the qualifier input is performed by OR gate U6335C. The resistors in series with the qualifier and data inputs provide over-voltage protection for the WR circuitry.

When a NAND gate's don't care input (from the Control Register) is HI, the NAND gate's output will be the inverse of its data input. When a NAND gate's don't care input is LO (don't care), its output is HI, preventing the input data from reaching the Comparator. When the don't care input bit (from the Control Register) for pin 10 of OR gate U6335C is LO, its output will equal the qualifier input (Q). When the OR gate's don't care input bit is HI (don't care) the OR gate output will be HI, preventing the qualifier input from reaching the Comparator.

Comparator

The comparison between the data inputs, the qualifier, and their match bits (from the Control Register) is done by the Comparator (U6320, U6415, U6435A, and U6335D). Each comparator input pair is connected to a data and match control line. Comparator U6320 compares data inputs D8-D15 with their control register match bits. Since U6320 pin 1 is tied LO, the IC is always enabled, and the output pin 19 will go LO when all of its input pairs match.

When the Q input equals its control register match bit, pin 3 of U6435 goes LO enabling U6415. Comparator U6415 compares inputs D0-D7 with their control register match bits. When the IC is enabled, its output will go LO when all its input pairs match. The output of both comparators is ORed together by U6335D. Its output (pin 11) will be LO when all comparator input pairs (data and match bit) are equal.

Output Multiplexer

Gating of either the synchronous output signal or the asynchronous comparator output signal to $\overline{\text{WORD}}$ is done by the Output Multiplexer (U6356).

The synchronous output signal is input to the multiplexer on pin 9 of U6356C. The asynchronous comparator output is input to the multiplexer on pin 11 of U6356D. The synchronous control line (Control Register bit 35) goes to pin 12 of U6356D and through resistor R6336 to the base of Q6334. The resistor, transistor, and R6340 form an inverter. When the synchronous control line is HI the transistor is on and saturated. When the synchronous control line is LO the transistor is cut off. When the synchronous control line is HI, U6356C is enabled and the synchronous output (U6350A, pin 5) is gated to the paralleled $\overline{\text{WORD}}$ driver U6356A and U6356B. When the synchronous control line is LO, the asynchronous gate U6356D is enabled, gating the asynchronous comparator output (U6335D, pin 11) to the paralleled $\overline{\text{WORD}}$ driver U6356A and U6356B. The filter between the output of U6356D (pin 13) and the inputs of the NOR gates U6356A (pin 3) and U6356B (pin 6) slows HI going edges by 35 to 60 ns. The LO going edge is transferred much faster.

Synchronizer

The Synchronizer synchronizes the Comparator's output with the external clock input (C). A bit of the Control Register selects the active edge of the Synchronizer's clock input.

Table 3-11
Control Register Setup

IC	Pin	Function	Word Recognizer Status Display[a]	Control Register Bit[a]
U6330	3	Data input 8 match bit	0 1 X	H L H
U6330	4	Data input 9 match bit	0 1 X	H L H
U6330	5	Data input 10 match bit	0 1 X	H L H
U6330	6	Data input 11 match bit	0 1 X	H L H
U6330	10	Data input 12 match bit	0 1 X	H L H
U6330	11	Data input 13 match bit	0 1 X	H L H
U6330	12	Data input 14 match bit	0 1 X	H L H
U6330	13	Data input 15 match bit	0 1 X	H L H

Table 3-11 (cont)
Control Register Setup

IC	Pin	Function	Word Recognizer Status Display[a]	Control Register Bit[a]
U6325	3	Data input 8 input enable	0 1 X	H H L
U6325	4	Data input 9 input enable	0 1 X	H H L
U6325	5	Data input 10 input enable	0 1 X	H H L
U6325	6	Data input 11 input enable	0 1 X	H H L
U6325	10	Data input 12 input enable	0 1 X	H H L
U6325	11	Data input 13 input enable	0 1 X	H H L
U6325	12	Data input 14 input enable	0 1 X	H H L
U6325	13	Data input 15 input enable	0 1 X	H H L

Table 3-11 (cont)
Control Register Setup

IC	Pin	Function	Word Recognizer Status Display[a]	Control Register Bit[a]
U6420	3	Data input 0 input enable	0	H
			1	H
			X	L
U6420	4	Data input 1 input enable	0	H
			1	H
			X	L
U6420	5	Data input 2 input enable	0	H
			1	H
			X	L
U6420	6	Data input 3 input enable	0	H
			1	H
			X	L
U6420	10	Data input 4 input enable	0	H
			1	H
			X	L
U6420	11	Data input 5 input enable	0	H
			1	H
			X	L
U6420	12	Data input 6 input enable	0	H
			1	H
			X	L
U6420	13	Data input 7 input enable	0	H
			1	H
			X	L
U6430	3	Data input 0 match bit	0	H
			1	L
			X	H
U6430	4	Data input 1 match bit	0	H
			1	L
			X	H
U6430	5	Data input 2 match bit	0	H
			1	L
			X	H

Table 3-11 (cont)
Control Register Setup

IC	Pin	Function	Word Recognizer Status Display[a]	Control Register Bit[a]
U6430	6	Data input 3 match bit	0	H
			1	L
			X	H
U6430	10	Data input 4 match bit	0	H
			1	L
			X	H
U6430	11	Data input 5 match bit	0	H
			1	L
			X	H
U6430	12	Data input 6 match bit	0	H
			1	L
			X	H
U6430	13	Data input 7 match bit	0	H
			1	L
			X	H
U6425	3	Qualifier input enable	0	L
			1	L
			X	H
U6425	4	Qualifier match bit	0	L
			1	H
			X	H
U6425	5	Clock edge set	↑	L
			↓	H
			X	X
U6425	6	Synchronous/ Asynchronous	↑	H
			↓	H
			X	L
U6425	10			L
U6425	11			L
U6425	12			L
U6425	13	(first bit sent by CTT)		H

[a]X = don't care, H = high, and L = low.

Clock edge selection is performed by U6435B. When edge select is LO (U6435B, pin 4), the output clock (U6435B, pin 6) will equal the input clock (U6435B, pin 5). When edge select is HI, the output clock will be the inverse of the input clock. This insures that synchronizer flip-flop U6350A will always see a rising edge clock.

Synchronizer flip-flop U6350A produces a LO (true) output when input pin 2 is LO on the rising edge of the clock (pin 3). Pin 5 is set back HI when the flip-flop set input (pin 4) is pulsed LO (true). The set input is driven by U6335A. When pin 5 of U6350A is LO, the set input will go LO on the falling edge of the clock (U6335A, pin 1). Since this makes U6350A pin 5 HI, the set input will return HI (false) readying the synchronizer flip-flop for the next active clock edge.

EXTERNAL FREQUENCY REFERENCE CIRCUITRY

The circuitry for External Frequency Reference is found on Diagram 25. The External Frequency Reference signal, input through EXT REF (the same physical connection as WR OUT), comes in through the high pass filter formed by C6180 and R6181. This high pass filter eliminates any DC offset or AC hum that might be present on the incoming reference. R6182 acts as a base current limiter as well as providing partial line termination. Since R6182 is connected to ground only through diodes, the termination impedance is nonlinear and noticeable distortion of the external reference signal is to be expected. This distortion should not affect the frequency content of the reference and hence should not affect the accuracy of any measurements.

Q6180 with R5991, R5992, R6127, and R6183 acts to convert the external reference input signal to a compatible signal. This logic signal appears on the input to the mux U6070. This is the same signal input as the $\overline{\text{WORD}}$ signal from the Word Recognizer. All frequency measurements of the external reference are made using the same CTT setup as would a frequency measurement of the Word Recognizer.

Q6181 is used to turn off the External Frequency Reference input for any mode that does not use the external reference. This allows the Word Recognizer to operate even though it and the External Frequency Reference share the $\overline{\text{WORD}}$ line. While the External Frequency Reference is in use, the Word Recognizer control register is loaded so there can never be a match on the $\overline{\text{WORD}}$ line between External Frequency Reference and Word Recognizer. This insures the Word Recognizer will not conflict with the External Frequency Reference signal in the use of the $\overline{\text{WORD}}$ line.

PERFORMANCE CHECK AND ADJUSTMENT PROCEDURES

INTRODUCTION

This section contains the Option 06 (Counter/Timer/Trigger), Option 09 (Counter/Timer/Trigger with Word Recognizer), and Option 1E (Counter/Timer/Trigger with External Frequency Reference) portion of the instrument's performance check and adjustment procedures. The "Performance Check Procedure" is used to check the instrument's performance against the requirements listed in Table 3-1. The "Adjustment Procedure" is used to restore optimum performance or return the options to conformance with their "Performance Requirements" as listed in Table 3-1.

Instrument performance should be checked after every 2000 hours of operation or once each year if used infrequently. A more frequent interval may be necessary if the instrument is subjected to harsh environments or severe usage. The results of these periodic checks will determine the need for readjustment.

Before performing these procedures, ensure that the LINE VOLTAGE SELECTOR switch is set for the ac power source being used (see Section 2 of the standard instrument Service manual). Connect the instrument to be checked and the test equipment to an appropriate power source.

LIMITS AND TOLERANCES

The tolerances given in these procedures are valid for an instrument that has been previously calibrated in an ambient temperature between +20 °C and +30 °C and is operating in an ambient temperature between −15 °C and +55 °C. The instrument also must have had at least a 20 minute warm-up period. To assure instrument performance, perform all steps in the following procedures at the same ambient temperature. When performing these checks, it is assumed that the standard instrument meets all of its "Performance Requirements" as stated in Section 1 of the standard instrument Service manual.

TEST EQUIPMENT

All the test equipment items listed in Table 3-12 are required to perform both the "Performance Check Procedure" and the "Adjustment Procedure." To assure accurate measurements, it is important that test equipment used for making these checks meets or exceeds the specifications described in Table 3-12. When considering use of equipment other than that recommended, use the "Minimum Specification" column to determine whether available test equipment will suffice.

The procedures in this section are written using the equipment listed in Table 3-12. When substitute equipment is used, control settings stated in the test setup and in the procedures may need to be altered.

Since detailed operating instructions for the test equipment are not provided in this procedure, refer to the appropriate test-equipment instruction manual if additional information is required.

Table 3-12
Test Equipment Required

Item Number and Description	Minimum Specification	Examples of Applicable Test Equipment
1. Pulse Generator (2 required)	Frequency: 10 MHz. Pulse width: 50 ns. Pulse width accuracy: 5%. Positive trigger input, 1 V to 5 V into 50 Ω. Positive trigger output, 1 V into 50 Ω. Variable pulse duration.	TEKTRONIX PG 502 Pulse Generator.[a]
2. Time-Mark Generator	Markers: 10 ns to 2 s in a 1-2-5 sequence. Accuracy: ±0.00005%.	TEKTRONIX TG 501 Time Mark Generator.[a]
3. Leveled Sinewave Generator	Frequency: 250 kHz to 250 MHz. Accuracy: ±1 LSD of generator's indicated frequency.	TEKTRONIX SG 503 Leveled Sinewave Generator.
4. Oscillator (High Stability)	Frequency: 1 MHz, 3.579545 MHz, 4.4336188 MHz, 5 MHz, or 10 MHz. Accuracy: >10 ppm. Output Amplitude: >2V p-p.	TEKTRONIX 1410R NTSC Generator with SPG2A signal generator.
5. BNC Cable (4 required)	Impedance: 50 Ω. Length: 42 in.	TEKTRONIX Part Number 012-0057-01.
6. BNC Cable	Impedance: 75 Ω. Length: 42 in.	TEKTRONIX Part Number 012-0074-00.
7. T-connector (2 required)	Connectors: BNC.	TEKTRONIX Part Number 103-0030-00.
8. Adapter	Connectors: BNC-to-probe-tip.	TEKTRONIX Part Number 013-0227-00.
9. Adapter (2 required)	Connectors: BNC-male-to-dual-binding post.	TEKTRONIX Part Number 103-0035-00.
10. Termination	Feedthrough: 75 Ω.	TEKTRONIX Part Number 011-0055-00.

[a]Requires a TM 5000-Series power-module mainframe.

PERFORMANCE CHECK PROCEDURE

This procedure is used to verify proper operation of the options and may be used to determine the need for readjustment. This check may also be used as an acceptance test and as a preliminary troubleshooting aid. Perform all steps, both in the sequence presented and in their entirety, to ensure that control settings are correct for the following step.

PREPARATION

Removing the wrap-around cabinet is not necessary to perform this procedure. All checks are made using operator accessible controls and connectors.

Turn on the oscilloscope and ensure that no error message is displayed on the CRT. If the instrument displays **"DIAGNSTIC. PUSH A/B TRIG TO EXIT"** at power on, one of the power-up tests has failed. If the error message on the bottom line of the CRT is **"TEST 04 FAIL XX"** where XX is X1, 1X, or 11, the stored calibration data is in error and the instrument should be recalibrated by a qualified service technician before performing the "Performance Check Procedure." If any other error messages occur, the failure is probably not related to calibration and the instrument should be repaired by a qualified service technician before performing either procedure.

COUNTER/TIMER/TRIGGER CHECKS

Initial Control Settings

Control settings not listed do not affect the procedure.

NOTE

Select channels to set VOLTS/DIV.

VOLTS/DIV

CH 1 and CH 2	500 mV
CH 1 and CH 2 VAR	In detent
CH 3 and CH 4	0.1 V

VERTICAL MODE

CH 1, CH 2, CH 3, CH 4, ADD and INVERT	Off
CHOP/ALT	ALT
20 MHz BW LIMIT	Off

Input Coupling

CH 1 and CH 2	50 Ω DC

Horizontal

A SEC/DIV	10 ns (knob in)
SEC/DIV VAR	In detent
X10 MAG	Off
TRACE SEP	Fully CW

Delta

Δt and ΔV	Off (press and release until associated readout is off)
TRACKING	Off

Trigger

HOLDOFF	Fully CCW
A and B LEVEL	Midrange
SLOPE	+ (plus)
A MODE	AUTO LVL
B MODE	RUN AFT DLY
SOURCE	VERT
COUPLING	DC

MENU Functions **Off**

1. Check Maximum Input Frequency at Minimum Sensitivity

a. Connect the leveled sinewave generator's output via a 50-Ω cable to the CH 1 input connector.

b. Set generator to produce a 150-MHz, 4-division display.

c. Press the MEASURE button to enter MENU mode.

d. Select COUNTER from menu.

e. Select CH1:FREQ from menu.

f. Press the upper Trigger MODE button to reinitialize the auto-trigger level.

g. CHECK—Reading is between 149 MHz and 151 MHz and is stable.

2. Check Minimum Sensitivity at 50 MHz

a. Set the generator to produce a 50.0-MHz, 1.3-division display.

b. Press the upper Trigger MODE button to reinitialize the auto-trigger level.

c. CHECK—Reading is between 49.9 MHz and 50.1 MHz and is stable.

d. Disconnect the test equipment from the instrument.

3. Check Frequency Accuracy

a. Connect the time-mark generator output via a 50-Ω cable to the CH 1 input connector.

b. Set the generator to produce 10-ns time markers four divisions in amplitude using CH 1 VOLTS/DIV and VAR VOLTS/DIV.

c. Press the upper Trigger MODE button to reinitialize the auto-trigger level.

d. CHECK—Reading is between 99.9995 MHz and 100.0005 MHz.

4. Check Minimum Input Frequency

a. Set the time-mark generator to produce 2-s time markers.

b. Set:

CH 1 VOLTS/DIV	100 mV
A SEC/DIV	50 ms (knob in)
A TRIGGER MODE	NORM

c. Adjust the A Trigger LEVEL control for a stable trigger.

d. CHECK—Reading is between 499.9975 mHz and 500.0025 mHz.

e. Disconnect the test equipment from the instrument.

5. Check Delay Time

a. Set:

CH 1 VOLTS/DIV	500 mV
CH 1 Input Coupling	GND
A SEC/DIV	20 ns (knob in)
A TRIGGER MODE	AUTO

b. Connect the output of the time-mark generator via a 50-Ω cable to the positive trigger input of the pulse generator.

c. Connect the output of the pulse generator via a 50-Ω cable to the CH 1 input connector.

d. Set the time-mark generator to produce 20-ns time markers.

e. Set the pulse generator to produce a positive 5-ns pulse when externally triggered.

f. Adjust the CH 1 POSITION control to center the CH 1 display.

g. Set the CH 1 Input Coupling to 50 Ω DC.

h. Adjust the pulse generator to produce a 5-division peak-to-peak display, centered about ground.

i. Adjust the A Trigger LEVEL for a readout of 0.00 V.

j. Pull out the SEC/DIV knob.

k. Press the A/B TRIG button.

l. Set the B Trigger:

SLOPE	+ (plus)
MODE	TRIG AFT DLY
SOURCE	VERT
COUPLING	DC

m. Adjust the B Trigger LEVEL for a readout of 0.00 V.

n. Turn the Δ REF OR DLY POS control counterclockwise until the intensified zone stops moving to the left.

o. CHECK—Reading is either 59.5 ns to 60.5 ns or 69.5 ns to 70.5 ns.

6. Check Delta Time Accuracy

a. Press MEASURE button.

b. Select <MORE> from menu.

c. Select CONFIGURE from menu.

d. Select RESOLUTION from menu.

e. Select 10 ps from menu.

f. Set the A AND B SEC/DIV to 1 μs (knob out).

g. Press A/B TRIG to access the B TRIGGER controls.

h. Press the lower Trigger MODE button to enter TRIG AFT DLY mode.

i. Set the time-mark generator to produce 1-μs time markers.

j. Set the pulse generator to produce a positive 0.5-μs pulse when externally triggered.

k. Press and release the Δt button until the Delta Time readout appears.

l. Turn the Δ control to intensify the rising edge of the second square wave.

m. Turn the Δ REF OR DLY POS control to intensify the rising edge of the second square wave.

n. CHECK—That the averaged Δt reading is between +0.00005 μs and -0.00005 μs.

o. Turn the Δ control to intensify the rising edge of the eleventh square wave.

p. CHECK—Averaged Δt reading is between 8.99990 μs and 9.00010 μs.

q. Set the A AND B SEC/DIV to 100 μs (knob out).

r. Set the time-mark generator to produce 0.1-ms time markers.

s. Set the pulse generator to produce a positive 50-μs pulse when externally triggered.

t. Turn the Δ control to intensify the rising edge of the eleventh square wave.

u. Turn the Δ REF OR DLY POS control to intensify the rising edge of the second square wave.

v. CHECK—Reading is between +899.996 μs and +900.004 μs.

w. Press MEASURE button.

x. Select <MORE> from menu.

y. Select CONFIGURE from menu.

z. Select RESOLUTION from menu.

aa. Select AUTO from menu.

7. Verify Delay-By-Events

a. Set the A SEC/DIV to 100 μs (knob in).

b. Set the A Trigger SLOPE to - (minus).

c. Press the Δt button until the Δt display disappears.

d. Press the MEASURE button.

e. Select <MORE> from menu.

f. Select DLY-BY-EVENTS (from menu.

g. Select B-SWP from menu.

h. Select ATRG-STRT from menu.

i. Select DLY-BY-B from menu.

j. Select RUN from menu.

k. Pull out the SEC/DIV knob.

l. Use the Δ REF OR DLY POS and the Δ controls to set the number of delaying events to 1.

m. VERIFY—That the intensified zone moves to each succeeding rising edge as the delaying event count is changed to 2, 3, 4, and 5.

8. Check Logic Trigger

a. Set the A AND B SEC/DIV to 20 ns (knob out).

b. Set the time-mark generator to produce 0.1 μs time markers.

c. Set the pulse generator to produce a positive 5-ns pulse when externally triggered.

d. Set the B Trigger MODE to TRIG AFT DLY.

e. Set the B Trigger SOURCE to CH 1.

f. Press the MEASURE button.

g. Select <MORE> from menu.

h. Select LOGIC-TRIGGER from menu.

i. Select A:A-AND-B from menu.

j. Push in the SEC/DIV knob.

k. Adjust the B Trigger LEVEL for a readout of 0.00 V.

l. Press the A/B TRIG button to illuminate an A Trigger MODE indicator.

m. Adjust the A Trigger LEVEL for a readout of 1.00 V.

n. Set the CH 1 Input Coupling to GND.

o. Turn the CH 1 POSITION control to align the trace with the center horizontal graticule line; do not readjust the CH 1 POSITION control during the remainder of this step.

p. Set the CH 1 Input Coupling to 50 Ω DC.

q. Set X10 MAG on.

r. Turn the Horizontal POSITION control to align the rising edge of the first displayed signal with the intersection of the second vertical graticule and the center horizontal graticule lines.

s. Set the pulse generator to produce a 2-ns pulse when externally triggered.

t. Increase the duration of the pulse until a stable display is obtained.

u. CHECK—Width of the pulse measured at the center horizontal graticule line is less than 4 ns.

v. Set X10 MAG off.

w. Press the upper Trigger MODE button.

x. Press the lower Trigger MODE button.

y. Press the upper Trigger MODE button.

z. Disconnect the test equipment from the instrument.

9. Verify Trigger Delta Delay

a. Connect the leveled sinewave generator's output via a 50-Ω cable to the CH 1 input connector. Set the A SEC/DIV to 10 μs. Set the Horizontal POSITION to midrange.

b. Set the generator for a 50-kHz, 6-division display.

c. Press the Trigger SLOPE button to illuminate the + SLOPE indicator.

d. Press the MEASURE button to enter MENU mode.

e. Select COUNTER from menu.

f. Select CH1:PERIOD from menu.

g. Press the upper Trigger MODE button to reinitialize the auto-trigger level.

h. Turn the SEC/DIV to 5 μs.

i. Pull out the SEC/DIV knob.

j. Press the A/B TRIG button for B Trigger MODE. Set B Trigger MODE to RUN AFTER DELAY.

k. Adjust the Δ REF OR DLY POS control for a delay of 5.00 μs.

l. Press the lower Trigger MODE button once.

m. Press the SLOPE button to select + SLOPE if necessary.

n. Press the lower Trigger MODE button once to select TRIG Δ DLY.

o. Press the Trigger SLOPE button to illuminate the - SLOPE.

p. Adjust the Δ control for a Δt reading of approximately 0.00 μs. The word "SET" will appear while making the adjustment.

q. VERIFY—There are two intensified zones on the displayed waveform.

r. VERIFY—The intensified zone moves on the falling edge of the waveform while adjusting the Trigger LEVEL control.

s. Press the lower Trigger MODE button to select TRIG AFT DLY.

t. VERIFY—The intensified zone moves on the rising edge of the waveform while adjusting the Trigger LEVEL control.

u. Disconnect the test equipment from the instrument.

WORD RECOGNIZER CHECKS

1. Initial Setup

a. Set:

VERTICAL MODE

CH 1, CH 2, CH 3, CH 4	On

VOLTS/DIV

CH 1 and CH 2	2 V
CH 3 and CH 4	0.1 V

Horizontal

A SEC/DIV	200 ns (knob in)

Delta

Δt and ΔV	Off (press and release until associated readout is off)

Trigger

SOURCE	CH 1
MODE	AUTO LVL

b. Connect the + trigger output of pulse generator # 1 via a 50-Ω cable to the + trigger input of pulse generator # 2.

c. Connect the output of pulse generator # 1 via a 50-Ω cable and T-connector to the CH 1 input connector. Use the T-connector at the CH 1 input.

d. Connect the output of pulse generator # 2 via a 50-Ω cable and T-connector to the CH 2 input connector. Use the T-connector at the CH 2 input.

e. Connect the Word Recognizer probe to the P6407 input connector at the rear of the instrument.

f. Connect a BNC-male-to-dual-binding post adaptor to the T-connector on the CH 1 input, and connect another BNC-male-to-dual-binding post adaptor to the T-connector on the CH 2 input.

g. Connect a 4-inch bare wire (suitable for connecting a scope probe) to the red binding post of the adaptor connected to the CH 1 input.

h. Connect a 4-inch bare wire (suitable for connecting a scope probe) to the red binding post of the adaptor connected to the CH 2 input.

i. Connect a 2-inch bare wire (suitable for connecting a scope probe) to the black binding post of the adaptor connected to the CH 2 input.

j. Connect both ground leads from the Word Recognizer probe to the bare wire on the black binding post on the CH 2 input.

k. Connect the CH 3 input to the WORD RECOG OUT connector using the instrument X10 probe and a BNC-male-to-probe-tip adaptor.

l. Set pulse generator # 1 to produce a positive 0.5-μs pulse every 1 μs.

m. Set pulse generator # 2 to produce a positive 400-ns pulse when it receives an external trigger.

NOTE

The lowest point of the HI must not be lower than 2.0 V.

n. Set both pulse generators to produce pulses of +0.6 V LO and +2.0 V HI.

o. Press the MEASURE button.

p. Select <MORE> from menu.

q. Select LOGIC-TRIG from menu.

r. Select B:WORD-REC from menu.

s. Press A/B TRIG button to select B Sweep Triggers.

If you wish to change the word recognizer display radix:

a. Press the MEASURE button.

b. Select <MORE> from menu.

c. Select CONFIGURE from menu.

d. Select WR-RADIX from menu.

e. Select HEX, OCTAL, or BINARY from menu.

f. Press RECALL to exit menu.

t. Connect the clock (C) input of the Word Recognizer to the wire on the red binding post of the CH 1 input.

u. Connect the Q and W0-W15 inputs of the Word Recognizer to the wire on the red binding post of the CH 2 input.

v. Set the A SEC/DIV to 20 ns (knob in).

2. Check Data Setup Time

a. For each test setup described in Table 3-13:

1. Vary (increase) the pulse duration of pulse generator # 2 until the active edge of the CH 2 signal falls about 10 ns after the trigger edge of the CH 1 signal.
2. CHECK—CH 3 is not displaying a signal.
3. Vary (decrease) the pulse duration of pulse generator #2, moving the active edge of the CH 2 signal to the left until CH 3 displays a stable signal.
4. Press the Δt button.
5. Turn the Δ REF OR DLY POS control to align the delta reference cursor with the first edge of the CH 2 signal.
6. Turn the Δ control to align the delta cursor with the first edge of the CH 1 signal.
7. CHECK—Reading is ≤25 ns.
8. Press the Δt button.

Table 3-13
Data Setup Time Checks

Polarity		Word Recognizer Word Definition	A TRIGGER SLOPE
Pulse Generator #1	Pulse Generator #2		
+	+	↓-0-0000	-
+	-	↓-1-FFFF	-
-	-	↑-1-FFFF	+
-	+	↑-0-0000	+

3. Check Data Hold Time

a. For each test setup described in Table 3-14:

1. Vary the pulse duration of pulse generator # 2 until the first edge of the CH 2 signal falls about 10 ns after the trigger edge of the CH 1 signal.
2. CHECK—A stable signal is displayed on CH 3.
3. Vary the pulse duration of pulse generator # 2, moving the first edge of the CH 2 signal to the left until CH 3 no longer displays a stable signal.
4. Press the Δt button.
5. Turn the Δ REF OR DLY POS control to align the delta reference cursor with the first edge of the CH 2 signal.
6. Turn the Δ control to align the delta cursor with the first edge of the CH 1 signal.
7. CHECK—Reading is >4 ns.

Table 3-14
Data Hold Time Checks

Polarity: Pulse Generator # 1	Polarity: Pulse Generator # 2	Word Recognizer Word Definition	A TRIGGER SLOPE
+	+	↓-1-FFFF	-
+	-	↓-0-0000	-
-	-	↑-0-0000	+
-	+	↑-1-FFFF	+

Table 3-15
Minimum Clock Pulse Width Checks

Polarity: Pulse Generator # 1	Polarity: Pulse Generator # 2	Word Recognizer Word Definition	A TRIGGER SLOPE
+	+	↑-X-XXXX	+
-	+	↓-X-XXXX	-

4. Check Minimum Clock Pulse Width

a. Set pulse generator # 1 to produce a 5-ns positive pulse every 1 µs.

b. Press the A/B TRIG button to select A Trigger MODE.

c. Press the upper Trigger MODE button to reinitialize the auto-trigger level.

d. Press the A/B TRIG button.

e. For each test setup described in Table 3-15:

1. If there is not a stable signal displayed on CH 3, (>0.6 V amplitude), vary (increase) the pulse duration of pulse generator # 1 until CH 3 displays a stable signal.
2. Press the Δt button.
3. Turn the Δ REF OR DLY POS control to align the delta reference cursor with the leading edge of the CH 1 pulse.
4. Turn the Δ control to align the delta cursor with the trailing edge of the CH 1 pulse.
5. CHECK—Reading is ≤20 ns.
6. Press the Δt button.

5. Check Delay From Selected Edge to WORD RECOG OUT

a. Set:

VERTICAL MODE

CH 3 and CH 4	On
CH 1, CH 2, ADD, and INVERT	Off

VOLTS/DIV

CH 3 VOLTS/DIV	0.1 V (1 V with X10 probe attached)

Horizontal

A SEC/DIV	20 ns (knob in)

b. Connect another instrument X10 probe to the CH 4 input connector and the probe tip to the wire on the red binding post of the CH 1 input.

c. Set pulse generator # 1 to produce a 50-ns positive pulse every 10 µs. (CH 4 Display.)

d. Set the A Trigger SOURCE to CH 4.

e. For each test setup described in Table 3-16:

1. Press the Δt button.
2. Turn the Δ REF OR DLY POS control to align the delta reference cursor with the active edge of the CH 4 signal.

3. Turn the Δ control to align the delta cursor with the rising edge of the CH 3 signal.

4. CHECK—Reading is ≤55 ns.

5. Press the Δt button.

Table 3-16
Delay From Selected Edge to WORD RECOG OUT Checks

Polarity		Word Recognizer Word Definition	A TRIGGER SLOPE
Pulse Generator # 1	Pulse Generator # 2		
+	+	↑–X-XXXX	+
–	+	↓–X-XXXX	–

6. Check Word Recognition Delay

a. Set pulse generator # 1 to produce a positive 0.5-μs pulse every 1 μs.

b. Disconnect the C input of the Word Recognizer from the wire on the red binding post of the CH 1 input.

c. Connect the Q and W0-W15 inputs of the Word Recognizer to the wire on the red binding post of the CH 1 input.

d. For each test setup described in Table 3-17:

1. Press the Δt button. Turn the Δ REF OR DLY POS control to align the delta reference cursor with the first edge of the CH 4 signal.

3. Turn the Δ control to align the delta cursor with the rising edge of the CH 3 signal.

4. CHECK—Reading is ≤140 ns.

5. Press the Δt button.

e. Disconnect the probe on the CH 4 input.

Table 3-17
Word Recognition Delay

Polarity		Word Recognizer Word Definition	A TRIGGER SLOPE
Pulse Generator # 1	Pulse Generator # 2		
+	+	X–1-FFFF	+
–	+	X–0-0000	–

7. Check Data Input Coincidence

a. Set:

CH 2 and CH 3	On
CH 4	Off
A SEC/DIV	50 ns (knob in)
SOURCE	CH 2
SLOPE	– (minus)

b. Set pulse generator # 1 to produce a positive 0.5-μs pulse every 1 μs.

c. Set pulse generator # 2 to produce a negative 5-ns pulse when it receives an external trigger.

d. Set the A SEC/DIV to 20 ns (knob in).

e. Set the Word Definition of the Word Recognizer probe to BX0 0000.

f. Connect the Q and W0-W15 inputs of the Word Recognizer to the wire on the red binding post of the CH 2 input.

g. Press the A/B TRIG button to select A Trigger MODE.

h. Press the upper Trigger MODE button to reinitialize the auto-trigger level.

i. Vary (increase) the pulse duration of pulse generator # 2 until further increase makes the CH 3 display stable (>0.6 V amplitude).

j. Press the Δt button.

k. Turn the Δ REF OR DLY POS control to align the delta reference cursor with the falling edge of the CH 2 signal.

l. Turn the Δ control to align the delta cursor with the rising edge of the CH 2 signal.

m. CHECK—Reading is $\geqslant$20 ns and $\leqslant$85 ns.

n. Press the Δt button.

o. Disconnect the test setup.

EXTERNAL FREQUENCY REFERENCE CHECK

NOTE

The Oscilloscope under test, the Oscillator, and the Time Mark Generator must have at least 20 minutes warm-up prior to performing the verification procedure.

Initial Control Settings

Control settings not listed do not affect the procedure.

NOTE

Select channels to set VOLTS/DIV.

VERTICAL

CH 1	ON
CH 2, CH 3, CH 4, ADD, and INVERT	OFF
BW LIMIT	OFF
CH 1 VOLTS/DIV	500 mV
CH 1 INPUT COUPLING	50 Ω DC
CH 1 POSITION	MID RANGE

HORIZONTAL

A SEC/DIV	200 ns (Knobs locked)
X10 MAG	OFF
ΔV AND Δt	OFF (Press and release until associated readout is off)

TRIGGER

TRIGGER MODE	AUTO
TRIGGER SOURCE	VERT
TRIGGER COUPLING	DC
TRIGGER SLOPE	+
TRIGGER HOLDOFF	MINIMUM
READOUT INTENSITY	SCALE FACTORS ON
INTENSITY	COMFORTABLE DISPLAY

MENU Functions **OFF**

1. Verify External Reference Operation

a. Connect the time-mark generator to CH 1 via a 50-Ω cable.

b. Set the generator to 0.2 μs time markers.

c. ADJUST—A Trigger Level Control for a 1.00 V Trigger Level Readout.

d. VERIFY—Displayed time markers are triggered and stable.

e. Press the measure button to enter the MENU mode.

f. Select COUNTER from menu.

g. Select FREQ from menu.

h. CHECK—The top right READOUT now displays a count of the input time markers using 7 digits.

i. VERIFY—The count reading is within 4.999995 to 5.00005 MHz.

2. Verify External Reference Count Stability

NOTE

External Reference Count starts approximately 100 counter updates after the Reference Signal is connected to the EXT REF input at the rear of the oscilloscope under test.

a. Connect output jack J20 of the oscillator to the oscilloscope EXT REF input via a 75-Ω cable and 75-Ω termination.

b. CHECK—After approximately 100 counter updates (about 1 minute 30 seconds) the readout count frequency is displayed with 8 digits.

c. Note the value of the 8 digit display.

d. VERIFY—For approximately 100 more counter updates that the frequency count does not vary by more than ±0.8 Hz from the initial reading noted in Step c above.

e. Disconnect the test set-up.

ADJUSTMENT PROCEDURE

The “Adjustment Procedure” is used to restore optimum performance or return the options to conformance with their “Performance Requirements” as listed in Tables 3-1 and 3-2. The options should be adjusted only when the standard instrument is known to meet its “Performance Requirements” as stated in Section 1 of the standard instrument Service manual. The instrument must have a 20-minute warmup period before making any adjustments. Performing this procedure while the instrument's temperature is drifting may cause erroneous calibration settings.

PREPARATION

Remove the wrap-around cabinet from the instrument as described in the “Maintenance” section of the standard instrument Service manual. Then set the CAL/NO CAL jumper P501 in the standard instrument to the CAL position (between pins 2 and 3).

Turn the oscilloscope on by pressing the POWER button. Check to see that it enters its normal operating mode and that no error message is displayed on the CRT. If an error message is present, have the instrument repaired or calibrated by a qualified service technician before performing this procedure.

COUNTER/TIMER/TRIGGER ADJUSTMENT PROCEDURE

Equipment Required (see Table 3-12)

Pulse Generator (Item 1)

Time-Mark Generator (Item 2)

BNC Cable (2 required) (Item 4)

Initial Oscilloscope Control Settings

Control settings not listed do not affect the procedure.

a. Set:

VOLTS/DIV

CH 1 and CH 2	200 mV
CH 1 and CH 2 VAR	In detent
CH 3 and CH 4	0.1 V

VERTICAL MODE

CH 1, CH 2, CH 3, CH 4, ADD, and INVERT	Off
CHOP/ALT	ALT
20 MHz BW LIMIT	Off

Input Coupling

CH 1 and CH 2	50 Ω DC

Horizontal

A SEC/DIV	10 ns (knob in)
SEC/DIV VAR	In detent
X10 MAG	Off
TRACE SEP	Fully CW

Delta

Δt and ΔV	Off (press and release until associated readout is off)
TRACKING	Off

Trigger

HOLDOFF	Fully CCW
A and B LEVEL	Midrange
A and B SLOPE	+
A MODE	AUTO LVL
B MODE	RUN AFT DLY
SOURCE	VERT
COUPLING	DC

b. Connect the output of the time-mark generator via a 50-Ω cable to the positive trigger input of the pulse generator.

c. Connect the output of the pulse generator via a 50-Ω cable to the CH 1 input connector.

d. Set the pulse generator to produce a positive 0.5-μs pulse when externally triggered.

e. Set the time-mark generator to produce 1-μs time markers.

f. Adjust the pulse generator to produce a 5-division display centered about ground.

g. Press the Trigger SLOPE button while holding in both the ΔV and Δt buttons to access the Diagnostic Menu.

NOTE

If the calibration feature is disabled (the CAL/NO CAL jumper is in the NO CAL position), CAL messages will not appear in the Diagnostic Menu of the CRT readout.

h. Press the lower Trigger MODE button until the message **"CT CAL 81"** appears in the lower left corner of the CRT.

i. Press the upper Trigger COUPLING button.

j. CHECK—The message **"1 MHZ CH1 1VOLT PEAK TO PEAK"** appears in the Diagnostic Menu of the CRT readout.

k. Press the upper Trigger COUPLING button to start the calibration routine.

NOTE

*If either the frequency of the signal generator or the frequency of the oscillator within the CTT is not within tolerance, the message **"FREQ OUT OF LIMITS"** will appear in the CRT readout.*

*If the calibration routine is unable to calculate a delay offset calibration constant that is within tolerance, the message **"OFFSET LIMIT"** will appear in the CRT readout.*

l. After about 10 seconds, the **"DIAGNSTIC. PUSH A/B TRIG TO EXIT"** message should appear in the Diagnostic Menu of the CRT readout.

m. Press the A/B TRIG button to exit the Diagnostic Menu.

n. Disconnect the test equipment from the instrument.

o. Return the CAL/NO CAL jumper to its NO CAL position and reinstall the instrument cabinet.

Section 4

DIGITAL MULTIMETER

SPECIFICATION

INTRODUCTION

The DMM Option (Option 01) to the TEKTRONIX 24X5B Oscilloscopes is a 4 ½-digit, fully autoranging digital multimeter which measures dc and ac voltage and current, resistance, dBV, dBm, continuity, and temperature. Option 1B is the same as Option 01 except that the temperature probe is not included. The DMM is controlled by "soft" front-panel switches that are used by the operator to determine the function or operation to be performed. All the controls are contained in the extended front panel.

Measurement results and DMM messages are displayed on the top line of the oscilloscope CRT readout. The processor can turn off the DMM when a display conflict arises either between the DMM and the standard oscilloscope or between the DMM and an option.

When the GPIB (General Purpose Interface Bus) Option (Option 10) is installed in the oscilloscope, the DMM functions can be controlled and the measurement results read over the bus. All controls available from the DMM front panel are also available through the GPIB interface. GPIB control, which differs from front-panel control, explicitly turns functions on and off. The normal front-panel control buttons work as toggles (when pressed the function switches to the opposite state).

ACCESSORIES

Standard Accessories

In addition to the standard accessories listed in the oscilloscope manuals, the following DMM Option standard accessories are provided:

Probe Set

Accessories to Probe Set

P6602 Temperature Probe

Optional Accessories

The following optional accessories are also available:

24X5B/2467B Options Service Manual

Protective Waterproof Vinyl Cover

The optional accessories can be ordered from Tektronix, Inc. A local Tektronix Field Office, representative, or the Tektronix Product catalog can provide ordering and product information.

PERFORMANCE CONDITIONS

Except as noted in Tables 4-1 and 4-2 of this manual, the electrical, mechanical, and environmental characteristics of Option 01 instruments are identical to those specified in the respective 24X5B Oscilloscope Service manual.

Table 4-1
Option 01 Electrical Characteristics

Characteristics	Performance Requirements
DC VOLTS	
Accuracies by Range	
+18 °C to +28 °C	
200 mV to 200 V	±(0.03% of reading + 0.01% of full scale).
500 V	±(0.03% of reading + 0.04% of full scale).
−15 °C to +18 °C and +28 °C to +55 °C	
200 mV to 200 V	Add ±(0.003% of reading + 0.001% of full scale)/°C below 18°C or above 28°C.[a]
500 V	Add ±(0.003% of reading + 0.004% of full scale)/°C below 18°C or above 28°C.[a]
Common Mode Rejection Ratio	>100 dB at dc: >80 dB at 50 and 60 Hz, with 1 kΩ imbalance.
Normal Mode Rejection Ratio	>60 dB at 50 and 60 Hz.

[a]Performance Requirement not checked in manual.

Table 4-1 (cont)

Characteristics	Performance Requirements
Resolution	1 part in 20,000 of full scale except 0.1 V on 500 V range.[a]
Step Response Time	
Manual Range	Less than 1 second.[a]
Auto Range	Less than 2 seconds.[a]
Input Resistance	
200 mV and 2 V Ranges	>1 GΩ or 10 MΩ ±1%.[a]
20 V to 500 V Ranges	10 MΩ ±1%.[a]
Input Bias Current at 23°C Ambient Temperature	Less than 10 pA.[a]
Reading Rate	Approximately 3 per second.[a]

AC VOLTS

NOTE

*Before a signal and frequency combination listed below is input, make sure the combination does not exceed the Maximum V*Hz Product specified in this table under **ADDITIONAL CHARACTERISTICS**.*

Accuracies by Range	Crest Factor ≤4.
+18 °C to +28°C	
200 mV to 200 V	Input signal between 5% and 100% of full scale.
40 Hz to 10 kHz	±(0.6% of reading + 0.1% of full scale).
20 Hz to 40 Hz and 10 kHz to 20 kHz	±(1% of reading + 0.1% of full scale).
20 kHz to 100 kHz	±(5% of reading + 0.1% of full scale).
500 V	Input signal between 100 V and 500 V.
40 Hz to 10 kHz	±(0.6% of reading + 0.2% of full scale).
20 Hz to 40 Hz and 10 kHz to 20 kHz	±(1% of reading + 0.2% of full scale).
20 kHz to 100 kHz	±(5% of reading + 0.2% of full scale).
−15°C to +18°C and +28°C to +55°C	
200 mV to 200 V	Input signal between 5% and 100% of full scale.
40 Hz to 10 kHz	±(0.8% of reading + 0.1% of full scale).[a]
20 Hz to 40 Hz and 10 kHz to 20 kHz	±(1.3% of reading + 0.1% of full scale).[a]
20 kHz to 100 kHz	±(6% of reading + 0.1% of full scale).[a]
500 V	Input signal between 100 V and 500 V.
40 Hz to 10 kHz	±(0.8% of reading + 0.3% of full scale).[a]
20 Hz to 40 Hz and 10 kHz to 20 kHz	±(1.3% of reading + 0.3% of full scale).[a]
20 kHz to 100 kHz	±(6% of reading + 0.3% of full scale).[a]

[a]**Performance Requirement not checked in manual.**

Table 4-1 (cont)

Characteristics	Performance Requirements
Common Mode Rejection Ratio	>60 dB from dc to 60 Hz, with 1 kΩ imbalance.
Resolution	1 part in 20,000 of full scale except 0.1 V on 500 V range.[a]
Response Time	
Manual Range	Less than 2 seconds.[a]
Auto Range	Less than 3 seconds.[a]
Input Impedance	1 MΩ ±1% in parallel with less than 100 pF.[a]
dBV, dBm	
Accuracy	dB readings are calculated from AC VOLTS measurements.[a]
Resolution	0.01 dB.[a]
HI OHMS	
Accuracies by Range	
+18 °C to +28 °C	
2 kΩ to 2 MΩ	±(0.1% of reading + 0.01% of full scale).
20 MΩ	±(0.5% of reading + 0.01% of full scale).
−15°C to +18°C and +28°C to +55°C	
2 kΩ to 200 kΩ	Add ±(0.01% of reading + 0.001% of full scale)/°C above 28°C or below 18°C.[a]
2 MΩ	Add ±(0.01% of reading + 0.001% of full scale)/°C above 28°C or below 18°C ±2% of reading per 10% relative humidity above 70% relative humidity.[a]
20 MΩ	Add ±(0.05% of reading + 0.001% of full scale)/°C above 28°C or below 18°C ±2% of reading per 10% relative humidity above 70% relative humidity.[a]
Voltage at Full Scale	Approximately 2 V.[a]
Maximum Open Circuit Voltage	Less than 6 V.[a]
Resolution	One part in 20,000 of full scale.[a]
Measuring Current by Range	
2 kΩ	Approximately 1 mA.[a]
20 kΩ	Approximately 0.1 mA.[a]
200 kΩ	Approximately 10 μA.[a]
2 MΩ	Approximately 1 μA.[a]
20 MΩ	Approximately 0.1 μA.[a]

[a]Performance Requirement not checked in manual.

Table 1-4 (cont)

Characteristics	Performance Requirements
Response Time	
2 kΩ to 2 MΩ	
Manual Range	Less than 1 second.[a]
Auto Range	Less than 2 seconds.[a]
20 MΩ Range	Less than 5 seconds.[a]
Reading Rate by Range	
2 kΩ to 2 MΩ	Approximately 3 per second.[a]
20 MΩ	Approximately 1.5 per second.[a]
LO OHMS	
Accuracies by Range	
+18°C to +28°C	
200 Ω	±(0.1% of reading + 0.1% of full scale).
2 kΩ to 200 kΩ	±(0.1% of reading + 0.01% of full scale).
2 MΩ	±(0.25% of reading + 0.01% of full scale).
−15°C to +18°C and +28°C to +55°C.	
200 Ω to 20 kΩ	Add ±(0.01% of reading + 0.001% of full scale)/°C above 28°C or below 18°C.[a]
200 kΩ	Add ±(0.01% of reading + 0.001% of full scale)/°C above 28°C or below 18°C ± 2% of reading per 10% relative humidity above 70% relative humidity.[a]
2 MΩ	Add ±(0.025% of reading + 0.001% of full scale)/°C above 28°C or below 18°C ±2% of reading per 10% relative humidity above 70% relative humidity.[a]
Voltage at Full Scale	Approximately 0.2 V.[a]
Maximum Open Circuit Voltage	Less than 6 V.[a]
Measuring Current by Range	
200 Ω	Approximately 1 mA.[a]
2 kΩ	Approximately 0.1 mA.[a]
20 kΩ	Approximately 10 μA.[a]
200 kΩ	Approximately 1 μA.[a]
2 MΩ	Approximately 0.1 μA.[a]
Resolution	1 part in 20,000 of full scale.[a]

[a]Performance Requirement not checked in manual.

Table 4-1 (cont)

Characteristics	Performance Requirements
Response Time	
Manual Range	Less than 1 second.[a]
Auto Range	Less than 2 seconds.[a]
Reading Rate	Approximately 3 per second.[a]
AMPS	
DC Accuracy	
+18°C to +28°C	±(0.6% of reading + 0.1% of full scale).
−15°C to +18°C and +28°C to +55°C	±(0.7% of reading + 0.15% of full scale).[a]
AC Accuracy	20 Hz to 10 kHz sinusoidal waveform.
+18°C to +28°C	±(0.6% of reading + 0.1% of full scale).
−15°C to +18°C and +28°C to +55°C	±(0.7% of reading + 0.15% of full scale).[a]
Response Time	
Manual Range	Less than 1 second.[a]
Auto Range	Less than 2 seconds.[a]
Input Resistance by Range	
100 μA	Approximately 1.0 kΩ.[a]
1 mA	Approximately 100.0 Ω.[a]
10 mA	Approximately 10.5 Ω.[a]
100 mA	Approximately 1.5 Ω.[a]
1 A (1000 mA)	Approximately 0.5 Ω.[a]
Maximum Input Current	1 A.[a]
Resolution	1 part in 10,000 full scale.[a]
CONTINUITY	
Response Time	Approximately 0.1 second.[a]
Threshold Resistance	10 Ω ±1 Ω.[a]
TEMPERATURE	
Accuracy	
+18°C to +28°C Ambient Temperature	±(2% of reading + 1.5°C).[a]
−15°C to +18°C and +28°C to +55°C Ambient Temperature	±(2% of reading + 2.0°C).[a]
Probe Tip Measurement Range	−62°C to +230°C in one range.[a]
Resolution	0.1°C or 0.1°F.[a]

[a]Performance Requirement not checked in manual.

Table 4-1 (cont)

Characteristics	Performance Requirements
ADDITIONAL CHARACTERISTICS	
Warmup Time to Meet Electrical Specification	45 minutes.[a]
Maximum Voltage between Inputs from either Input to Ground	
DC to 20 kHz	500 V rms; 700 V peak.[a]
Above 20 kHz	10^7 V*Hz.[a]

[a]Performance Requirement not checked in manual.

NOTE

For AMPS modes, maximum voltage between inputs is limited by maximum input current.

Table 4-2
Option 01 Mechanical Characteristics

Characteristics	Description
Weight	
With Accessories and Accessories Pouch	13.1 kg (28.8 lb).
Without Accessories and Accessories Pouch	12.2 kg (26.9 lb).
Shipping Weight	
Domestic	19.2 kg (42.2 lb).
Height	
With Feet and Accessories Pouch	231 mm (9.1 in).
Without Accessories Pouch	202 mm (7.9 in).
Width	
With Handle	338 mm (13.3 in).
Depth	
With Front Cover	429 mm (16.9 in).
With Handle Extended	508 mm (20.0 in).
Cooling	Forced-air circulation.

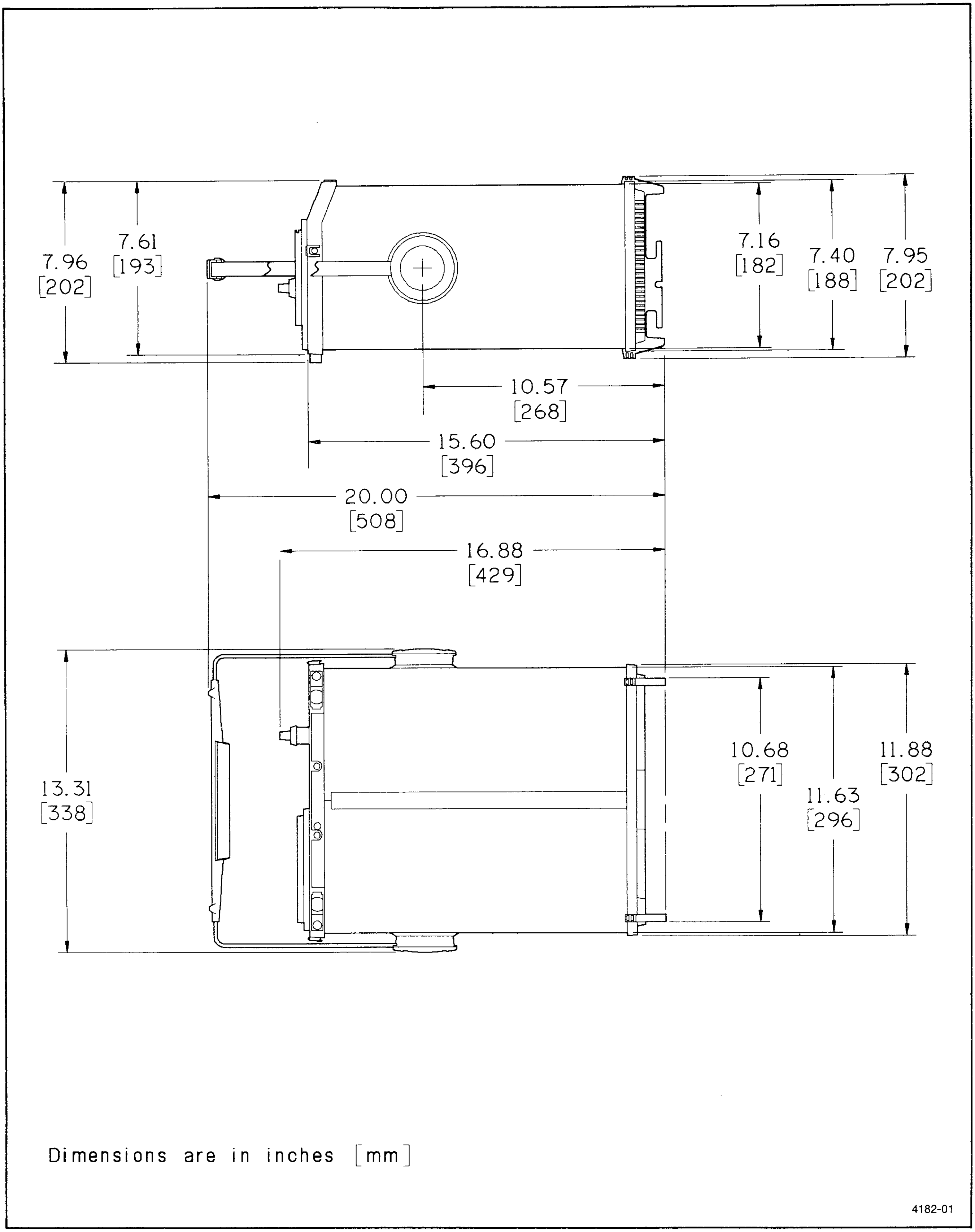

Figure 4-1. Dimensional drawing of the 24X5B Option 01 Oscilloscope.

PREPARATION FOR USE

This section of the manual explains the power-up of the main instrument containing the DMM Option. The power-up sequence of the oscilloscope is described, along with explanations of option-related error messages that may occur if the instrument is not functioning properly.

POWER-UP SEQUENCE

Before turning on power to the instrument, read Section 2 in the standard oscilloscope Service manual and follow the safety and precautionary information described there.

The power-up tests, automatically performed each time the oscilloscope is turned on, test both the standard oscilloscope circuitry and the DMM Option circuitry. Tests that apply to the DMM Option are integrated into the power-up tests for the host oscilloscope; they include the DMM Kernel test and Confidence tests.

Kernel Test

Operation of the DMM Option memory (ROM) is checked by the standard instrument Kernel test. Kernel test failures will result in an attempt to flash the front-panel A SWP TRIG'D indicator.

Even with a Kernel failure, pressing the A/B TRIG button may still place the instrument in an operating mode. However, if the operating mode is successfully entered, instrument operation may be unpredictable. If the instrument then functions adequately for your particular measurement, it can be used, but refer it to a qualified service technician for repair as soon as possible.

Confidence Tests

Failure of a DMM Confidence test during power-up is indicated in the bottom line of the CRT readout. The failure display has the following format:

"DM TEST 7X FAIL YY"

where 7X indicates the DMM Option and YY represents the code for the failed test segment.

A Confidence test failure may not render the DMM inoperable. Pressing the A/B TRIG button may still place the instrument into the normal operating mode; however, it may not meet all DMM specifications.

Successful Power-Up Sequencing

When the power-up routine is completed without a failure indication, the oscilloscope enters the normal operating state. The oscilloscope parameters are set to correspond with current front-panel settings and with functions that were established before instrument power was last turned off. The instrument is now ready to make measurements.

If the DMM was on when the oscilloscope was turned off, the DMM will return to the same operating condition when power is restored to the main instrument, with the exception of dc amps, ac amps, continuity, and the hold operator. With any one of these functions, the DMM will initialize upon power up to dc volts. For all DMM functions at power-up, the minimum and maximum values will be reset, but the reference in effect before the oscilloscope was turned off will be retained.

POWER-DOWN SEQUENCE

When the POWER switch is set to OFF, the instrument powers down and the instrument front-panel settings will be stored for use the next time power is applied to the instrument.

DMM PARAMETER SELECTION

The following procedures are used to verify DMM push-button operation, to set the continuity function audible indicator frequency, and, if enabled, to set or determine the input impedance of the 0.2 V and 2 V DC DMM ranges.

Exercise procedure DM EXER 71, accessed through the oscilloscope Diagnostic Monitor, allows the operator to verify that the DMM front panel push buttons are functioning properly.

Exercise procedure DM EXER 72, also accessed through the Monitor, lets the operator set the continuity function audible-indicator frequency. Also, if enabled during the calibration of the DMM Option, the input impedance of the 0.2 V and 2 V DC ranges may be selected.

Perform the following procedure to access the functional selections described above:

1. Hold in both the ΔV and Δt buttons and press the Trigger SLOPE button to enter the Diagnostic Menu. The top row of the readout will display **"DIAGNSTIC. PUSH A/B TRIG TO EXIT"**.

2. Press and hold the Trigger MODE button until the message **"DM EXER 71"** appears at the lower left corner of the CRT.

3. Press the upper Trigger COUPLING button, and the top of the display will contain all 1's grouped on the CRT to match the DMM push button layout.

4. When a DMM button is pressed, the corresponding 1 in the CRT readout should change to a 0. This will verify that the button is functioning. After checking each button, press the lower Trigger COUPLING button.

5. Press the upper Trigger MODE button. The message **"DM EXER 72"** will be displayed in the lower left corner of the CRT.

6. Press the upper Trigger COUPLING button, and the message **"MOVE SOURCE FOR CONTINUITY TONE"** will appear in the CRT readout.

7. Touch the test lead tips together and a tone will be heard. Press the upper Trigger SOURCE button to increase the frequency of the tone or press the lower Trigger SOURCE button to decrease the frequency of the tone.

8. Press the upper Trigger COUPLING button to get the message relating to the input impedance of the DMM in the 0.2 V and 2 V DC ranges. The message will be either:

   "INPUT.Z ON 0.2VDC 2VDC = 10 MW" or

   "INPUT Z ON 0.2VDC 2VDC > 100 GW"

9. If the desired input impedance is not displayed, press the upper Trigger COUPLING button. The correct impedance should now be displayed.

10. Once the correct impedance is displayed, press the lower Trigger COUPLING button to store the impedance selection.

11. Press the A/B TRIG button to exit the Diagnostic Menu and resume normal operation.

DMM FUSES

The DMM has two fuses in series with the HI input connector to protect the DMM circuitry from current overload. One of the fuses is on the DMM front panel, and the other is inside the instrument cabinet. Only the front-panel fuse is operator replaceable; if the internal fuse opens, refer the instrument for fuse replacement or repair to a qualified service technician.

If the DMM does not make measurements after a potential current overload condition has occurred, turn off the instrument, remove the probes, and check the front-panel fuse. If it has opened, replace it with a fuse of the same type and rating. Otherwise replace the fuse in its holder and turn on the instrument. If the internal fuse has opened, the message **"DM TEST 76 FAIL 01"** will appear on the CRT readout during instrument power-up. In this case, refer the instrument to a qualified service technician for repair.

THEORY OF OPERATION

INTRODUCTION

SECTION ORGANIZATION

This section contains a functional circuit description of the Option 01 Digital Multimeter (DMM) circuitry for the 24X5B Oscilloscopes. The discussion begins with an overview of option functions and continues with detailed explanations of each major circuit. Reference is made to supporting schematic and block diagrams, which aid in understanding the text. These diagrams show interconnections between parts of the circuitry, identify circuit components, list specific component values, and show interrelationships with the standard oscilloscope.

The block and schematic diagrams are located in the tabbed "Diagrams" section at the rear of this manual. The particular schematic diagram associated with each circuit description is identified by number in the text. The diagram number, enclosed within a diamond symbol, also appears on the tab of the appropriate foldout page. For the best understanding of the circuit being described, refer to both the applicable schematic and block diagrams.

DIGITAL LOGIC CONVENTIONS

Digital logic circuits perform many functions within the instrument. The operation of these circuits is represented by specific logic symbology and terminology. Logic-function descriptions contained in this manual use the positive-logic convention. The specific voltages which constitute a HI or a LO vary among individual devices. For specific device characteristics, refer to the manufacturer's data book.

GENERAL CIRCUIT DESCRIPTION

Before individual circuits are discussed in detail, a general block-level discussion is provided to aid in understanding overall operation of the option circuitry. A simplified block diagram of the option, showing basic interconnections, is shown in Figure 10-7. The diamond-enclosed numbers in the blocks refer to the schematic diagrams at the rear of this manual in which the corresponding circuitry is located. Throughout this discussion, standard oscilloscope refers to the 24X5B Oscilloscopes without option circuitry.

The activities of the options are directed by the microprocessor contained in the standard oscilloscope. The microprocessor, under the control of firmware present in the options, monitors each option's functions and sets up the operating modes according to instructions received.

While executing the control program, the microprocessor retrieves previously stored calibration constants and front-panel settings and, as necessary, places program-generated data in temporary storage for later use. The random access memory (RAM), and ultraviolet erasable programmable read only memory (EPROM) contained in the option circuit boards and the nonvolatile RAM in the standard instrument provide these storage locations.

The microprocessor control bus, address bus, and data bus are buffered by Control board circuitry. Microprocessor bus timing for the options is modified by buffers on the Control board to make bus timing compatible with the options. These signal paths are used for communication between the DMM option and the standard oscilloscope.

DMM BOARD

The DMM option adds hardware and software to the standard oscilloscope that make it possible to measure ac and dc voltage and current, resistance, dBV, dBm, and temperature. The DMM board circuitry is divided into 5 sections:

1. DMM Input Circuit.
2. V/F Converter and Digital Control.
3. Digital Counter and Processor Interface.
4. Extended Front Panel.
5. Power Distribution.

The option is under control of the microprocessor in the standard oscilloscope. The Processor Interface provides the interface to the microprocessor. After reading the switches in the Extended Front Panel, the microprocessor sets up the Digital Control circuitry for the desired operating mode. Range changing in the input circuitry is also controlled by the microprocessor through the Digital Control circuitry.

The DMM Input Circuit converts the input signal to a dc voltage for use by the V/F Converter. The voltage produced is proportional to the input signal. The V/F Converter generates a signal whose frequency is inversely proportional to the input voltage. The Digital Counter counts the frequency during the measurement interval. At the end of the measurement interval the microprocessor reads the Digital Counter, calculates, and displays the input's value.

The Power Distribution circuitry contains the floating power supplies used by the DMM circuitry.

DETAILED CIRCUIT DESCRIPTION

INTRODUCTION

The following discussion provides detailed information concerning the electrical operation and circuit relationships of the 24X5B Digital Multimeter circuitry. Unique circuitry is described in detail, while circuits common in the electronics industry are not. The descriptions are supported by the associated detailed block diagram (Figure 10-18) and schematic diagrams located at the rear of this manual in the tabbed foldout pages.

DIGITAL MULTIMETER OPTION CIRCUIT BOARD

The DMM option adds hardware and software to allow measuring ac and dc voltage and current, resistance, dBV, dBm, and temperature. The DMM board is divided into 5 sections:

1. DMM Input Circuit.
2. V/F Converter and Digital Control.
3. Digital Counter and Processor Interface.
4. Extended Front Panel.
5. Power Distribution.

In general, the measurement procedure is the same for all measurements: the microprocessor sets up the Digital Control circuitry. The Digital Control circuitry sets up the input circuit for the desired operating mode. The input signal is attenuated by the Input Attenuators. Then the signal is buffered by one of the Volts Buffers. The V/F Input

Multiplexer selects the buffer's output, sending it to the V/F Converter. The V/F Converter converts the input to a frequency. The signal is then counted, the reading calculated, and then displayed.

Interleaved between each measurement of the unknown input is the measurement of an offset or a reference. The measurement sequence is: unknown, offset, unknown, reference, unknown, offset, ...

In Continuity mode, the circuitry is set up as in the Ohms ranges. Before measurements start, a 10 Ω resistance in the Input Attenuators is measured and used as a reference. Measurements of 10 Ω or less sound the continuity tone; measurements greater than 10 Ω do not sound a tone.

For Temperature measurements, the circuitry is set up as for the 200 Ω range. The resistance of the Temperature Probe (a 100-Ω at 0°C thermistor) is measured. The resistance measured (which is proportional to temperature) is converted to temperature and displayed.

DMM Input Circuit

The DMM Input Circuit (see Diagram 28) converts all inputs to a standard range of voltages. The circuitry contains Input Attenuators, an Ohms Current Source, a DC Volts Buffer, an AC Volts Buffer, and the V/F Input Multiplexer.

The gain path in DC Volts is maintained to keep the voltage to the V/F Converter at a full scale range of ±2 V, except in the 500 V range where the full scale range is ±0.5 V. Gain path selections used are shown in Table 4-3.

Table 4-3
DC Volts Selections

DC Volts Range	Input Atten	Reference	Buffer Gain	V/F Input Selected
.2 V	÷1	−0.2 V	X10	X1
2 V	÷1	−2 V	X1	X1
20 V	÷10	−2 V	X1	X1
200 V	÷100	−2 V	X1	X1
500 V	÷100	−2 V	X1	÷10

In the current ranges, the Input Attenuators convert the input current to a voltage (0.1 V at the top of the range) which is then sent to the 0.2 V input of one of the Volts buffers. The Volts buffer multiplies by 10, producing 1 V at the top of the range to the V/F Converter. The rest of the process is the same as for voltage readings.

In the Ohms ranges, the Ohms Current Source generates a current. This current is sent through the unknown resistance, producing a voltage proportional to the unknown resistance. The voltage produced is sent to the volts buffer, where the rest of the process is the same as for voltage readings.

INPUT ATTENUATORS. The Input Attenuators contain the voltage dividers that attenuate the inputs to levels usable by the voltage buffers. Both the AC and the DC Volts Buffers have their own input attenuators. In addition, part of the attenuator for the DC Volts Buffer is used in the Amps ranges to convert the input current to a voltage. The setup for a given range is controlled by the Digital Control circuitry.

DC Volts Attenuator. Resistors R5081, R5080, R5082, R4960, and R4975 make up the voltage divider for the DC Volts Attenuator. Relays K4981 and K5091 determine which voltage tap will be used. Relay K5191 selects between >100-GΩ and the 10-MΩ input impedances. If the attenuator is to divide by 10 or 100, the 10-MΩ input impedance is selected.

AC Volts Attenuator. Resistors R5181 and R5177 make up the voltage divider for the AC Volts Attenuator. Relay K5180 determines which voltage tap will be used. Relay K5191 switches the input to the AC circuitry.

The attenuator is ac compensated by C5170. The effective capacitance of C5170 is changed by multiplier U5170 and the D-A Converter made up of R4970, R4971, R4972, R4973, R4974, and R5073. The effective capacitance required is determined during calibration and is the same for all ac voltage ranges.

Amps Attenuator. The Amps Attenuator converts the input current to a voltage. The resistances used are in R4960 and R4975. The resistance used in a given Amps range is selected by FETs Q4970, Q4971, Q4972, Q4973, and Q4980. Relay K4990 switches the input to the Amps circuitry. The attenuator is set to maintain ±0.10 V dc or ac rms full scale into the Volts Buffers. To give a ±1 V full scale signal to the V/F Converter, the buffers multiply by 10.

DC VOLTS BUFFER. The DC Volts Buffer buffers dc input voltages, sending the resultant signal to the V/F Input Multiplexer.

Input voltages first pass by U5060B, an active low pass filter. It removes both input noise and FET switching noise from the input signal. FET Switch Q5070A and Q5070B, selects either the unknown input voltage or the voltage reference (OFFSET or INPUT REF). Operational amplifier U5060A maintains proper bias on the FET switch, with varying input voltages. The B5 and $\overline{\text{B5}}$ Digital Control signals control the FET switch.

Operational amplifier U4970 amplifies the selected input signal. FET switches U4950C and U4950D control the feedback resistance and therefore the gain of the operational amplifier. The B6 Digital Control signal controls the FET switches. A LO on the control input (pin 16 or pin 9) of one of the FET switches closes the switch.

AC VOLTS BUFFER. The AC Volts Buffer buffers ac input voltages, converts the ac voltage to dc, and then sends the resultant signal to the V/F Input Multiplexer.

Operational amplifier U5151B buffers the ac input voltage. VR5160, VR5162, R5167, R5168, CR5163, and CR5164 protect the amplifier's input. The output of the operational amplifier is sent to operational amplifier U5151A. FET switches U5150C and U5150D control the operational amplifier's feedback resistance and therefore its gain. The C7 Digital Control signal controls the FET switches. A LO on the control input (pin 16 or pin 9) of one of the FET switches closes the switch. The output of the operational amplifier is converted to dc by rms-to-dc converter U5140.

V/F INPUT MULTIPLEXER. The V/F Input Multiplexer selects one signal from the DMM Input Circuit. The selected signal is sent to the V/F Converter. Signal selection is controlled by Digital Control signals B2, B3, and B4. The signal selected is either the output of the AC Volts Buffer (AC X1 or AC ÷10), the output of the DC Volts Buffer (DC X1 or DC ÷10), the −2 V REF, the Ground REF, or the AMPS ST signal.

OHMS CURRENT SOURCE. The Ohms Current Source generates the constant currents used to make resistance measurements. Also contained in the circuitry are the voltage references used by the current source and those used in all measurement sequences.

The voltage references are produced by U5050, R5049, R5054, R5055, and R5056. The Ohms Current Source uses the −6.95 V reference. The −2.0 V or −0.20 V reference is measured during reference measurement cycles. FET switch U4942B selects one of the references. The A6 Digital Control signal controls the FET switch. FET switch U4942A selects either the selected reference or the ground offset. The offset is measured during an offset measurement cycle. The A5 Digital Control signal controls the FET switch. For ac measurements, the −2.0 V reference is always used, and the V/F Input Multiplexer selects the −2.0 V reference and the offset directly.

The voltage drop across R4951 determines the current through Q4952. The voltage reference of −6.95 V is at one end of the resistor. FET switch U4942C, controlled by the A7 Digital Control signal, selects either −6.26 V or 0.0 V for the other end of the resistor. Voltage follower U5040 buffers the selected voltage.

The resulting current through Q4952 (either 1 mA or 0.1 mA) is divided by either 1 or 10 by R4957 and FET switches U4950A and U4950B, the negative feedback loop for operational amplifier U4960. The positive feedback loop for U4960 drops the same voltage as its negative feedback loop. The B0 Digital Control signal controls the negative feedback; the B1 Digital Control signal controls the positive feedback. The selections for each Ohms range are shown in Table 4-4.

The Voltage Clamp, CR4980 and CR4981, keeps the output voltage between −0.7 V and 5.7 V and protects the current source from over-voltage inputs.

V/F Converter and Digital Control

The V/F Converter and Digital Control circuitry (see Diagram 29) generates a frequency that is inversely proportional to the voltage received from the input circuit. It also contains the registers which control the DMM Input Circuit hardware.

VOLTAGE-TO-CURRENT CONVERTER. The V/F Input Multiplexer (U5020, Diagram 28) selects the input to the Voltage-to-Current Converter. Selected input is converted to a current and inverted by operational amplifiers U5030A and U5030B. The current, which is inversely proportional to the input voltage, passes through Q4934 and charges integrating capacitor C4914 negatively.

INTEGRATING CAPACITOR. Integrating Capacitor C4914 is charged negatively by the Voltage-to-Current

Table 4-4
Ohms Selections

Range	Low-Voltage Ranges			High-Voltage Ranges		
	Output Current	Current at Q4952	Output Voltage Full Scale	Output Current	Current at Q4952	Output Voltage Full Scale
200 Ω	1 mA	1 mA	0.2 V			
2 kΩ	100 μA	0.1 mA	0.2 V	1 mA	1 mA	2 V
20 kΩ	10 μA	0.1 mA	0.2 V	100 μA	0.1 mA	2 V
200 kΩ	1 μA	0.1 mA	0.2 V	10 μA	0.1 mA	2 V
2 MΩ	100 nA	0.1 mA	0.2 V	1 μA	0.1 mA	2 V
20 MΩ				100 nA	0.1 mA	2 V

Converter. If the Current Source is turned on by the comparator, the Current Source charges the capacitor positively. The Comparator senses the charge on the capacitor; if the charge on the capacitor drops below zero volts, the comparator turns on the Current Source. Each time the Current Source is turned on it charges the capacitor for the same length of time. The voltage on the capacitor ramps down at a rate determined by the input signal. Once the capacitor's voltage goes below zero volts, the voltage on the capacitor ramps up at a rate determined by the input signal and the Current Source.

COMPARATOR. The Comparator senses the charge on the Integrating Capacitor, controls the Current Source, and sends a frequency, which is inversely proportional to the option's input, to the Digital Counter.

If the charge on the capacitor drops below zero volts, the collector of Q4932 goes HI. The HI enables the Current Source (U4932B, pin 12), and is inverted LO by U4920D. The LO is buffered by Q5130 and sent to the Digital Counter. This signal starts and stops all measurements and is counted to determine the measurement.

Whenever the microprocessor is loading the Digital Control circuitry with the hardware control information, ENL (U5130B, pin 3) stops the Comparator from sending the frequency signal to the Digital Counter. Whenever control information is being sent, ENL is LO. The LO is inverted HI by U5130B. The HI prevents the Comparator from sending frequency information to the Digital Control circuitry by holding the output of U4920D LO. The Digital Counter ignores its input during this time (see Delay Generator).

CURRENT SOURCE. The Current Source charges the Integrating Capacitor in the positive direction whenever the Current Source is enabled by the Comparator.

Crystal Y4910 and U4920C make up a 3.58-MHz crystal oscillator. This clock is buffered and inverted by both U4920A and U4920B.

When the Comparator senses that the charge on the Integrating Capacitor is below zero volts, its output (collector of Q4932), going to pin 12 of U4932B, goes HI. The next time the clock goes HI (U4932B, pin 11), U4932B sets, making pin 8 LO. The LO at pin 8 causes counter U4930 to be loaded with zeros, making MAX/MIN (U4930, pin 12) LO. Flip-flop U4932A resets when the next rising edge of the clock arrives at pin 3 of U4932A. Resetting U4932A switches the current source for Q4920 from ground to the Integrating Capacitor and resets U4932B, removing the load signal from counter U4930.

The amount of current removed from the Integrating Capacitor is determined by Q5020. Counter U4930 controls the length of time the current is removed. The counter counts the oscillator clocks at pin 14. When the maximum count (15) is reached, MAX/MIN pin 12 goes HI. The next rising clock at pin 3 of U4932A sets U4932A, switching the current source for Q4920 back to ground.

The current from the Current Source charges the Integrating Capacitor up past zero volts. The amount of charge and the time of charge is always the same: the constant current through Q5020 and Q4920 for 16 cycles of the crystal oscillator (see Figure 4-2). The frequency of these charge cycles (about 20 kHz at 2 V, 40 kHz at 0.0 V, and 70 kHz at −2 V) varies inversely with the DMM's input.

DIGITAL CONTROL. The Digital Control circuitry stores the hardware control words (relays and FET switches that determine the measurement path). As explained later, the Register Control circuitry serially shifts the hardware control words to the Digital Control circuitry. Due to transformer coupling in the Register Control circuitry, U5124 only sees the rising and falling edges of the CLK (pin 10) and DATA (pin 7) signals. The signals are reconstructed by line receiver U5124. The reconstructed data is clocked into the 24-bit register by the reconstructed clock signal (see Figure 4-2). Three serial-input parallel-output latches (U5122, U5120, and U4940) make up the 24-bit register. The control signals are buffered and inverted by U5132, U5130, U5010, and Q4950.

When digital control words are not being written, the V/F Converter (Comparator) uses the DATA line. Before the digital control words can be written, the V/F Converter's information must be stopped. Sending an ini-

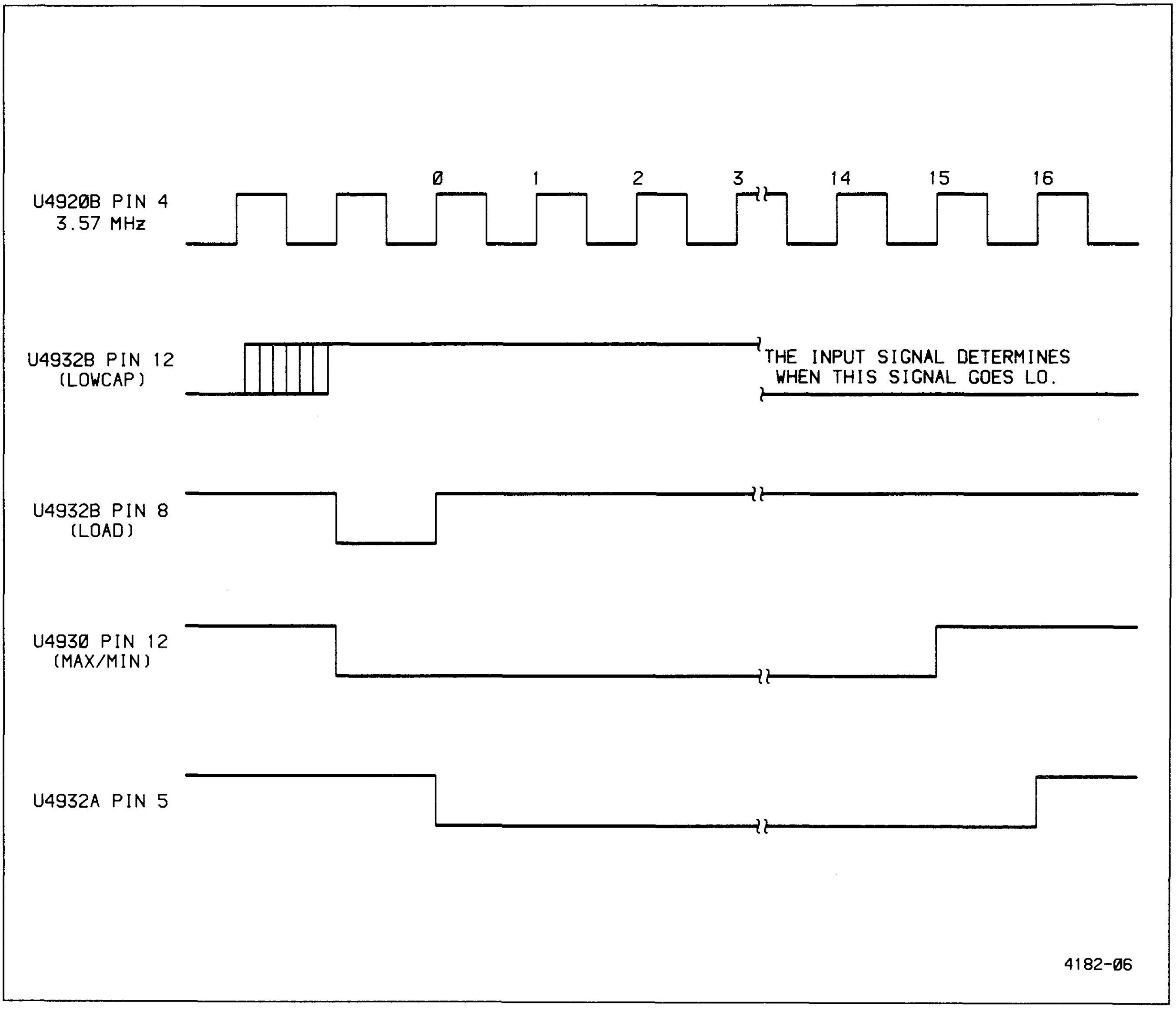

Figure 4-2. Current Source Timing Diagram.

tial series of CLK pulses stops the information. The pulses discharge C5130. The LO on C5130 is inverted HI by U5130B. The HI on pin 11 of U4920D keeps its output LO, stopping the V/F Converter's information.

When the CONT button is pushed, the continuity function is calibrated by measuring the 10-Ω current shunt (the 10-Ω reference). The instrument then enters the 200-Ω unknown position and takes measurements. The state of the control signals, in hexadecimal, for each DMM operating mode is shown in Tables 4-5 through 4-13.

Digital Counter and Processor Interface

The Digital Counter and Processor Interface (see Diagram 30) contains the option's microprocessor interface, Counters, Delay Generator, and Register Control circuitry. Included in the microprocessor interface is the option's memory, buffers, registers, and latches that interface the option to the microprocessor. The counters count clocks used in calculating measurements. The Delay Generator delays each measurement's start until the hardware (relays and FET switches) settles. The Register Control circuitry loads the Digital Control registers and isolates instrument circuitry from the voltages possible at the DMM inputs.

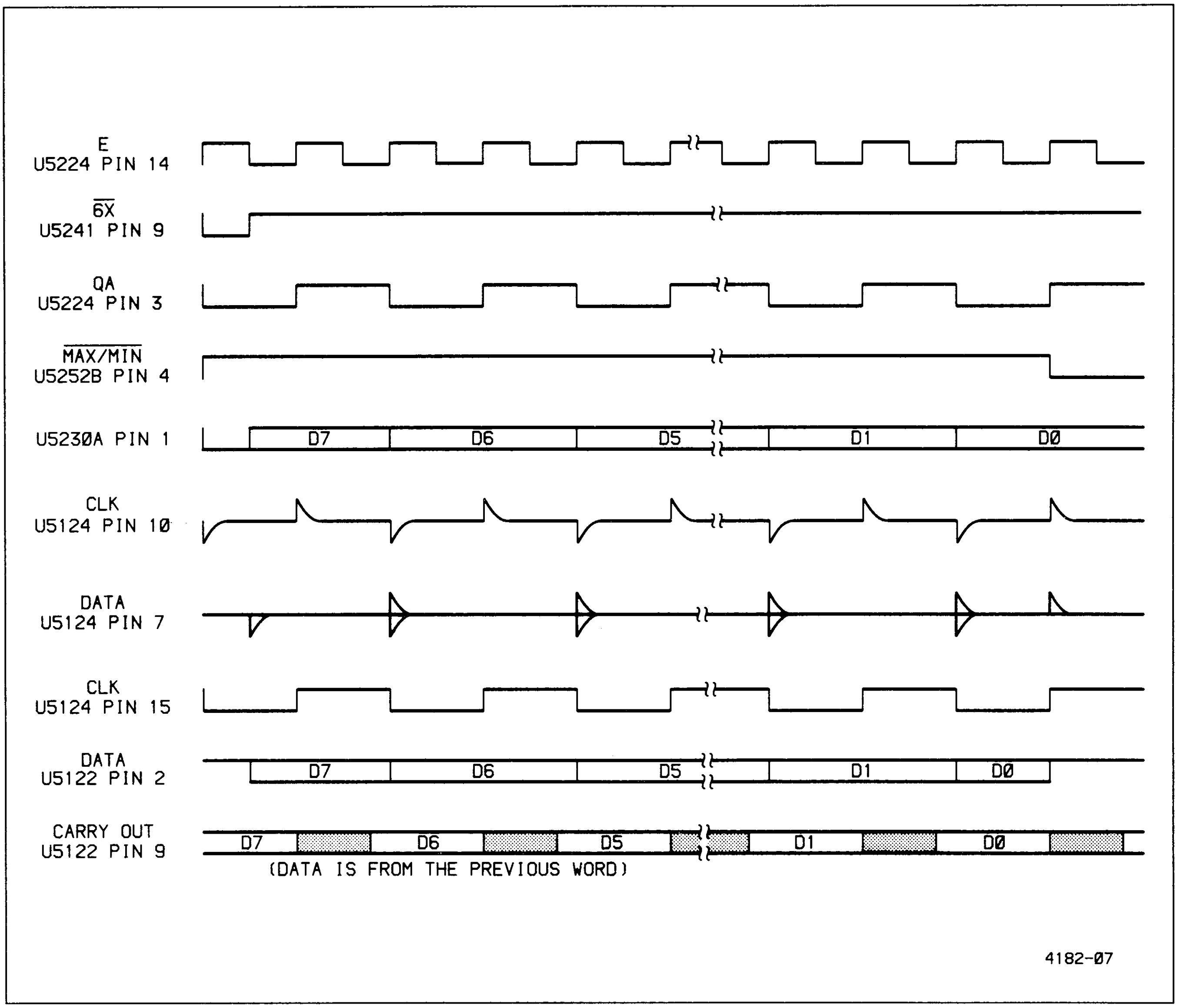

Figure 4-3. Digital Control timing diagram.

Table 4-5
Continuity

	A	B	C
Calibration	E5	36	00
Measurement	E0	B6	22

Table 4-6
LO Ω Control Signals

Range	Unknown A	Unknown B	Unknown C	Reference A	Reference B	Reference C	Offset A	Offset B	Offset C
200 Ω	E0	B6	22	C0	96	22	E0	96	22
2 kΩ	60	B6	22	40	96	22	60	96	22
20 kΩ	60	B7	22	40	97	22	60	97	22
200 kΩ	60	B4	22	40	94	22	60	94	22
2 MΩ	60	B5	22	40	95	22	60	95	22

Table 4-7
HI Ω Control Signals

Range	Unknown A	Unknown B	Unknown C	Reference A	Reference B	Reference C	Offset A	Offset B	Offset C
2 kΩ	E0	F6	22	80	D6	22	E0	D6	22
20 kΩ	60	F6	22	00	D6	22	60	D6	22
200 kΩ	60	F7	22	00	D7	22	60	D7	22
2 k	60	F4	22	00	D4	22	60	D4	22
20 kΩ	60	F5	23	00	D5	22	60	D5	22

Table 4-8
DC Volts Control Signals

Range	Unknown A	Unknown B	Unknown C	Reference A	Reference B	Reference C	Offset A	Offset B	Offset C
.2 V	60	B4	2X	40	94	2X	60	94	2X
2 V	60	F4	2X	00	D4	2X	60	D4	2X
20 V	60	74	04	00	54	04	60	54	04
200 V	60	74	24	00	54	24	60	54	24
500 V	60	64	24	00	44	24	60	44	24

X is 0 if input Z is > 1 GΩ, and X is 4 if input Z = 10 MΩ.

Table 4-9
AC Volts Control Signals

Range	Unknown A	Unknown B	Unknown C	Reference A	Reference B	Reference C	Offset A	Offset B	Offset C
.2 V	6X	0C	88	6X	10	88	6X	00	88
2 V	6X	0C	08	6X	10	08	6X	00	08
20 V	6X	0C	98	6X	10	98	6X	00	98
200 V	6X	0C	18	6X	10	18	6X	00	18
500 V	6X	1C	18	6X	10	18	6X	00	18

The value of X is set during calibration; the value depends on the amount of frequency compensation required. Also, since X is a 5-bit word, the 6X could be a 7X.

Table 4-10
DC Amps Control Signals

Range	Unknown A	Unknown B	Unknown C	Reference A	Reference B	Reference C	Offset A	Offset B	Offset C
100 μA	71	34	40	51	14	40	71	14	40
1 mA	69	34	40	49	14	40	69	14	40
10 mA	65	34	40	45	14	40	65	14	40
100 mA	63	34	40	43	14	40	63	14	40
1 A	60	34	40	40	14	40	60	14	40

Table 4-11
AC Amps Control Signals

Range	Unknown A	Unknown B	Unknown C	Reference A	Reference B	Reference C	Offset A	Offset B	Offset C
100 μA	71	4C	C0	71	50	C0	71	40	C0
1 mA	69	4C	C0	69	50	C0	69	40	C0
10 mA	65	4C	C0	65	50	C0	65	40	C0
100 mA	63	4C	C0	63	50	C0	63	40	C0
1 A	60	4C	C0	60	50	C0	60	40	C0

Table 4-12
Control Signals to Measure AC Volts Offset at Calibration

Range	Unknown A	Unknown B	Unknown C	Reference A	Reference B	Reference C	Offset A	Offset B	Offset C
.2 V	70	4C	81	70	50	81	70	40	81
2 V	70	4C	01	70	50	01	70	40	01
20 V	70	0C	11	70	10	11	70	00	11
200 V	70	4C	11	70	50	11	70	40	11
500 V	70	5C	11	70	50	11	70	40	11

Table 4-13
Control Signals to Measure AC Amps Offset at Calibration

Range	Unknown A	Unknown B	Unknown C	Reference A	Reference B	Reference C	Offset A	Offset B	Offset C
All	F1	4E	83	F1	52	83	F1	42	83

MEMORY AND I/O DECODERS. This circuitry generates enabling signals and strobes that allow the microprocessor to control the various circuit functions and devices as in the standard oscilloscope (see "Address Decode" description in the Service manual of the standard oscilloscope). The DMM option memory map is shown in Table 4-14.

OPTION SELECT REGISTER. The Option Select Register U5251B enables and disables access to DMM circuitry.

When there is a write to address 7FFF, data bus line BBD6 is latched by the register. If BBD6 is HI when latched, DMM circuitry is selected for memory and I/O accesses within the paged address space (4000-7FFF). If BBD6 is LO when latched, the DMM is deselected. While the DMM is deselected, the Option Select Register is the only DMM circuitry that can be accessed by the microprocessor.

DATA BUS BUFFER. Bidirectional buffer U5282 buffers the data bus.

The buffer is enabled by BVMA, BA14, E, and the Option Select Register through U5232A and U5242A. BR/$\overline{W}$ through U5270A controls the direction of data flow through the buffer.

EPROM. The EPROM stores the option's control program.

Table 4-14
DMM Option Memory Map

Address	Device Description
0820-0823	Extended front panel switches
4000-7FFF	Data bus buffer
4000-7F7F	EPROM
7F80	Tone control register (set)
7F81	Tone control register (reset)
7F82	Flip-flop U5273B (set)
7F83	Flip-flop U5273B (reset)
7F84	Delay generator (set)
7F85	Status register
7F86	Register control (shift/load)
7F87	EPROM select register
7F88-7F8F	Timer U5272 registers
7F90-7F97	Address decoder image
7F98-7F9F	Timer image
7FA0-7FA7	Address decoder image
7FA8-7FAF	Timer image
7FB0-7FB7	Address decoder image
7FB8-7FBF	Timer image
7FC0-7FFE	Option select register images
7FFF	Option select register

The Option Select Register, through U5271A and U5271B, enables both EPROM U5280 and U5281. EPROM data is sent over the data bus when an EPROM address is decoded by U5242A and U5250 through U5270D, U5271D, and U5232A.

If both EPROMs are used, the EPROM Select Register (U5251A) allows only one EPROM to be enabled at a time. When the register's address is decoded by U5241, the register latches D0. If D0 was HI, U5281 is enabled; if D0 was LO, U5280 is enabled.

If only EPROM U5281 is used, jumper W5260 will connect U5271 pin 1 and pin 10. This enables the EPROM whenever the option is selected.

REGISTER CONTROL. The Register Control circuitry loads the hardware control word into the Digital Control register.

The DMM Input Circuit hardware (relays and FET switches that determine the measurement path) is controlled by writing three 8-bit words in succession (A, B, and C) to shift register U5240. The microprocessor writes the three words every 150 ms, once to set up each unknown, offset, and reference measurement. Each write loads shift register U5240 and resets counter U5242. The counter then outputs eight clock pulses at one-half the microprocessor clock (E) rate. The eight pulses shift the word through U5240.

The word (DATA) is sent to the Digital Control circuitry through U5242B, U5230A, and T5230. The DATA is only sent when the shift register is not being loaded and the counter is not at its maximum count. The same CLK used to shift the word out of the shift register is sent to the Digital Control circuitry through U5230B and T5220.

Before sending each group of three words, part of another word is sent. The sending of this word disables the V/F output clock which also uses the data path through T5230.

Transformers T5230A and T5230B isolate the Digital Counter, Processor Interface, and Extended Front Panel circuitry from the floating ground and high input potentials associated with the rest of the circuitry.

DELAY GENERATOR. The Delay Generator delays the start of a measurement. The delay starts after the Register Control circuitry has loaded the Digital Control registers. This delay allows the measurement path (relays and FET switches) to settle before a measurement is taken.

Whenever counter U5224 is not at its maximum count, reset, or counting, counter U5231 and flip-flop U5222A are reset. While the flip-flop is reset, counters U5272 and U5274 do not count. When the Digital Control register (see Diagram 29) has been loaded, U5224 will be at its maximum count. The MAX/MIN output (U5224, pin 2) goes HI, removing the reset hold it had on both U5231 and U5222A. This is the start of the delay. Counter U5231 then counts the 25-kHz clock (5.5 V ac) at U5231 pin 10.

About 50 ms after the start of the delay, pin 15 of U5231 goes HI. If DATA (C0) was HI, U5222A sets, ending the delay. If, however, the option is in its 20-MΩ range, DATA will be LO, keeping U5222A reset. In this case, the delay lasts about 400 ms. The delay ends when pin 3 of U5231 goes HI, stopping counter U5231 through CR5211, and setting U5222A through U5252A, U5232C, and U5252C. In both cases, counter U5272 starts counting V/F pulses once U5222A is set.

If the DMM mode is changed by pushing a front panel switch, the microprocessor does not wait for the delay to end. When the mode is changed, the microprocessor writes to address 7F84, making U5241 pin 11 LO. This sets U5222A through U5252C and U5232C, ending the delay.

COUNTERS. Timer U5272 takes all measurements. The timer contains three programmable counters. Except for Continuity and some Diagnostics modes, the timer is programmed as follows:

Counter 1 counts V/F clock pulses. Counting starts when the counter's gate goes LO. When the gate goes HI, counting stops and the measurement-complete bit is set.

Counter 2 counts the most-significant bits of the 10-MHz clock over the same interval as Counter 1.

Counter 3 counts the internal E clock. The counter produces the 0.1-s measurement interval, outputting a positive 0.1-s pulse when its gate goes LO.

Counting does not start until after the Delay Generator's delay has ended. When the delay ends, Counter 3 starts and its output goes HI. The first V/F clock after the output of Counter 3 goes HI starts Counters 1 and 2. The first V/F clock after Counter 3 goes LO (0.1-s measurement interval ends) stops Counters 1 and 2. When Counter 1 stops (its gate goes HI), Counters 1 and 2 are read and the measurement calculated (see Figure 4-4). Three of these measurements are required to display a reading; the unknown measurement measures the input signal, the offset measurement measures zero volts, and the reference measurement measures the −0.2 V or the −2 V reference. After all three measurements are made, the measurement to be displayed is calculated and then displayed.

At the start of the delay period, pin 2 of U5274A, pin 2 of U5272, and pin 5 of U5272 all go HI. This resets the least-significant bits, from the previous measurement, of the 10-MHz counter (U5274A) and prevents Counters 2 and 3 from counting. When Counter 3 is not counting, its output (U5272, pin 6) is LO.

When the delay ends (pin 6 of U5222A goes LO), DELAY goes LO enabling Counter 3. When Counter 3 is enabled, it starts counting and its output (U5272, pin 6) goes HI. This HI, at pin 12 of U5273B, allows U5273B to set when the next V/F clock arrives (at pin 11 of U5273B). When U5273B is set, Counter 1 and U5273A are both enabled. Counter 1 starts counting the V/F clocks, and the 10-MHz counter (U5273A, U5274A, and Counter 2) starts counting the B10MHZ clocks.

This counting continues until the measurement interval ends. At the end of the interval, the output of Counter 3 goes LO (U5272, pin 6). This LO allows U5273B to be reset when the next V/F clock arrives. The reset U5273B stops Counter 1 and sets U5273A, stopping the 10-MHz counter.

The V/F clock is stretched and inverted by Q5230, U5271B, U5274B, and U5252D. When the V/F clock goes LO, Q5230 turns on. This makes pin 12 of U5274B HI, resetting U5274B. This makes pin 9 of U5252 LO. This signal stays LO until four E clocks, through U5271B, are counted by U5274B. This stretched V/F clock is inverted by U5252D.

TONE CONTROL. The Tone Control circuitry generates a tone when the resistance measured in Continuity mode is less than 10 Ω. This circuitry is only used in Continuity mode.

At the start of Continuity mode, a 10-Ω resistance is measured. The count obtained in Counter 1 during the measurement is used for each initialization of Counter 1 for the duration of Continuity mode. Counter 2 is set up to

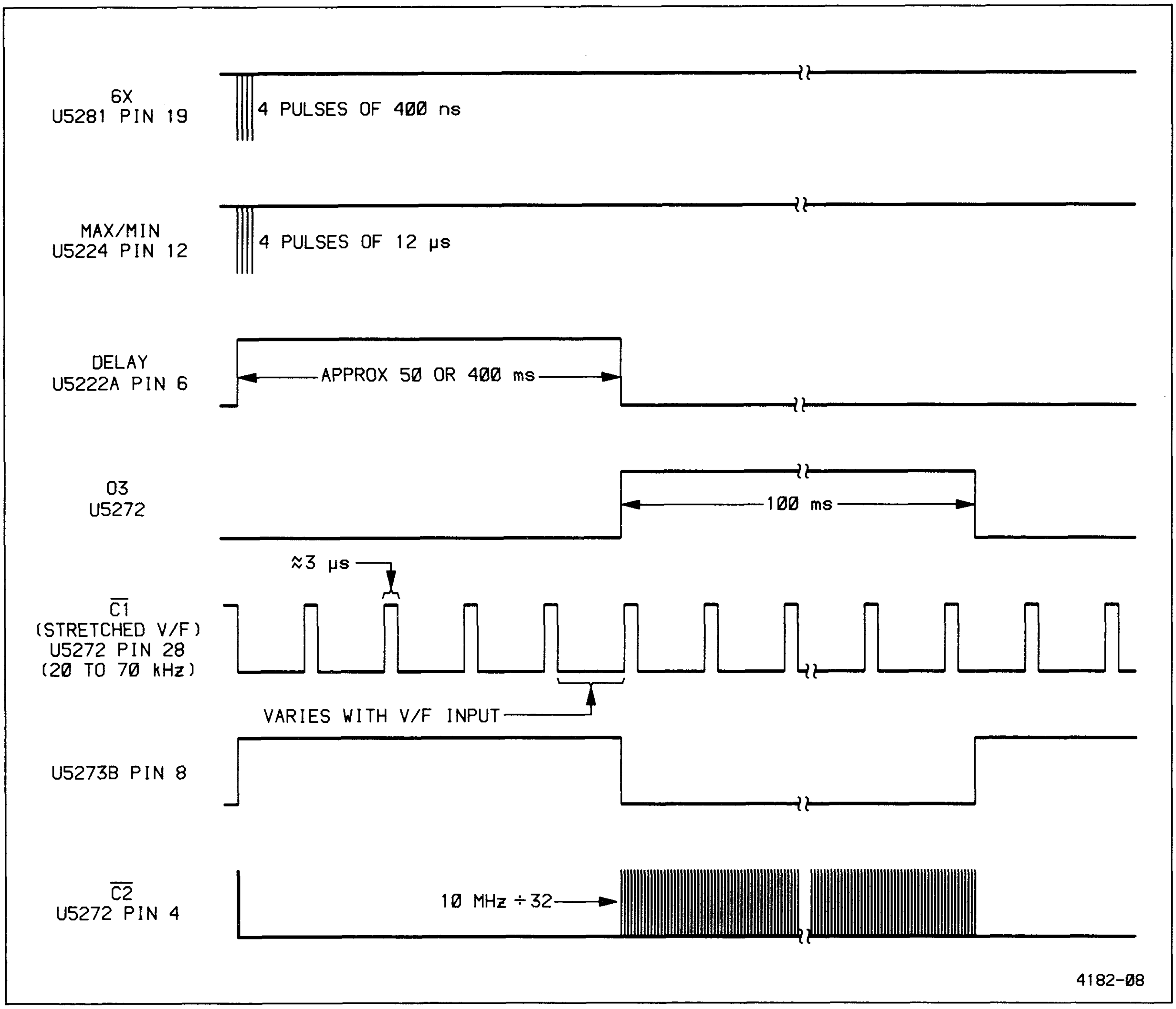

Figure 4-4. Digital Counter timing diagram.

produce the tone selected for continuity measurements. Counter 3 is set up to produce the measurement interval, which for Continuity mode is about 20 ms.

Counter 2 is always producing a tone signal in Continuity mode. Flip-flop U5222B determines whether or not the tone reaches the speaker. If the flip-flop is set, CR5212 is reverse biased, allowing the tone to reach Q5210. If the flip-flop is set, Q5210 inverts the tone signal and drives the speaker located in the Extended Front Panel circuitry. If the flip-flop is reset, CR5210 is forward biased, stopping the tone before it reaches Q5210.

Since Counter 1 is initialized to the count obtained for a 10-Ω resistance, if the resistance being measured is less than or equal to 10 Ω, the counter counts down to zero within the measurement interval. When the counter reaches zero, its output goes HI. If the resistance being measured is greater than 10 Ω, the counter will not reach zero, and its output will remain LO.

At the end of each measurement interval, the output of Counter 3 goes HI. This HI clocks the output of Counter 1 into flip-flop U5222B. If the output of Counter 1 is HI (resistance is 10 Ω or less), the flip-flop sets and the tone sounds. If the output of the counter is LO (resistance is greater than 10 Ω) the flip-flop resets and the tone does not sound.

STATUS REGISTER. The microprocessor reads the Status Register whenever the register's address is decoded by U5241 during a read operation. The register contains the least-significant bits of the 10-MHz counter (U5274A), the output of the Register Control's shift register (U5240), and the state of the Tone Control flip-flop.

Extended Front Panel

The Extended Front Panel circuitry (see Diagram 31) contains the Continuity Indicator, I/O Decoders, Extended Front Panel Switches, and the Switch Column Buffer.

CONTINUITY INDICATOR. The Continuity Indicator is a speaker driven by the Tone Control circuitry during Continuity measurements.

I/O DECODERS. The I/O Decoders decode addresses from the microprocessor, generating strobes for the Extended Front Panel Switches (U4310A and U4310B, pin 12). Decoder outputs are buffered by U4300.

EXTENDED FRONT PANEL SWITCHES. The Extended Front Panel Switches are pushed to select the desired DMM operating mode.

The switches are arranged in three rows and five columns. When the microprocessor wants to see if a switch has been pushed, it consecutively reads each row of switches. The row of switches being read is pulled LO by U4310A when the row's address is decoded. If the row being read has a switch pushed in, the column the switch is in is LO. Each read of a switch row returns the state of all five switch columns.

SWITCH COLUMN BUFFER. The Switch Column Buffer buffers the five switch columns, driving the data bus with switch column data whenever the switches are read.

Power Distribution

The Power Distribution circuitry (see Diagram 32) contains the floating power supplies used by the DMM circuitry and distributes both the floating supplies and the standard instrument's 5-V supply to the DMM.

PERFORMANCE CHECK AND ADJUSTMENT PROCEDURES

INTRODUCTION

This section contains the Option 01 (DMM) portion of the instrument performance check and calibration procedures. The "Performance Check Procedure" is used to verify that the instrument meets the "Performance Requirements" listed in Table 4-1. The "Adjustment Procedure" is used to restore optimum performance or return the option to conformance with its "Performance Requirements" as listed in Table 4-1.

Instrument performance should be checked after every 2000 hours of operation or once each year if used infrequently. A more frequent interval may be necessary if the instrument is subjected to harsh environments or severe usage. The results of these periodic checks will determine the need for recalibration.

Before performing these procedures, ensure that the LINE VOLTAGE SELECTOR switch is set for the ac power source being used (see Section 2 of the standard instrument Service manual). Connect the instrument to be checked and the test equipment to an appropriate power source.

LIMITS AND TOLERANCES

The tolerances given in this procedure are valid for an instrument that has been previously calibrated in an ambient temperature between +20 °C and +30 °C and is operating in an ambient temperature between −15°C and +55°C. The instrument must also have had at least a 45-minute warm-up period. To assure instrument performance, perform all steps in the following procedures at the same ambient temperature. When performing these checks, it is assumed that the standard instrument meets all of its "Performance Requirements" as stated in Section 1 of the standard instrument Service manual.

TEST EQUIPMENT

All the test equipment items listed in Table 4-15 are required to accomplish both the "Performance Check Procedure" and the "Calibration Procedure." To assure accurate measurements, it is important that the test equipment used to calibrate the option meets or exceeds the specifications described in the table. When considering use of equipment other than that recommended, use the "Minimum Specification" column to determine whether available test equipment will be adequate.

The procedures in this section are written using the equipment listed in Table 4-15. When substitute equipment is used, control settings stated in the test setup and in the procedures may need to be altered.

Detailed operating instructions for the test equipment are not given in this procedure. If more operating information is needed, refer to the appropriate test-equipment instruction manual.

Table 4-15
Test Equipment Required

Item and Description	Minimum Specification	Examples of Suitable Test Equipment
1. Calibrator	Dc voltage: 180 mV to 450 V. Voltage accuracy: 0.0075%. Resistance accuracy: 0.025%. Dc current: 10 μA to 900 mA. Current accuracy: 0.03%. Ac current: 10 μA to 900 mA. Current accuracy: 0.01%.	Fluke 5101B with Option 03.
2. Ac Calibration System	Ac voltage: 20 mV to 450 V. Voltage accuracy: 0.2%. Frequency: 50 Hz to 50 kHz.	Fluke 5101B and 5205A.
3. Cable	Impedance: 50 Ω.	Tektronix Part No. 012-0057-01.
4. Adaptor (2 required)	BNC-Female-to-Dual Banana.	Tektronix Part No. 103-0090-00.
5. Adaptor	Connectors: BNC-Male-to-Dual Binding Post.	Tektronix Part No. 103-0035-00.
6. Adaptor	BNC-Female-to-BNC-Female.	Tektronix Part No. 103-0028-00.
7. Patch Cord	Banana-Plug-to-Banana Plug.	Tektronix Part No. 012-0039-00.
8. Resistor	1 kΩ ¼ W.	

PERFORMANCE CHECK PROCEDURE

This procedure is used to verify proper operation of the option and may be used to determine the need for adjustment. This check may also be used as an acceptance test and as a preliminary troubleshooting aid. Perform all steps, both in the sequence presented and in their entirety, to ensure that control settings are correct for the following step.

PREPARATION

Removing the wrap-around cover is not necessary to perform this procedure. All checks are made using operator-accessible controls and connectors.

Turn on the instrument and ensure that no error message is displayed on the CRT. If the instrument displays **"DIAGNSTIC. PUSH A/B TRIG TO EXIT"** at power on, one of the power-up tests has failed. If the error message on the bottom line of the CRT is **"TEST 04 FAIL XX"** where XX is X1, 1X, or 11, the stored calibration data is in error and the instrument should be recalibrated by a qualified service technician before performing the "Performance Check Procedure." If any other error messages occur, the failure is probably not related to calibration and the instrument should be repaired by a qualified service technician before performing either procedure.

DMM OPTION CHECKS

1. Check Dc Volts Accuracy

a. Connect the calibrator via a BNC-female-to-dual banana adaptor, a 50-Ω cable, and a BNC-female-to-dual banana adaptor to the HIGH and LOW DMM input connectors.

b. Select the DC V function.

c. CHECK—Reading is within the limits shown in Table 4-16 for each dc calibrator output voltage.

Table 4-16
Dc Voltage Readout Checks

Calibrator Dc Voltage (V)	Display Readout Limits (V)
180 m	179.93 m to 180.07 m
−180 m	−179.93 m to −180.07 m
1.8	1.7993 to 1.8007
−1.8	−1.7993 to −1.8007
18	17.993 to 18.007
−18	−17.993 to −18.007
180	179.93 to 180.07
−180	−179.93 to −180.07
450	449.7 to 450.3
−450	−449.7 to −450.3

2. Check Ac Volts Accuracy

a. Select the AC V function.

b. CHECK—Reading is within the limits shown in Table 4-17 for each ac calibrator output voltage.

c. Disconnect the test equipment from the instrument.

WARNING

Use extreme caution when performing the following ac voltage checks. Make sure that the signal connectors are correctly oriented so that ac voltage is not present on any exposed metal pieces.

d. Connect the ac power amplifier by means of a BNC-male-to-dual binding post adaptor, a BNC-female-to-BNC female adaptor, a 50-Ω cable, and a BNC-female-to-dual banana adaptor to the HIGH and LOW DMM input connectors.

e. CHECK—Reading is within the limits shown in Table 4-18 for each ac calibrator output voltage.

f. Disconnect the test equipment from the instrument.

Table 4-17
Ac Voltage Readout Checks

Calibrator Ac Voltage (V)	Frequency (Hz)	Display Readout Limits (V)
20 m	50	19.68 m to 20.32 m
180 m	50	178.72 m to 181.28 m
	10 k	178.72 m to 181.28 m
0.2	50	0.1968 to 0.2032
1.8	50	1.7872 to 1.8128
	10 k	1.7872 to 1.8128
2	50	1.968 to 2.032
18	50	17.872 to 18.128
	10 k	17.872 to 18.128
	20 k	17.800 to 18.200
	50 k	17.080 to 18.920
20	50	19.68 to 20.32
180	50	178.72 to 181.28
450	50	446.3 to 453.7

Table 4-18
Ac Voltage Readout Checks

Calibrator Ac Voltage (V)	Frequency (Hz)	Display Readout Limits (V)
180	10 k	178.72 to 181.28
	20 k	178.00 to 182.00
	50 k	170.80 to 189.20
450	10 k	446.3 to 453.7
	20 k	444.5 to 455.5

3. Check Resistance Accuracy

a. Connect the calibrator by means of a BNC-female-to-dual banana adaptor, a 50-Ω cable, and a BNC-female-to-dual banana adaptor to the HIGH and LOW DMM input connectors.

b. Select the LO Ω function.

c. CHECK—Reading is within the limits shown in Table 4-19 for each calibrator output resistance.

d. Select the HI Ω function.

e. CHECK—Reading is within the limits shown in Table 4-20 for each calibrator output resistance.

Table 4-19
LO Ω Readout Checks

Calibrator Resistance (Ω)	Display Readout Limits (Ω)
100	99.70 to 100.30
1 k	0.9988 k to 1.0012 k
10 k	9.988 k to 10.012 k
100 k	99.88 k to 100.12 k
1 M	0.9973 M to 1.0027 M

Table 4-20
HI Ω Readout Checks

Calibrator Resistance (Ω)	Display Readout Limits (Ω)
2 k	1.9978 k to 2.002 k
10 k	9.988 k to 10.012 k
100 k	99.88 k to 100.12 k
1 M	0.9973 M to 1.0027 M
10 M	9.948 M to 10.052 M

4. Check Continuity Function

a. Set the calibrator to produce a 1-Ω output resistance.

b. Select the CONT function.

c. CHECK—The instrument produces an audible tone.

5. Check Dc Current Accuracy

a. Select the DC A function.

b. CHECK—Reading is within the limits shown in Table 4-21 for each dc calibrator output current.

Table 4-21
Dc Current Readout Checks

Calibrator Dc Current (A)	Display Readout Limits (A)
−10 μ	− 9.97 μ to −10.03 μ
90 μ	89.89 μ to 90.11 μ
−90 μ	−89.89 μ to −90.11 μ
0.9 m	0.8989 m to 0.9011 m
−0.9 m	− 0.8989 m to −0.9011 m
9 m	8.989 m to 9.011 m
−9 m	− 8.989 m to −9.011 m
90 m	89.89 m to 90.11 m
−90 m	−89.89 m to −90.11 m
0.9	0.8989 to 0.9011
−0.9	− 0.8989 to −0.9011

6. Check Ac Current Accuracy

a. Select the AC A function.

b. CHECK—Reading is within the limits shown in Table 4-22 for each ac calibrator output current.

c. Disconnect the test equipment from the instrument.

Table 4-22
Ac Current Readout Checks

Calibrator Ac Current (A)	Frequency (Hz)	Display Readout Limits (A)
10 μ	50	9.84 μ to 10.16 μ
	1 k	9.84 μ to 10.16 μ
	5 k	9.84 μ to 10.16 μ
90 μ	50	89.36 μ to 90.64 μ
0.9 m	50	0.8936 m to 0.9064 m
9 m	50	8.936 m to 9.064 m
90 m	50	89.36 m to 90.64 m
900 m	50	893.6 m to 906.4 m

7. Check Normal and Common Mode Rejection Ratios

Connect the calibrator by means of a BNC-female-to-dual banana adaptor, a 50-Ω cable, and a BNC-female-to-dual banana adaptor to the HIGH and LOW DMM input connectors.

b. Select the DC V function.

c. Set the calibrator to produce a 60-Hz, 1.0-V output.

d. CHECK—Reading is between −1.0000 mV and +1.0000 mV.

e. Disconnect the test equipment from the instrument.

f. Connect the test setup as shown in Figure 4-5.

g. Set the calibrator to produce a 10-V dc output.

h. CHECK—Reading is between −0.1000 mV and +0.1000 mV.

i. Set the calibrator to produce a 60-Hz, 10-V output.

j. CHECK—Reading is between −10.000 mV and +10.000 mV.

k. Select the AC V function.

l. Set the calibrator to produce a 60-Hz, 10.0-V output.

m. CHECK—Reading is less than 10.000 mV.

n. Disconnect the test equipment from the instrument.

ADJUSTMENT PROCEDURE

INTRODUCTION

The "Adjustment Procedure" is used to restore optimum performance or to return the option to conformance with its "Performance Requirements" as listed in Table 4-1.

Calibration constants are generated for each of the functional ranges by the system microprocessor and are stored in nonvolatile memory. Although this procedure is designed to calibrate all DMM functions, an individual calibration routine may be performed separately if only one function is suspected of being out of calibration. For example, DM CAL 74 may be run alone if the LO Ω function is suspected of being out of calibration. See Table 4-23 for a listing of the calibration routines and the associated function that is calibrated.

Table 4-23
Calibration Routines

Calibration Routine	Ranges Calibrated
DM CAL 71	DC V
DM CAL 72	AC V
DM CAL 73	HI Ω
DM CAL 74	LO Ω
DM CAL 75	DC A
DM CAL 76	AC A
DM CAL 77	DC V input impedance selection

PREPARATION

Remove the wrap-around cabinet from the instrument as described in the "Maintenance" section of the standard instrument Service manual. Then set the CAL/NO CAL jumper (P501) in the standard instrument to the CAL position (between pins 2 and 3).

Adjustment of the instrument must be done at an ambient temperature between +20 °C and +30 °C, and the instrument must have had a warm-up period of at least 45 minutes. Performing this procedure while the temperature is drifting may cause wrong calibration settings.

DMM ADJUSTMENT

a. Connect the calibrator by means of a BNC-female-to-dual banana adaptor, a 50-Ω cable, and another BNC-female-to-dual banana adaptor to the HIGH and LOW DMM input connectors.

b. Press the Trigger SLOPE button while holding in both the ΔV and Δt buttons to access the Diagnostic Menu. The readout will display **"DIAGNSTIC. PUSH A/B TRIG TO EXIT"**.

NOTE

If the calibration feature is disabled (the CAL/NO CAL jumper is in the NO CAL position), CAL messages will not appear in the Diagnostic Menu of the CRT readout.

c. Press and hold the lower Trigger MODE button until the **DM CAL 71** message appears in the Diagnostic Menu of the CRT readout.

d. Start the calibration routine by pressing the upper Trigger COUPLING button.

e. Set the calibrator to produce the signal called for in the Diagnostic Menu of the CRT readout.

f. Start the calibration constant calculation by pressing the upper Trigger COUPLING button. The top line of the CRT readout will display **"BUSY"**.

g. Wait for the microprocessor to finish calculating the calibration constant. When finished, the **"BUSY"** display is removed and the display is updated in preparation for the calculation of the next calibration constant.

NOTE

*If the calculation of the calibration constant fails, **"OUT OF LIMIT"** is displayed in the top line of the CRT readout and the display is updated in preparation for the calculation of the next calibration constant. This will happen if the applied signal is not within tolerance or if it is not applied soon enough. If desired, the calibration constant calculation may be reattempted by pressing the lower Trigger COUPLING button and then pressing the upper Trigger COUPLING button.*

h. Repeat steps e through g until **"COMPLETE"** is displayed in the bottom line of the CRT readout.

i. Press the upper Trigger COUPLING button to exit the current calibration routine.

j. Press the upper Trigger MODE button to select the next calibration routine.

k. Repeat steps d through g until **"DM CAL 77"** is displayed in the bottom line of the Diagnostic Menu.

l. Press the upper Trigger COUPLING button. One of the following messages will be displayed on the CRT readout:

"INPUT Z ON 0.2VDC 2VDC = 10MΩ"

"INPUT Z ON 0.2VDC 2VDC > 100GΩ"

m. If the desired input impedance is not displayed, press the upper Trigger COUPLING button. The desired impedance message should now be displayed.

n. Press the lower Trigger COUPLING button to store the selected impedance. The CRT readout will then display one of the following messages:

"INPUT Z IS NOT SELECTABLE"

"INPUT Z IS SELECTABLE"

NOTE

The ability to select the input impedance of the 0.2 V dc and 2 V dc ranges using DM EXER 72 is determined by this calibration setting.

o. If the desired input impedance selection is not displayed, press the upper Trigger COUPLING button. The desired input impedance selection message should now be displayed.

p. Press the lower Trigger COUPLING button to store the desired impedance selection.

q. Press the A/B TRIG button to exit the Diagnostic Menu.

r. Disconnect the test equipment from the instrument.

s. Turn the instrument off and disconnect it from its ac power source.

t. Return the CAL/NO CAL jumper to its NO CAL position.

u. Reinstall the instrument cabinet using the reverse of the procedure outlined in the "Maintenance" section of this manual.

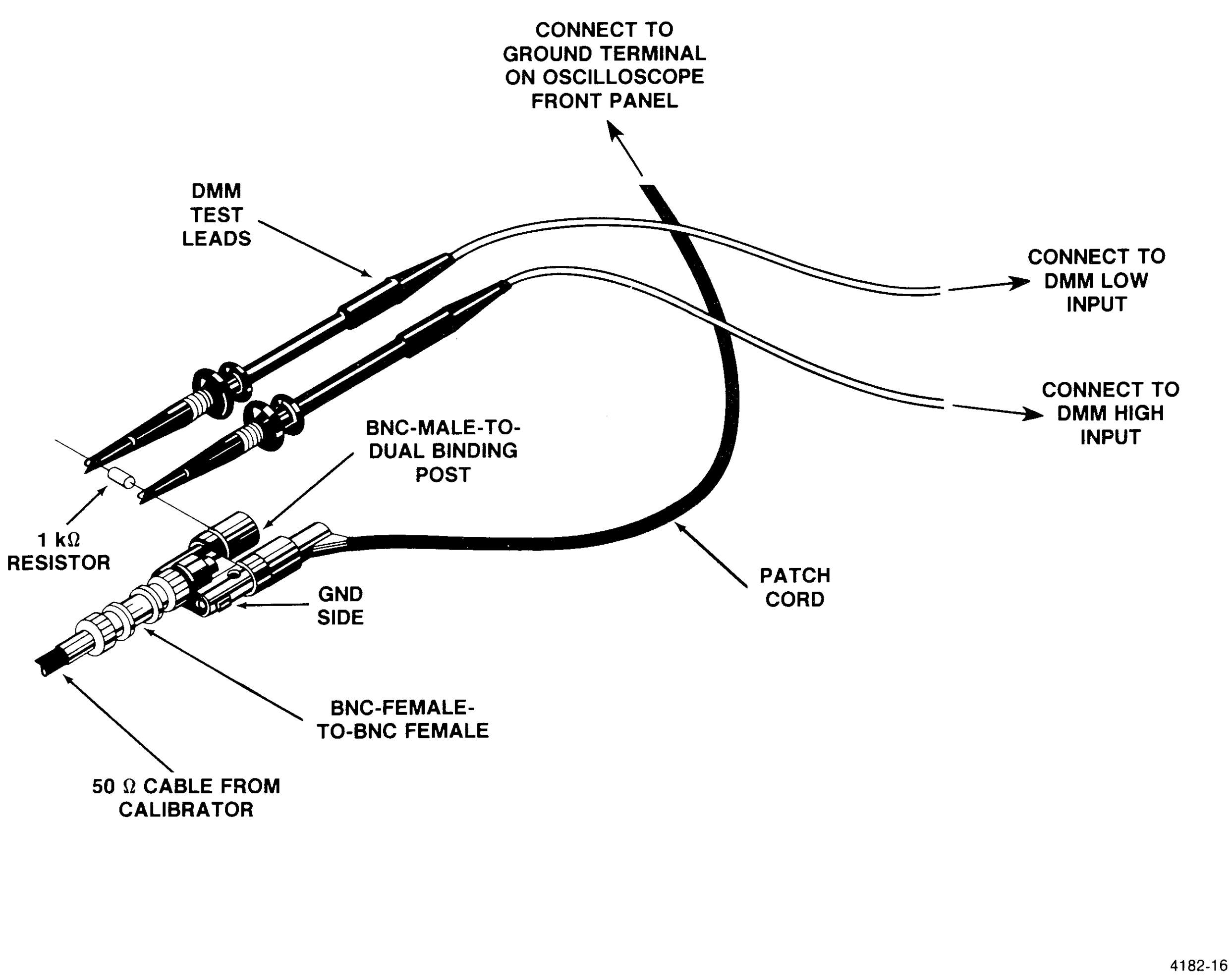

Figure 4-5. Test setup for DMM common mode check.

Section 5

MAINTENANCE

OPTIONS MAINTENANCE

This section contains information for troubleshooting the 24X5B/2467B Options. Maintenance information contained in the Service manual for the standard instrument still applies to maintenance of these options. To function properly, the option requires a working standard oscilloscope.

TROUBLESHOOTING

Preventive maintenance performed on a regular basis should reveal most potential problems before an instrument malfunctions. However, should troubleshooting be required, the following information is provided to facilitate location of a fault. In addition, the material presented in the "Theory of Operation" and "Diagrams" sections of this manual and the "Troubleshooting" portion of the "Maintenance" section in the standard instrument Service manual may be helpful while troubleshooting.

GENERAL TROUBLESHOOTING PROCEDURE

The information presented here is intended to complement the information contained in the "Troubleshooting" charts for the individual options. (These charts are among the "Diagrams" in Section 10.) Become familiar with the rest of the information in this section before proceeding with instrument troubleshooting. If the instrument will run the diagnostic routines as described in the "Diagnostic Routines" part of this section, use them to help localize the instrument problems.

Before troubleshooting the options, first make sure the standard instrument is functioning properly. In general, to check the standard instrument the options must be removed; when troubleshooting the DMM, however, it is sufficient to verify that the instrument has a sweep and a properly functioning readout.

Next, check the operation of each option, one at a time. After all options are working correctly, reassemble the instrument.

DIAGNOSTIC ROUTINES

Control of Diagnostic routines and their display format is the same as for the standard instrument.

Kernel Tests

The Kernel tests for the standard instrument include checks to determine if any options are present. A ROM checksum test is performed on each option ROM contained in the instrument.

A failure of a Kernel test is considered "fatal" to the operation of the microprocessor system. Kernel test failures will result in an attempt to flash the front-panel A SWP TRIG'D indicator and illuminate certain other front-panel indicators with an error code. The code points to the failure area as indicated in Table 5-1. Tables 5-2 and 5-3 are used to determine the option and device numbers used in Table 5-1.

Table 5-1
Kernel Test Failure Codes

Failure Codes		
Option	Device	Failing Device
0	0	Control Board RAM U2460
0	1	Control Board ROM U2160
0	2	Control Board ROM U2360 (U2260)
1	1	GPIB Option ROM U4715
1	2	GPIB Option ROM U4710
6	1	HDTV/TV Option ROM U5565
7	1	DMM Option ROM U5280[a]
7	2	DMM Option ROM U5281[a]
8	1	CTT Option ROM U5930
F	1	Control Board ROM U2160

[a]When only one ROM is used, either device code indicates ROM U5281 is the failing device.

Table 5-2
Front-Panel LED Option Codes

Option Code					
CH 1 TRIGGER SOURCE LED (bit 3)	CH 2 TRIGGER SOURCE LED (bit 2)	CH 3 TRIGGER SOURCE LED (bit 1)	CH 4 TRIGGER SOURCE LED (bit 0)	Option Number (in hex)	Option Name
OFF	OFF	OFF	OFF	0	Standard Instrument
OFF	OFF	OFF	ON	1	GPIB (Option 10)
OFF	ON	ON	OFF	6	HDTV/TV (Option 5H/05)
OFF	ON	ON	ON	7	DMM (Option 01)
ON	OFF	OFF	OFF	8	CTT (Option 06)
ON	OFF	OFF	OFF	8	WR (Option 09)
ON	ON	ON	ON	F	Standard Instrument

Table 5-3
Front-Panel LED Device Codes

Device Codes			
Ready LED (bit 2)	+ SLOPE LED (bit 1)	- SLOPE LED (bit 0)	Device Number
OFF	OFF	OFF	0
OFF	OFF	ON	1
OFF	ON	OFF	2
OFF	ON	ON	3
ON	OFF	OFF	4
ON	OFF	ON	5
ON	ON	OFF	6
ON	ON	ON	7

Even if a failure is reported, the A/B TRIG button may be pressed (or the GPIB command NORM may be used) to try to resume normal instrument operation. However, because of the failure, operation of specific instrument functions is unpredictable.

Confidence Tests

Option-related Confidence tests, Exerciser routines, and their associated error codes are listed in Table 5-4. Except for the DMM, the Confidence tests are performed automatically at power-up if the Kernel tests are completed successfully. In the case of the DMM, only Confidence Test 76 is performed automatically; to run any of the others, the operator must disconnect the input leads and initiate the routine from the Diagnostics Monitor.

All the error codes are in hexadecimal. In the case of the CTT only, it is possible for any combination (through binary addition) of the listed error codes for a given test to occur.

To initiate these tests from the Diagnostics Monitor, the operator must:

1. Hold in both ΔV and Δt buttons and press the Trigger SLOPE button to enter the Diagnostic Menu. The readout will display "DIAGNSTIC. PUSH A/B TRIG TO EXIT".
2. Press and hold the upper or lower Trigger MODE button to sequence through the TEST and EXER routine messages until the desired one appears at the lower left corner of the CRT.
3. Press the upper Trigger COUPLING button to start the test procedure.
4. Press the A/B TRIG button to exit the Diagnostic Menu and return to normal instrument operation.

If the Diagnostic Menu reports a failure, refer the instrument to a qualified service technician.

Table 5-4
Diagnostic and Exerciser Routines

Routine Type	Test Number	Routine Name	Error Code	Error Code Meaning
GPIB Board Test	11	RAM	01	Error in RAM or associated circuitry.
		GPIB Controller	02	Malfunction of U4818, decoder U4708, or buffer U4701.
		Power Latch	03	Failure in latch U4801, gate U4735D, Q4745, or buffer U4701.
		Output Latches	04	Malfunction of latch U4625, gate U4731, buffer U4701, a GPIB STATUS indicator, or latch U4626.
		Wait State	05	Malfunction of U4831B, Generator U4735A, U4801, U4838A.
HDTV/TV Board Tests	none			
CTT and WR	81	Calibration constant test	01	Delay Offset constant Board Tests out of limit. Recalibrate the CTT.
			02	Clock Frequency constant out of limit. Recalibrate the CTT.
	82	Gate Array (U6190)	01	Gate Array bit 0 I/O path test. Read/Write error. Check U6190, R5935, U6290A, U6250, and U5950.
			02	Gate Array bit 1 Read/Write error. Check U6190, U6290B, U6250, U5950, and R5934.
			04	Gate Array bit 2 Read/Write error. Check U5952, U6190, U6290C, U6250, U5950, and R5933.
			08	Gate Array bit 3 Read/Write error. Check U5952, U6190, U6290A, U6250, U5950, and R5932.
			10	Gate Array bit 4 Read/Write error. Check U5952, U6190, U6290B, U6250, U5950, and R5931.
			20	Gate Array bit 5 Read/Write error. Check U5952, U6190, U6290C, U6250, U5950, and R5930.

Table 5-4 (cont)

Routine Type	Test Number	Routine Name	Error Code	Error Code Meaning
CTT and WR (cont)	83	Complex Counter (U6140) I/0 path test.	08	Complex counter bit 0 Read/Write error. Check U6140, U5950, and for U5930 pin 22 stuck LO.
			09	Complex counter bit 1 Read/Write error. Check U6140, U5950, and for U5930 pin 22 stuck LO.
			0B	Complex counter bit 2 Read/Write error. Check U6140, U5950, and for U5930 pin 22 stuck LO.
			0C	Complex counter bit 3 Read/Write error. Check U6140, U5950, and for U5930 pin 22 stuck LO.
			0D	Complex counter bit 4 Read/Write error. Check U6140, U5950, and for U5930 pin 22 stuck LO.
			0E	Complex counter bit 5 Read/Write error. Check U6140, U5950, and for U5930 pin 22 stuck LO.
			0F	Complex counter bit 6 Read/Write error. Check U6140, U5950, and for U5930 pin 22 stuck LO.
			10	CLK A path error. Check U6140, U6190, Q6290, Q6291, and U5950.
			20	GATE A path error. Check U6140, U6190, Q6273, Q6271, and U5950.
	84	Gate Array (U6190) trigger path tests.	0C	Boolean OR trigger failed to generate a sweep on the rising edge of ATS. Check U6190, Q5981, Q5982, Q5983, Q6090, Q6092, Q6091, U5952, and U6070.
			0D	Boolean OR trigger generated multiple sweeps on rising edge of ATS. Check U6190, U6070, HO, and MT.
			0E	Boolean OR trigger generated sweep on falling edge of ATS. Check R5981 and look for glitch on ATS.

Table 5-4 (cont)

Routine Type	Test Number	Routine Name	Error Code	Error Code Meaning
CTT and WR (cont)			10	Boolean OR trigger failed to generate a sweep on rising edge of BTS. Check BTS into U6190.
			14	Boolean AND trigger failed. There were no sweeps but one was expected. Check U6190, and HO into U6190.
			15	Boolean AND trigger generated multiple sweeps. Check HO into U6190.
			16	Sweep occurred on rising edge of EXT when driven from ATS. Check for a glitch on EXT into U6190.
			17	Multiple sweeps occurred on rising edge of EXT when driven from ATS. Check HO into U6190 and look for a glitch on EXT into U6190.
			18	Expected sweep did not occur on EXT when driven from ATS. Check both HO and EXT into U6190.
			19	Multiple sweeps occurred, only one was expected, when EXT was driven from ATS. Check HO into U6190.
			40	Either the ATS to TSA or the BTS to TSB signal path is bad. Check the trigger status from and to the Main board, Q5981, Q5980, U5990A, Q5983, Q6093, U5990B, and U5952.
	85	Counters, Phase Locked Loop, and Oscillator test.	01	Top byte of 131 MHz counter too low. Check U6190 pin 40.
			02	Top byte of 2.65 MHz counter too low. Check Q5920, Q5921, U6140 pin 5, and U6140.
			04	Phase Locked Loop not locked. Check Phase Locked Loop.
			08	Wrong oscillator frequency. Check Y5910 and associated circuitry.

Table 5-4 (cont)

Routine Type	Test Number	Routine Name	Error Code	Error Code Meaning
CTT and WR (cont)	86	Delay-By-Events circuitry test.	01	In Trigger After Delay mode with the delay time set shorter than the delay, a sweep was produced. Check B AUX TRIG and HO at U6190.
			02	In Trigger After Delay mode with the delay time set longer than the delay, there was no sweep. Check B AUX TRG and HO at U6190 and output O1 at U6140.
			04	BHO path into Gate Array stuck low.
			08	Forced HO (U6140 pin 44) doesn't work. Check U6140 pin 44 and associated circuitry.
			10	Complex counter (U6140) reset sequence fails.
			20	AHO turn off too slow. Check R5962.
	87	Delta Time measurement test.	01	BSG to Gate Array bad.
			02	DS to Gate Array bad.
			04	Delay difference is bad. Check the stability of the 131.0669-MHz clock.
			08	Counter C contains a bad count.
			10	Counter B contains a bad count. Check CLKB path between U6190 and U6140.
			18	Counter A contains a bad count. Failure should be caught by earlier tests.
			20	Clock C or ASG path bad.
			40	Clock B path bad.

Table 5-4 (cont)

Routine Type	Test Number	Routine Name	Error Code	Error Code Meaning
DMM Board Tests	71	Digital	01	Malfunction of timer U5272 or associated microprocessor signals.
			02	Malfunction of timer U5272, flip-flop U5222, decoder U5241, or Status Register U5260.
			03	Malfunction of timer U5272 or flip-flop U5222.
			04	Malfunction of timer U5272, dividers U5273 and U5274, or the B10MHZ signal.
			05	Malfunction of timer U5272, transistor Q5230, gate U5271, counter U5274, or inverter U5252.
			06	Malfunction of shift register U5240, counter U5224, gate U5252E, or Status Register U5260.
			07	Malfunction of timer U5272.
			08	Malfunction of the Delay Generator, decoder U5241, or timer U5272.
	72	V/F Converter	01	Malfunction of floating power supplies, fuse F5220, or V/F Converter, with 0 V input.
			02	Malfunction of V/F Input Multiplexer, Voltage-to-Current Converter, or Current Source, with -2 V input.
			03	Malfunction of V/F Input Multiplexer, Voltage-to-Current Converter, or Current Source, with +5 V input.
			04	Frequency change between 0 V and + 5 V is low, but is OK between 0 V and -2 V. Malfunction of multiplexer U5020 or shift register U5120.
			05	Frequency change between -2 V, 0 V, and +5 V is very low. Malfunction of multiplexer U5020 or shift registers U5122, U5120, or U4940.

Table 5-4 (cont)

Routine Type	Test Number	Routine Name	Error Code	Error Code Meaning
DMM Board Test (cont)			06	Malfunction of precision reference U5050 or the Voltage-to-Current Converter.
			07	Frequency of V/F Converter is offset. Check frequency at U4920B pin 4 and zeners VR5020 and VR5031.
	73	DC Volts	01	Malfunction of the DC Volts Buffer.
			02	The 0 V reference through the DC Volts Buffer at X1 gain is incorrect, but ÷10 gain is OK.
			03	Previous reference measurements failed, but measurements from the input passed. Check the reference at FET Q5070A.
			04	Previous measurements failed. Output of the DC Volts Buffer is offset. Check amplifier U4970, FET switch U4950D, FET switch U4950C, amplifier U5060A, FET Q5070A, and FET Q5070B.
			05	The ÷10 output of the DC Volts Buffer is offset.
			06	The 0 V reference through the DC Volts Buffer X10 is offset.
			07	Voltage on input of DC Volts Buffer causing an offset. Check voltage to ground at R5080, and check resistance to ground at R5080.
			09	Malfunction of FET Q5070A, FET switch U4942B, or FET switch U4942A.
			0A	The -0.2 V reference through the DC Volts Buffer at X10 gain is incorrect, but the -2 V X1 gain is OK. Check resistor R5064 and FET switches U4942A, U4942B, U4950C, and U4950D.
			0B	The -2 V reference through the DC Volts Buffer at X1 gain is incorrect, but -0.2 V X10 gain is OK. Check resistor R5064 and FET switches U4942A, U4942B, U4950C, and U4950D.

Table 5-4 (cont)

Routine Type	Test Number	Routine Name	Error Code	Error Code Meaning
DMM Board Test (cont)	74	AMPS/OHMS	01	Measurement time-out. Unable to obtain a reading.
			02	Measured too high using test setup A. Malfunction of Ohms Current Source, 10 MΩ resistor chain, relay K4980, FET switches U4942 and U4950, or operational amplifiers U5040 and U4960.
			03	Measurements using test setups A and B were not equal. Malfunction of FET switch U4950 or shift register U5120.
			04	Measurement using test setup C failed. Malfunction of relay K5191, resistor R5181, or resistor R5177. This will also cause DM TEST 75 to fail with error code 02.
			05	Measured too low using test setup A. Malfunction of Ohms Current Source, relay K5090, relay K5091, or the front panel fuse or the connections to it.
			06	Measurements using test setup D failed. Malfunction of fuse F4990, relay K4980, or FETs Q4972, Q4973, or Q4980.
			07	Measurement using test setup D with 0.1 mA failed. Malfunction of shift register U4940, or FETs Q4970 or Q4971.
			08	Measurement using test setup D with 1 mA failed. Malfunction of FET Q4971 or FET switch U4942C.
	75	AC Volts	01	Measurement time-out.
			02	Malfunction of the AC Volts Buffer or the V/F Input Multiplexer.
	76	Power-up	01	Malfunction of DMM, or if this is the only failure, V/F Input Multiplexer U5020 input pin 2.
			02	Malfunction of decoder U4310, buffer U4300, or cable W4330 to Buffer board.
			03	Malfunction of resistor R4320, buffer U4320, or cable W4330 to Buffer board.

Table 5-4 (cont)

Routine Type	Test Number	Routine Name	Error Code	Error Code Meaning
DMM Board Test (cont)			04	Malfunction of front panel switch S4302, S4306, S4309, or S4318.
			05	Malfunction of front panel switch S4304, S4308, S4312, S4314, or S4316.
			06	Malfunction of front panel switch S4303, S4307, S4310, or S4317.
Buffer Exerciser	F1	Option Identification	None	
Buffer Exerciser	F2	Page Selection	None	
Exerciser	02	Calibration RAM Examine	None	
GPIB Exerciser	11	Address Selection	None	
GPIB Exerciser	12	Terminator and Talk/Listen Mode Selection	None	
GPIB Exerciser	13	Receive-Setups Mode	None	
GPIB Exerciser	14	Send-Setups Mode	None	
HDTV/TV Exerciser	61	Line 1 Format Selection	None	
HDTV/TV Exerciser	62	TV Protocol Selection	None	
HDTV/TV Exerciser	63	TV Sync Selection	None	
HDTV Exerciser	64	TV Presets	None	
Word Recognizer Exerciser	81	Word Recognizer Probe	None	
DMM Exerciser	71	Extended Front Panel Switches	None	
DMM Exerciser	72	Tone and Input Impedance	None	

GPIB BOARD (GP TEST 11). This test checks the circuitry listed in Table 5-4 under GPIB Test 11.

The circuitry on the GPIB board is checked for proper operation, and error conditions are reported.

CALIBRATION CONSTANT TEST (CT TEST 81). Checks the CTT calibration constants to see if they are within set limits.

GATE ARRAY I/O PATH TEST (CT TEST 82). Checks the I/O paths into and out of the Gate Array. The tested circuitry includes Hardware Register 1 and the ECL-to-TTL level shifters and data buffers.

The Gate Array is written to six times; each time one data line is HI and the others are LO. After each write, the data is read back and checked.

COMPLEX COUNTER I/O PATH TEST (CT TEST 83). Checks the I/O paths to and from the Complex Counter. The test involves circuitry in the Gate Array, Complex Counter, and the CLK A-to-S1 and GATE A-to-G1 signal paths between the Gate Array and Complex Counter. The only IC not involved in earlier tests is U6140.

Each data bit, starting with D0, is set HI and written to U6140. This data is read back in order while recording errors. The CLK A-to-S1 and the GATE A-to-G1 interfaces between U6180 and U6140 are then checked. Counters 1 and 2 of U6140 count CLK A and GATE A respectively. The Gate Array is initialized to cycle both GATE A and CLK A. Counters 1 and 2 of U6140 are then checked to see if they received the count.

GATE ARRAY TRIGGER PATH TEST (CT TEST 84). Checks the following signal paths: $\overline{\mathrm{TSA}}$ to and from the Main board, $\overline{\mathrm{TSB}}$ to and from the Main board, the three AHO paths to the Gate Array, the $\overline{\mathrm{EXT}}$ inputs, and the $\overline{\mathrm{A\ AUX\ TRG}}$ output. This test also checks to see if the AHO paths clear the $\overline{\mathrm{A\ AUX\ TRG}}$ output between sweeps. Circuitry not involved in earlier tests includes U6070 and the circuitry in the $\overline{\mathrm{TSA}}$ and $\overline{\mathrm{TSB}}$ to U6190 signal paths.

This test is performed with the triggers set to fast compare. The trigger status inputs are manipulated by changing the A and B trigger levels. Both the A and B trigger status pass-through paths are checked in both the HI and LO states. With the trigger status inputs in ECL mode (status inputs to U6190), the $\overline{\mathrm{ATS}}$ and $\overline{\mathrm{BTS}}$ inputs, the $\overline{\mathrm{EXT}}$ input, and the $\overline{\mathrm{A\ AUX\ TRG}}$ output are checked with the CTT in LOGIC AND, LOGIC OR, and simulated external trigger modes. Then each AHO path is checked to see if it clears $\overline{\mathrm{A\ AUX\ TRG}}$ between sweeps.

COUNTER, PHASE LOCKED LOOP, AND OSCILLATOR TEST (CT TEST 85). Checks the time base by comparing the count in two of the counters after about 20 ms. One counter is counting the 131-MHz Phase Locked Loop clock; the other counter counts the 2.62-MHz clock. The count in the 131-MHz counter should contain 50 times the count contained in the 2.62-MHz counter. The count in the 2.62-MHz counter must be within 1000 parts per million of the correct value, referenced to the 6802 clock.

DELAY-BY-EVENTS CIRCUITRY TEST (CT TEST 86). Checks the Delay-By-Events circuitry, BHO input, $\overline{\mathrm{B\ AUX\ TRG}}$ output, the HO output of the complex counter, and the $\overline{\mathrm{TC}}$ input to the Gate Array.

This test uses the B-Sweep Delayed-By-Time mode, where the A Trigger is the starting event and 131-MHz clocks are the delaying event. The oscilloscope is run in the B-Sweep Triggerable-After-Delay mode with the B Delay set at half sweep. The delay-by-events time is set shorter than the B Delay; a Delay Sweep should not occur. The time is then set longer than the B Delay; a Delayed Sweep should occur. Checks are also made to see that Delay-By-Events mode resets and that $\overline{\mathrm{B\ AUX\ TRG}}$ clears between sweeps. During one sweep, auto holdoff is exerted; a Delay Sweep should not occur. In a Delay-By-Events test, holdoff turn off time is checked.

DELTA TIME MEASUREMENT TEST (CT TEST 87). Makes a one sample (two sweep) Delta Time measurement. Checks $\overline{\mathrm{ASG}}$, $\overline{\mathrm{BSG}}$, $\overline{\mathrm{DS}}$, and the three counters in the Gate Array and Complex Counter.

The sweeps are triggered by grounding the A-Trigger input and then changing the A-Trigger level. Each time the 3.3-ms interrupt occurs, the levels are changed. The reference delay is set to 800 ns ($\approx$ 105 clocks) and the delta delay is set to 400 ns ($\approx$ 52 clocks). When the sample is taken, the difference between the two counters must be within two counts of 52.

DIGITAL (DM TEST 71). The circuitry in the digital half of the DMM board is checked. Failure of analog tests that follow do not affect this test. A failure of this test will probably cause all other tests to fail.

V/F CONVERTER (DM TEST 72). This test checks the voltage-to-frequency conversion circuitry. A failure of this test will cause all tests that follow to fail.

DC VOLTS (DM TEST 73). DMM Test 73 checks the offsets and gain of the DC Volts Buffer.

Zero volts is first applied to the input of the buffer from the reference and then from the input (see Figure 5-1). Each time, the buffer's gain is changed from X1 to ÷10 to X10 and the results compared to 0.0 V into multiplexer U5020. Then the −2 V reference is applied to the input of the buffer with X1 gain and compared to −2 V through the multiplexer. Finally, the −0.2 V reference is applied to the input of the buffer with X10 gain and compared to −2 V through the multiplexer.

AMPS/OHMS (DM TEST 74). This test checks the input relays, the Ohms Current Source, and the Amps range selection circuitry. The input leads must be disconnected for the test to pass.

The test setups used during this test are shown in Figure 5-2. Every setup results in 1 V on the output of the DC Volts Buffer; a voltage other than 0.0 V or 1 V is a failure.

AC VOLTS (DM TEST 75). This Confidence test checks the ac signal path between FET switch U5150A and multiplexer U5020. The input leads must be disconnected for the test to pass.

Software generates a 1-V ac signal to pin 2 of FET switch U5150 by switching 0.1 mA from the Ohms Current Source on and off (see Figure 5-3). The 0.1 mA is sent through FET Q4970 into the 1 kΩ of R4960 and R4975. This produces a 0.1-V square wave that the AC Volts Buffer multiplies by 10 to a 1-V square wave. The RMS Converter converts this to 0.5 V dc (1-V square wave = 0.5 V rms). Then, a measurement is made before RMS Converter U5140 has a chance to decay. This measurement is compared with a measurement identical to the measurement made during the AMPS/OHMS Test divided by two.

POWER-UP (DM TEST 76). This test makes a quick check of the circuitry on the DMM board and the Extended Front Panel. The input leads may be connected for this test.

Exerciser Routines

Operation of Exerciser routines is the same as for the standard instrument. The Exerciser routines allow the operator to set and examine various bytes of control data used in determining option function.

OPTION IDENTIFICATION (BU EXER F1). This routine displays across the top line of the CRT readout, the option designator for all installed options. Option designators are listed in Table 5-5.

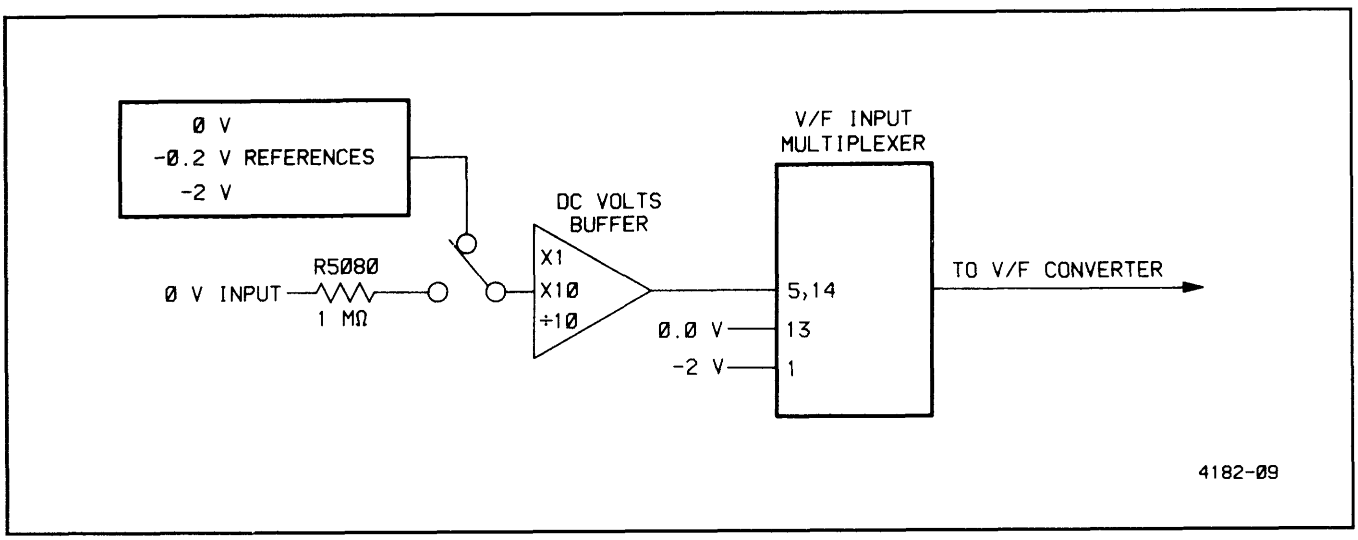

Figure 5-1. DC Volts test setup.

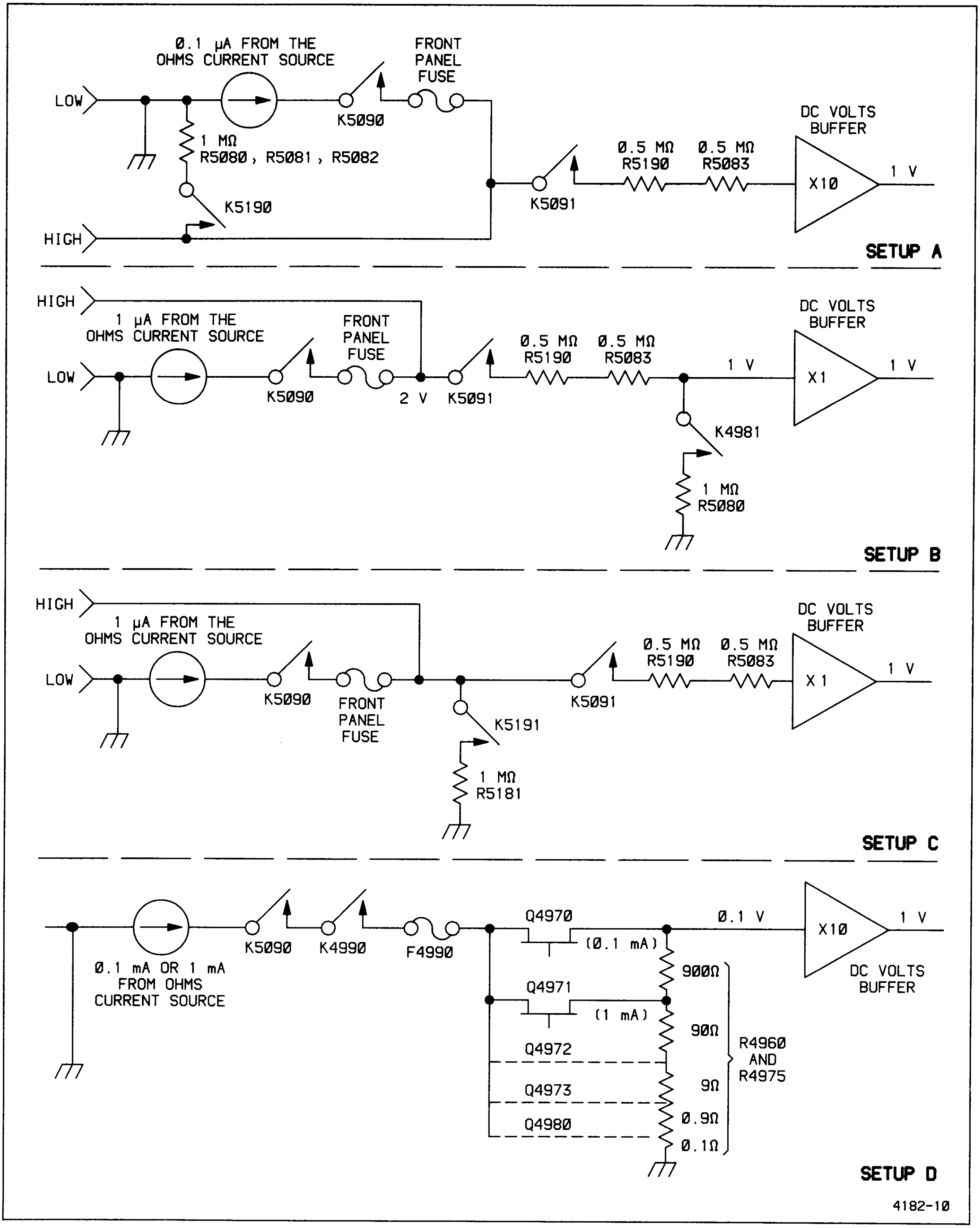

Figure 5-2. AMPS/OHMS test setups.

Table 5-5
Option Designators

Option	Option Designator
Buffer	BU
GPIB	GP
TV	TV
HDTV	HD
DMM	DM
Counter/Timer/Trigger	CT

PAGE SELECTION (BU EXER F2). This routine continuously selects and deselects each of the option page registers.

CALIBRATION RAM EXAMINE (EXER 02). This is the standard instrument Calibration RAM Examine routine.

ADDRESS SELECTION (GP EXER 11). Used to select the instrument's GPIB address. For an explanation of its use, refer to the "Preparation" portion of the "Performance Check Procedure" in the GPIB Section of this manual.

TERMINATOR AND TALK/LISTEN MODE SELECTION (GP EXER 12). Used to select both the instrument's end-of-message terminator and the Talk/Listen mode of the instrument's GPIB interface. For an explanation of its use, refer to the "Preparation" portion of the "Performance Check Procedure" in the GPIB Section of this manual.

RECEIVE/SEND SETUPS MODE (GP EXER 13/14). Used to transfer SAVE/RECALL stored setups from instrument to instrument via the GPIB.

TV PROTOCOL SELECTION (HD/TV EXER 61). This routine allows the starting position of Line 1 to be selected. The starting position may be either three lines prior to the field sync pulse (system-M), coincident with the field sync pulse (nonsystem-M), or one line after field sync pulse (1050/59.4 or 1250/50). Selecting the incorrect system for a given TV protocol will not affect the ability to trigger on a given TV waveform, but it will cause the line number displayed to be inaccurate. For an explanation of its use, refer to the "TV Protocol and Line-Numbering Format Selection" portion of "Preparation for Use" in the TV Section of this manual.

TV LINE1 FORMAT SELECTION (HD/TV EXER 62). This routine allows the selection of the TV line numbering format. Line numbering can be selected to reset on each field or on field 1 only. For an explanation of its use, refer to the "TV Protocol and Line-Numbering Format Selection" portion of "Preparation for Use" in the TV Section of this manual.

TV SYNC SLOPE SELECT (HD/TV EXER 63). Used to select the default condition of the instrument trigger slope when a TV mode (FLD 1, FLD 2, or LINES) is selected. For an explanation of its use, refer to the "Automatic Sync Selection" portion of "Preparation for Use" in the TV Section of this manual.

TV PRESET RESTORE (HD EXER 64). The HDTV option (5H) has 8 semi-automatic stored presets which facilitate observation of TV signal characteristics. These presets include the following:

LINES	FIELD	FRAME	LINESEL
ACTVID	H-BLANK	V-BLANK	PIXEL

During normal oscilloscope operation, it is possible for the operator to overwrite these stored setups. This routine provides a method for restoring these setups. In addition to the eight TV presets, a ninth stored setup, TSGTRIG, is provided. This setup facilitates the use of the oscilloscope with the external trigger feature on the Tektronix TSG1000 range of HDTV generators.

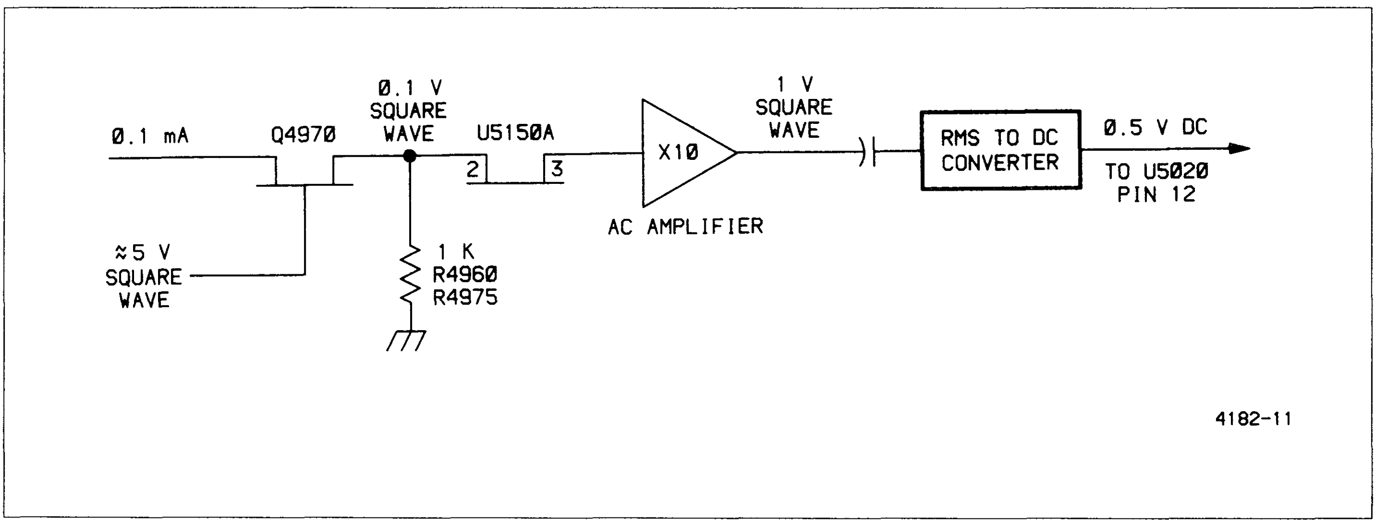

Figure 5-3. AC Volts test setup.

WORD RECOGNIZER EXERCISER (CT EXER 81). This routine continuously exercises the Word Recognizer Data line by repeatedly sending a HI followed by 39 LOs over the WDATA signal line, to the Word Recognizer probe.

EXTENDED FRONT PANEL SWITCHES (DM EXER 71). This routine displays, across the top line of the CRT readout, a one for each switch in the Extended Front Panel. When a DMM switch is pushed, the one representing the depressed switch is replaced by a zero and all other switches are represented by a one. For an explanation of its use, refer to "DMM Parameter Selection" in the "Preparation for Use" portion of the DMM Section of this manual. The following is the display when the ACV/ACA switch is pushed in or shorted:

111 10111 11 111

TONE AND INPUT IMPEDANCE (DM EXER 72). This routine changes the tone of the continuity indicator and changes the input impedance of the 0.2-Vdc and 2-Vdc ranges. For an explanation of it use, refer to "DMM Parameter Selection" in the "Preparation for Use" portion of the DMM Section of this manual.

Instrument Troubleshooting Without Options

To troubleshoot the standard instrument after removing the options, it may be necessary (depending on which options were included in the instrument) to perform one or both of the following steps in order to complete signal paths required for operation of the standard instrument circuitry.

NOTE

J101 and J102 are located on the Main board in the standard instrument.

1. If the instrument contained the TV or CTT Option, disconnect ribbon cable from J102 on the Main board. Using zero ohm connectors, join pin 3 to pin 4 and pin 7 to pin 8 of J102.

2. If the instrument contained the CTT Option, disconnect ribbon cable from J101 on the Main board. Using zero ohm connectors, join pin 1 to pin 3 and pin 6 to pin 8 of J101.

Instrument Troubleshooting With Options

After verifying that the standard instrument is functioning properly, troubleshoot the options one at a time.

NOTE

Refer to the CAUTION and WARNING statements under "Corrective Maintenance" before working on the DMM. When cable P4330 from the DMM is disconnected, the DMM diagnostics will run (except that DM TEST 76 will fail with an 02 error code). While the DMM diagnostics will run, the switches in the Extended Front Panel will not work and the DMM will not operate under the control of the switches in the Extended Front Panel. If the instrument also contains the GPIB Option, the DMM will operate under the control of GPIB commands.

Troubleshooting of the DMM board can be done with the board rotated out on its hinge.

CORRECTIVE MAINTENANCE

Corrective maintenance for the options is the same as for the standard instrument unless stated otherwise in this section.

REMOVAL AND REPLACEMENT INSTRUCTIONS

The various option boards may be removed for repair or replacement using the following procedures. Before beginning any procedure, read the information at the beginning of the "Removal and Replacement Instructions" in the Maintenance section of the standard instrument Service manual.

CAUTION

Improper handling can cause defects to occur in Surface Mount Technology (SMT) circuit boards. Bending or flexing the circuit boards can crack the ceramic components attached to the circuit board.

Use caution when removing or replacing SMT circuit boards. Do not bend or flex the circuit boards.

Option Vertical Bracket (Top-Cover Plate) Removal

The following instructions describe how to remove the options from a fully optioned instrument. For instruments with fewer options, some of the steps may not be necessary.

1. If the GPIB cable from the controller is connected to the instrument, disconnect it from the oscilloscope rear panel.

   NOTE

   The "Cabinet Removal" procedure and the "Vertical Bracket (Top-Cover Plate) Removal" procedure are at the beginning of "Removal and Replacement Instructions" in the Maintenance section of the standard instrument Service manual.

2. Perform the "Cabinet Removal" procedure as outlined in the standard instrument Service manual. If the instrument has the DMM Option, make these changes to the procedure:

   a. In Step 5, remove six screws in the rear feet.

   b. In Step 6, the top-center screw is about 2.5 inches from the top of the rear panel.

   NOTE

   The next five steps (Steps 3 through 7) apply only to instruments that have the DMM Option.

   WARNING

   The input potential to the DMM is present on the five screws mounting the DMM board shields. To avoid electric shock, remove inputs to the DMM HIGH and LOW input connectors.

3. Disconnect the two-conductor cable (P5210) from the left rear corner of the DMM board.

4. Remove the two board-securing screws located at the left edge of the DMM board.

5. Lift and rotate the DMM board about its hinge on the right edge until its top is about level; support the extended edge of the board.

6. Perform Steps 3 through 8 of the "Vertical Bracket (Top-Cover Plate) Removal" procedure as outlined in the standard instrument Service manual.

To reinstall the option Vertical Bracket (Top-Cover Plate) into the standard instrument, perform the reverse of the preceding steps. Be certain to align the option circuit boards with the two black plastic grommets installed in the Vertical Bracket.

GPIB Board Removal

To remove the GPIB board for repair or replacement:

1. Perform applicable steps of the "Option Vertical Bracket (Top-Cover Plate) Removal" procedure.
2. Disconnect the GPIB power cable (P4244) from the Inverter board.
3. Disconnect the LED cable (P4540) from the GPIB board.
4. Disconnect the GPIB bus cable (P4243) from the GPIB board.
5. Disconnect the GPIB cable (P4800) from the GPIB board.
6. Pull the GPIB board out of its plastic board mounts.

To reinstall the GPIB board, perform the reverse of the preceding steps.

GPIB LED Board Removal

To remove the LED board for repair or replacement:

1. Perform all applicable steps through Step 12 of the "Option Vertical Bracket (Top-Cover Plate) Removal" procedure.
2. Remove the two screws securing the LED Mounting plate.
3. Remove the LED Mounting plate and the LED board, being careful not to damage the clear LED light lens.

To reinstall the LED board, perform the reverse of the preceding steps.

CTT/TV/HDTV Option Board Removal

To remove the Option board for repair or replacement:

1. Perform applicable steps of the "Option Vertical Bracket (Top-Cover Plate) Removal" procedure.
2. Disconnect the CTT/TV/HDTV bus cable (P4242) from the CTT/TV/HDTV board.

   NOTE

   If the instrument has the GPIB Option (Option 10), disconnect the GPIB bus cable (P4243) from the GPIB board.

3. Disconnect cable P4330 from the standard instrument Control board.
4. Disconnect cable P251 from the standard instrument Control board.
5. If the instrument has the Word Recognizer Option (Option 09) or the External Reference Option (Option 1E), disconnect the Word Recognizer cable (P5990) and the WORD RECOG OUT/EXT REF IN cable (P5991) from the CTT/TV/HDTV board.
6. Disconnect the CTT/TV/HDTV power cable (P305) from the Inverter board.
7. Place the instrument, left side down, on a flat surface.
8. Remove the rear cable clamp that holds the CTT/TV/HDTV ribbon cable (P4232) in place.
9. Disconnect the 50 Ohm coax cables (P4234) from the lower front of the CTT/TV/HDTV board.
10. Disconnect CTT/TV/HDTV ribbon cable (P4232) from J101 and J102 on the Main board.

11. Remove the two mounting screws securing the CTT/TV/HDTV board to the chassis, found at the rear right side of the instrument.

12. Unsnap plastic standoffs from chassis.

13. With the instrument still on its side, carefully pull the CTT/TV/HDTV board out of its plastic board mounts. Remove it from the instrument while guiding the ribbon cable and connectors through the slots in the Main board and chassis.

To reinstall the CTT/TV/HDTV board, perform the reverse of the preceding steps.

Word Recognizer Probe Disassembly

To disassemble the Word Recognizer Probe for repair or replacement:

1. If the cable from the Word Recognizer probe is connected to the instrument, disconnect it from the oscilloscope rear panel.

2. If the 10-wide combs are connected to the probe, disconnect them from the probe by pulling them straight out of the probe body.

3. Remove the four screws securing the probe covers.

4. Remove the probe covers.

5. Remove the two Word Recognizer boards by holding the board that contains J6300 and pulling the other board straight to the front toward J6300.

6. Remove P6370 by pulling it straight back between J6380 and J6385.

To reassemble the Word Recognizer probe, perform the reverse of the preceding steps, making sure that the probe cover with D8 to D15 markings covers the board containing J6300.

DMM Extended Front Panel Board Removal

To remove the Extended Front Panel board for repair or replacement:

NOTE

Instruments with the DMM Option installed have five screws on the top edge of the front decorative trim ring (rather than four). They also have one screw on each side of the front decorative trim ring.

1. Perform the first six steps of the "A6—Front Panel Circuit Board Assembly Removal," which is under "Removal and Replacement Instructions" in the Maintenance section of the standard instrument Service manual. Three additional screws must be removed to complete this procedure (see NOTE).

2. Perform Steps 3-6 of the "Option Vertical Bracket (Top-Cover Plate) Removal" procedure, which is in this manual at the beginning of Corrective Maintenance.

3. Disconnect cable P4330 from the standard instrument Control board.

4. Remove three screws along the middle of the Extended Front Panel.

5. Remove the Extended Front Panel board from the Extended Front Panel.

To reinstall the Extended Front Panel board into the Extended Front Panel, perform the reverse of the preceding steps.

Probe Connector and Fuse Assembly Removal

To remove the Probe Connector and Fuse Assembly for repair or replacement:

WARNING

To avoid electric shock, remove inputs to the DMM HIGH and LOW input connectors.

1. Perform the first five steps of the "Option Vertical Bracket (Top-Cover Plate) Removal" procedure.

2. Remove the screw that retains P4990 at the right front corner of the DMM board.

3. Disconnect the two wires from the top probe connector and the fuse assembly by pulling the white plastic receptacles away from the tabs. (These connectors mate very tightly. It may be necessary to use pliers to pull them apart.)

NOTE

Instruments with the DMM Option installed have five screws on the top edge of the front decorative trim ring (rather than four). They also have one screw on each side of the front decorative trim ring.

4. Perform the first six steps of the "A6—Front Panel Circuit Board Assembly Removal," which is under "Removal and Replacement Instructions" in the Maintenance section of the standard instrument Service manual. Three additional screws must be removed to complete this procedure (see NOTE).

5. Remove the two screws from the right front of the Extended Front Panel.

6. Remove the Probe Connector and Fuse Assembly.

To reinstall the Probe Connector and Fuse Assembly into the Extended Front Panel, perform the reverse of the preceding steps.

DMM Board Removal

To remove the DMM board for repair or replacement:

WARNING

To avoid electric shock, remove inputs to the DMM HIGH and LOW input connectors.

1. Perform the first three steps of the "Probe Connector and Fuse Assembly Removal" procedure.

2. Disconnect the cable (P5290) from the right rear of the DMM board.

3. Disconnect the cable (P5220) from the left rear of the DMM board.

4. Rotate the DMM board back to its normal position.

5. Remove the two board-mounting screws at the right edge of the DMM board.

6. Remove the DMM board.

CAUTION

To avoid increased leakage, avoid touching the circuit board and the components located under the shields.

WARNING

The input potential to the DMM is present on the five screws mounting the DMM board shields. To avoid electric shock, remove inputs to the DMM HIGH and LOW input connectors.

7. Remove five screws from the DMM board shields.

8. Remove shields.

To reinstall the DMM board, perform the reverse of the preceding steps.

REPLACEABLE ELECTRICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

When ordering parts, 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 Mfg. Code Number to Manufacturer Cross 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 parts list)

Example a. component number

A23R1234 — A23 R1234

Assembly number — Circuit number

Read: Resistor 1234 of Assembly 23

Example b. component number

A23A2R1234 — A23 A2 R1234

Assembly number — Subassembly number — Circuit number

Read: Resistor 1234 of Subassembly 2 of Assembly 23

The circuit component's number appears 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 parts list)

Indicates part number to be used when ordering replacement part from Tektronix.

SERIAL NO. (columns three and four of the 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 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 Catalog handbook H6-1 can be utilized where possible.

MFR. CODE (column six of the 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 NO. (column seven of the parts list)

Indicates actual manufacturer's part number.

CROSS INDEX – MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
D5243	ROEDERSTEIN E SPEZIALFABRIK FUER KONDENSATOREN GMBN	LUDMILLASTRASSE 23-25	8300 LANDSHUT GERMANY
TK0161	WYLE LABORATORIES ELECTRONICS MARKETING GROUP LOS ANGELES DIV	124 MARYLAND ST	EL SEGUNDO CA 90245-4115
TK0987	TOPAZ SEMICONDUCTOR SUB OF HYTEK MICROSYSTEMS INC	1971 N CAPITOL AVE	SAN JOSE CA 95132-3799
TK1601	PULSE ENGINEERING INC	2801 MOORPARK AVE SUITE 7	SAN JOSE CA 95128
TK1727	PHILIPS NEDERLAND BV AFD ELONCO	POSTBUS 90050	5600 PB EINDHOVEN THE NETHERLANDS
TK1743	UNITRODE (UK) LTD	6 CRESSWELL PARK BLACKHEATH	LONDON SE 3 9RD ENGLAND
TK1864	INTERFET CORP	322 GOLD ST	GARLAND TX 75042
TK2425	CHUNG HING INDUSTRY CO LTD PHONE: 5-564114/8 FAX: 852-5-713679	1ST FLOOR, SUNRIDGE IND BLDG 10 HONG MAN STREET	CHAIWAN HONG KONG
0CVK3	SPRAGUE ELECTRIC CO INTERGRATED CIRCUIS DIVISION	115 NE CUTOFF	WORCHESTER MA 01606
0JR03	ZMAN AND ASSOCIATES	7633 S 180th	KENT WA 98032
0JR04	TOSHIBA AMERICA INC ELECTRONICS COMPONENTS DIV BUSINESS SECTOR	2692 DOW AVE	TUSTIN CA 92680
0J7N9	MCX INC	30608 SAN ANTONIO ST	HAYWARD CA 94544
0J9R5	MARCON AMERICA CORP	3 PEARL COURT	ALLENDALE NJ 07401
00779	AMP INC	2800 FULLING MILL PO BOX 3608	HARRISBURG PA 17105
01121	ALLEN-BRADLEY CO	1201 S 2ND ST	MILWAUKEE WI 53204-2410
01295	TEXAS INSTRUMENTS INC SEMICONDUCTOR GROUP	13500 N CENTRAL EXPY PO BOX 655012	DALLAS TX 75265
03888	KDI ELECTRONICS	60 S JEFFERSON RD	WHIPPANY NJ 07981-1001
04222	AVX CERAMICS DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
04713	MOTOROLA INC SEMICONDUCTOR PRODUCTS SECTOR	5005 E MCDOWELL RD	PHOENIX AZ 85008-4229
06665	PRECISION MONOLITHICS INC SUB OF BOURNS INC	1500 SPACE PARK DR	SANTA CLARA CA 95050
09922	BURNDY CORP	RICHARDS AVE	NORWALK CT 06852
09969	DALE ELECTRONICS INC	EAST HIGHWAY 50 P O BOX 180	YANKTON SD 57078
11502	INTERNATIONAL RESISTIVE CO INC	GREENWAY RD PO BOX 1860	BOONE NC 28607-1860
12617	HAMLIN INC	612 EAST LAKE STREET	LAKE MILLS WI 53551
14301	ANDERSON ELECTRONICS INC	310 PENN ST PO BOX 89	HOLLIDAYSBURG PA 16648-2009
14752	ELECTRO CUBE INC	1710 S DEL MAR AVE	SAN GABRIEL CA 91776-3825

CROSS INDEX – MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
17745	ANGSTROHM PRECISION INC	ONE PRECISION PLACE P O BOX 1827	HAGERSTOWN MD 21740
17856	SILICONIX INC	2201 LAURELWOOD RD	SANTA CLARA CA 95054–1516
18324	SIGNETICS CORP MILITARY PRODUCTS DIV	4130 S MARKET COURT	SACRAMENTO CA 95834–1222
19647	CADDOCK ELECTRONICS INC	1717 CHICAGO AVE	RIVERSIDE CA 92507–2302
19701	PHILIPS COMPONENTS DISCRETE PRODUCTS DIV RESISTIVE PRODUCTS FACILITY AIRPORT ROAD	PO BOX 760	MINERAL WELLS TX 76067–0760
2D532	SPRAGUE ELECTRIC CO SEMICONDUCTOR DIVISION	70 PEMBROKE ROAD	CONCORD NH 03301
22526	DU PONT E I DE NEMOURS AND CO INC DU PONT ELECTRONICS DEPT	515 FISHING CREEK RD	NEW CUMBERLAND PA 17070–3007
24355	ANALOG DEVICES INC	RT 1 INDUSTRIAL PK PO BOX 9106	NORWOOD MA 02062
24546	CORNING GLASS WORKS	550 HIGH ST	BRADFORD PA 16701–3737
25088	SIEMENS CORP	186 WOOD AVE S	ISELIN NJ 08830–2704
25403	PHILIPS COMPONENTS DISCRETE PRODUCTS DIV DISCRETE SEMICONDUCTOR GROUP	GEORGE WASHINGTON HWY	SMITHFIELD RI 02917
27014	NATIONAL SEMICONDUCTOR CORP	2900 SEMICONDUCTOR DR	SANTA CLARA CA 95051–0606
31433	KEMET ELECTRONICS CORP NATIONAL SALES HEADQUARTERS	PO BOX 5928	GREENVILLE SC 29606
32997	BOURNS INC TRIMPOT DIV	1200 COLUMBIA AVE	RIVERSIDE CA 92507–2114
33096	COLORADO CRYSTAL CORP	2303 W 8TH ST	LOVELAND CO 80537–5268
34335	ADVANCED MICRO DEVICES	901 THOMPSON PL	SUNNYVALE CA 94086–4518
34371	HARRIS CORP HARRIS SEMICONDUCTOR PRODUCTS GROUP	200 PALM BAY BLVD PO BOX 883	MELBOURNE FL 32919
50157	MIDWEST COMPONENTS INC	1981 PORT CITY BLVD P O BOX 787	MUSKEGON MI 49443
50434	HEWLETT–PACKARD CO OPTOELECTRONICS DIV	370 W TRIMBLE RD	SAN JOSE CA 95131
53387	MINNESOTA MINING MFG CO	PO BOX 2963	AUSTIN TX 78769–2963
53469	PLESSEY SEMICONDUCTOR	SEQUOIA RESEARCH PARK 1500 GREEN HILLS ROAD	SCOTTS VALLEY CA 95066
54583	TDK ELECTRONICS CORP	12 HARBOR PARK DR	PORT WASHINGTON NY 11550
56289	SPRAGUE ELECTRIC CO WORLD HEADQUARTERS	92 HAYDEN AVE	LEXINGTON MA 02173–7929
57668	ROHM CORP	8 WHATNEY PO BOX 19515	IRVINE CA 92713
58050	TEKA PRODUCTS INC	45 SALEM ST	PROVIDENCE RI 02907
58361	QUALITY TECHNOLOGIES CORP	3400 HILLVIEW AVE	PALO ALTO CA 94304–1319
61529	AROMAT CORP	250 SHEFFIELD ST	MOUNTAINSIDE NJ 07092–2303

CROSS INDEX – MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
63791	STAR MICRONICS INC	200 PARK AVE SUITE 2308	NEW YORK NY 10166-0001
64155	LINEAR TECHNOLOGY CORP	1630 MCCARTHY BLVD	MILPITAS CA 95035-7417
71400	BUSSMANN DIV OF COOPER INDUSTRIES INC	114 OLD STATE RD PO BOX 14460	ST LOUIS MO 63178
71590	CRL COMPONENTS INC	HWY 20 W PO BOX 858	FORT DODGE IA 50501
75498	MULTICOMP INC	3005 SW 154TH TERRACE #3	BEAVERTON OR 97006
75915	LITTELFUSE INC SUB TRACOR INC	800 E NORTHWEST HWY	DES PLAINES IL 60016-3049
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077-0001
91637	DALE ELECTRONICS INC	2064 12TH AVE PO BOX 609	COLUMBUS NE 68601-3632

Component Number	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A2	672-0076-10			CIRCUIT BD ASSY:LV PWR SPLY MODULE (OPTION 01 ONLY)	80009	672007610
A22	670-8159-00			CIRCUIT BD ASSY:LED (OPTION 10 ONLY)	80009	670815900
A23	671-0981-00			CIRCUIT BD ASSY:GPIB OPTION 10 (OPTION 10 ONLY)	80009	671098100
A25	671-1340-00	B050000	B051409	CIRCUIT BD ASSY:TV	80009	671134000
A25	671-1340-01	B051410		CIRCUIT BD ASSY:TV (OPTION 05 ONLY) (FOR SUBPARTS SEE A26)	80009	671134001
A26	671-0982-00	B050000	B051160	CIRCUIT BD ASSY:TV/CTT	80009	671098200
A26	671-0982-01	B051161		CIRCUIT BD ASSY:CTT/TV (OPTION 05/06/09)	80009	671098201
A27	671-1341-00	B050000	B051160	CIRCUIT BD ASSY:CTT	80009	671134100
A27	671-1341-01	B051161		CIRCUIT BD ASSY:CTT (OPTION 06/09 ONLY) (FOR SUBPARTS SEE A26)	80009	671134101
A29	670-7835-10			CIRCUIT BD ASSY:DMM (OPTION 01 ONLY)	80009	670783510
A30	670-7894-02			CIRCUIT BD ASSY:FRONT PANEL (OPTION 01 ONLY)	80009	670789402
A32	670-7999-00			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE (OPTION 09 ONLY)	80009	670799900
A33	670-7998-01			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE (OPTION 09 ONLY)	80009	670799801

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A2	672-0076-10			CIRCUIT BD ASSY:LV PWR SPLY MODULE (OPTION 01 ONLY)	80009	672007610
A22	670-8159-00			CIRCUIT BD ASSY:LED (OPTION 10 ONLY)	80009	670815900
A22DS4540	150-1061-00			LT EMITTING DIO:RED,660NM,50MA MAX	50434	HLMP-1301
A22DS4542	150-1061-00			LT EMITTING DIO:RED,660NM,50MA MAX	50434	HLMP-1301
A22DS4545	150-1061-00			LT EMITTING DIO:RED,660NM,50MA MAX	50434	HLMP-1301
A23	671-0981-00			CIRCUIT BD ASSY:GPIB OPTION 10 (OPTION 10 ONLY)	80009	671098100
A23C4625	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4626	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4705	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4706	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4708	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4730	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4735	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4738	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4745	283-0203-00			CAP,FXD,CER DI:0.47UF,20%,50V	04222	SR305SC474MAA
A23C4747	290-0847-00			CAP,FXD,ELCTLT:47UF,+50-20%,10WVDC	0J9R5	CE02W1A470MD
A23C4801	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4805	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4808	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4831	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4838	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23J4243	131-3323-00			CONN,HDR::PCB,;MALE,STR,2 X 20,0.1 CTR,0.36	22526	66506-025
A23J4540	131-2919-01			CONN,HDR::PCB,;MALE,STR,1 X 4,0.1 CTR,0.235	53387	2404-6112 UB
A23J4800	131-4114-00			CONN,HDR::PCB,;MALE,STR,2 X 12,0.1 CTR,0.36	53387	3589-6002
A23P4243	174-1375-00			CA ASSY,SP,ELEC:40,28 AWG,14.375 L,FLAT CABL	53387	ORDER BY DESC
A23P4800	174-1450-00			CA ASSY,SP,ELEC:24,28 AWG,8.25 L,RIBBON	53387	ORDER BY DESC
A23Q4743	151-0622-00			TRANSISTOR:PNP,SI,40V,1A,TO-226AE/237 2N672	04713	MPS6727
A23Q4745	151-0736-00			TRANSISTOR:NPN,SI,TO-92	04713	2N4401
A23R4513	313-1101-00			RES,FXD,FILM:100 OHM,5%,0.2W	91637	CCF50-2-100R0J
A23R4543	313-1201-00			RES,FXD,FILM:200 OHM,5%,0.2W	91637	CCF50-2-200R0J
A23R4544	313-1201-00			RES,FXD,FILM:200 OHM,5%,0.2W	91637	CCF50-2-200R0J
A23R4545	313-1201-00			RES,FXD,FILM:200 OHM,5%,0.2W	91637	CCF50-2-200R0J
A23R4732	313-1103-00			RES,FXD,FILM:10K OHM,5%,0.2W	91637	CCF50-2-10001J
A23R4734	313-1131-00			RES,FXD,FILM:130 OHM,5%,0.26	91637	CCF501G130R0J
A23R4735	313-1271-00			RES,FXD,FILM:270 OHM,5%,0.2W	91637	CCF50-2-270R0J
A23R4740	313-1152-00			RES,FXD,FILM:1.5K OHM,5%,0.2W	91637	CCF50-2-15000J
A23R4743	313-1152-00			RES,FXD,FILM:1.5K OHM,5%,0.2W	91637	CCF50-2-15000J
A23R4750	313-1103-00			RES,FXD,FILM:10K OHM,5%,0.2W	91637	CCF50-2-10001J
A23U4501	156-1065-00			IC,DIGITAL:LSTTL,LATCH;OCTAL D TRANSPARENT,	01295	SN74LS373N
A23U4505	156-1065-00			IC,DIGITAL:LSTTL,LATCH;OCTAL D TRANSPARENT,	01295	SN74LS373N
A23U4601	156-0866-00			IC,DIGITAL:LSTTL,GATES;13-INPUT NAND	04713	SN74LS133N
A23U4605	156-0386-00			IC,DIGITAL:LSTTL,GATES;TRIPLE 3-INPUT NAND	01295	SN74LS10N
A23U4606	156-0385-00			IC,DIGITAL:LSTTL,GATES;HEX INV	01295	SN74LS04N
A23U4608	156-1111-00			IC,DIGITAL:LSTTL,TRANSCEIVER;OCTAL NONINV,	01295	SN74LS245N
A23U4625	156-1221-00			IC,DIGITAL:LSTTL,FLIP FLOP;HEX D, POS EDGE	01295	SN74LS378N
A23U4626	156-1221-00			IC,DIGITAL:LSTTL,FLIP FLOP;HEX D, POS EDGE	01295	SN74LS378N
A23U4701	156-1277-00			MICROCKT,DGTL:LSTTL,3-STATE OCTAL BFR	27014	DM81LS95AN
A23U4705	156-0480-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT AND	01295	SN74LS08N
A23U4706	156-0382-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NAND	01295	SN74LS00N
A23U4708	156-0469-00			IC,DIGITAL:LSTTL,DEMUX/DECODER	01295	SN74LS138 (N OR

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A23U4710	160-5881-01	B050000	B050731	MICROCKT,DGTL:8K X 8 EPROM,PRGM	80009	160588101
A23U4710	160-5881-02	B050732		MICROCKT,DGTL:8K X 8 EPROM,PRGM	80009	160588102
				(NOT PARTS OF BOARD, ORDER SEPERATELY)		
A23U4715	160-5882-01	B050000	B050731	MICROCKT,DGTL:32K X 8 EPROM,PRGM	80009	160588201
A23U4715	160-5882-02	B050732		MICROCKT,DGTL:32K X 8 EPROM,PRGM	80009	160588202
				(NOT PARTS OF BOARD, ORDER SEPERATELY)		
A23U4730	156-0467-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NAND BU	01295	SN74LS38N
A23U4735	156-0382-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NAND	01295	SN74LS00N
A23U4738	156-0386-00			IC,DIGITAL:LSTTL,GATES;TRIPLE 3-INPUT NAND	01295	SN74LS10N
A23U4801	156-0865-00			IC,DIGITAL:LSTTL,FLIP FLOP;OCTAL D-TYPE, CL	01295	SN74LS273N
A23U4805	156-1415-00			IC,DIGITAL:LSTTL,TRANSCEIVER;OCTAL IEEE-488	01295	SN75161BN
A23U4808	156-1414-00			IC,DIGITAL:LSTTL,TRANSCEIVER;OCTAL IEEE-488	01295	SN75160B (N OR
A23U4811	156-2473-00			IC,MEMORY:CMOS,SRAM;8K X 8,200NS,10UA,OE	0JR04	TC5564PL-20
A23U4818	156-1444-01			IC,PROCESSOR:NMOS,CONTROLLER	01295	TMS9914A (NL OR
A23U4831	156-0479-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT OR	01295	SN74LS32N
A23U4838	156-0388-00			IC,DIGITAL:LSTTL,FLIP FLOP;DUAL D W/SET & C	01295	SN74LS74AN
A23W4244	174-1697-00			CA ASSY,SP,ELEC:3,26 AWG,5.25 L	80009	174169700
A23W4540	174-0128-00			CA ASSY,SP,ELEC:4,26 AWG,9.0 L,9-N	0J7N9	ORDER BY DESC
A23W4750	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225L	24546	OMA 07
A23XU4710	136-0755-00			SOCKET,DIP::PCB,;28 POS,2 X 14,0.1 X 0.6 CT	09922	DILB28P-108
A23XU4715	136-0755-00			SOCKET,DIP::PCB,;28 POS,2 X 14,0.1 X 0.6 CT	09922	DILB28P-108
A25	671-1340-00	B050000	B051409	CIRCUIT BD ASSY:TV	80009	671134000
A25	671-1340-01	B051410		CIRCUIT BD ASSY:TV	80009	671134001
				(OPTION 05 ONLY)		
				(FOR SUBPARTS SEE A26)		
A26	671-0982-00	B050000	B051160	CIRCUIT BD ASSY:TV/CTT	80009	671098200
A26	671-0982-01	B051161		CIRCUIT BD ASSY:CTT/TV	80009	671098201
				(OPTION 05/06/09)		
A26C5332	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5371	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5372	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5373	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5374	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5419	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5433	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5438	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5458	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5460	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5462	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5465	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5468	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5490	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5543	283-5188-00			CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C5545	283-5068-00			CAP,FXD,CER DI:2200PF,10%,50V	04222	W1206X222K2B04
A26C5612	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5613	283-5187-00			CAP,FXD,CER DI:15PF,5%,100V	04222	W1206C150J3B04
A26C5614	283-5108-00			CAP,FXD,CER DI:68PF,5%,100V	04222	W1206C680J3B04
A26C5625	283-5106-00			CAP,FXD,CER DI:470PF,5%,100V	04222	W1206C470J3B04
A26C5626	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5627	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5628	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5630	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26C5631	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5633	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5638	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5640	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C5651	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5690	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5720	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5724	283-5188-00			CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C5726	283-5108-00			CAP,FXD,CER DI:68PF,5%,100V	04222	W1206C680J3B04
A26C5728	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5731	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5734	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5735	283-5107-00			CAP,FXD,CER DI:22PF,5%,100V	04222	W1206C220J3B04
A26C5740	283-5105-00			CAP,FXD,CER DI:1UF,+80/-20%,50V	04222	W1825Z105Z2B04
A26C5755	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5757	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5758	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5770	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5771	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5772	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5773	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5774	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5775	283-5113-00			CAP,FXD,CER DI:0.047UF,10%,50V,X7R,1206 PKT	04222	W1206X473K2B04
A26C5776	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5777	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5778	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5779	283-5188-00			CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C5804	283-5098-00	B051410		CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5806	283-5098-00	B051410		CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5808	283-5105-00			CAP,FXD,CER DI:1UF,+80/-20%,50V	04222	W1825Z105Z2B04
A26C5810	283-5105-00			CAP,FXD,CER DI:1UF,+80/-20%,50V	04222	W1825Z105Z2B04
A26C5812	283-5098-00	B051410		CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5814	283-5098-00	B051410		CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5830	283-5109-00			CAP,FXD,CER DI:680PF,5%,100V	04222	W1206C681J3B04
A26C5848	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5849	283-5196-00			CAP,FXD,CER DI:47PF,5%,100V	04222	W1206C470J3B04
A26C5850	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C5853	283-5105-00			CAP,FXD,CER DI:1UF,+80/-20%,50V	04222	W1825Z105Z2B04
A26C5865	283-5203-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	W1206X102K2B04
A26C5872	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C5875	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5910	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5920	283-5195-00			CAP,FXD,CER DI:10PF,5%,100V	04222	W1206C100J3B04
A26C5922	283-5107-00			CAP,FXD,CER DI:22PF,5%,100V	04222	W1206C220J3B04
A26C5923	283-5197-00			CAP,FXD,CER DI:330PF,5%,100V	04222	W1206C331J3B04
A26C5924	283-5197-00			CAP,FXD,CER DI:330PF,5%,100V	04222	W1206C331J3B04
A26C5930	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5940	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5942	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5950	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5952	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5958	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5960	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5961	283-5188-00			CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C5980	283-5196-00			CAP,FXD,CER DI:47PF,5%,100V	04222	W1206C470J3B04

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A26C5981	283-5196-00			CAP,FXD,CER DI:47PF,5%,100V	04222	W1206C470J3B04
A26C5990	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5991	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5992	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C6010	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6021	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6030	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C6070	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6111	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6113	283-5203-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	W1206X102K2B04
A26C6114	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6115	283-5188-00	B050000	B051160	CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C6121	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6122	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6130	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6131	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6140	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6180	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6190	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6223	283-5202-00			CAP,FXD,CER DI:0.022UF,10%,50VDC	04222	W1206X223K2B04
A26C6230	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6231	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6233	283-5203-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	W1206X102K2B04
A26C6250	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6252	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6291	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6300	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26CR5522	152-5005-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR5522	152-5062-00	B051998		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR5526	152-5004-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5526	152-5018-00	B051998		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5590	152-5004-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5590	152-5018-00	B051998		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5623	152-5004-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5623	152-5018-00	B051998		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5653	152-5005-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR5653	152-5062-00	B051998		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR5721	152-5004-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5721	152-5018-00	B051998		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5735	152-5004-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5735	152-5018-00	B051998		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5751	152-5000-00	B050000	B052664	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-CAT	25088	BAV70T3
A26CR5751	152-5047-00	B052665		SEMICOND DVC,DI:SGNL,FAST RCVRY	27014	FDSO1204.LA
A26CR5772	152-5000-00	B050000	B052664	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-CAT	25088	BAV70T3
A26CR5772	152-5047-00	B052665		SEMICOND DVC,DI:SGNL,FAST RCVRY	27014	FDSO1204.LA
A26CR5825	152-5005-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR5825	152-5062-00	B051998		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR5867	152-5004-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5867	152-5018-00	B051998		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5870	152-5004-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5870	152-5018-00	B051998		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5872	152-5004-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5872	152-5018-00	B051998		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5874	152-5004-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5874	152-5018-00	B051998		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA

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A26CR5876	152-5004-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5876	152-5018-00	B051998		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5878	152-5004-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5878	152-5018-00	B051998		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5930	152-5005-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR5930	152-5062-00	B051998		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR5960	152-5000-00	B050000	B052664	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-CAT	25088	BAV70T3
A26CR5960	152-5047-00	B052665		SEMICOND DVC,DI:SGNL,FAST RCVRY	27014	FDSO1204.LA
A26CR5970	152-5005-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR5970	152-5062-00	B051998		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR5990	152-5005-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR5990	152-5062-00	B051998		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR5995	152-5005-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR5995	152-5062-00	B051998		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR6010	152-5005-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR6010	152-5062-00	B051998		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR6020	152-5005-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR6020	152-5062-00	B051998		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR6162	152-5005-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR6162	152-5062-00	B051998	8	DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR6181	152-5004-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR6181	152-5018-00	B051998		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR6190	152-5005-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR6190	152-5062-00	B051998		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR6210	152-0269-00			SEMICOND DVC,DI:VVC,SI,35V,33PF AT 4V,DO-7	04713	SMV1263RL
A26CR6211	152-5005-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR6211	152-5062-00	B051998		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR6273	152-5005-00	B050000	B051997	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR6273	152-5062-00	B051998		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26J4232	131-3360-00			CONN,HDR::PCB,;MALE,STR,2 X 10,0.1 CTR,0.36	53387	3592-6002
A26J4234	131-2920-00			CONN,HDR::PCB,;MALE,RTANG,2 X 5,0.1 CTR,0.3	00779	86479-3
A26J4242	131-3181-00			CONN,HDR::PCB,;MALE,RTANG,2 X 20,0.1 CTR,0.	22526	69155-040
A26J5800	131-3766-00			CONN,HDR::PCB,;MALE,RTANG,1 X 2,0.1 CTR,0.2	00779	87232-2
A26J5990	131-2920-00			CONN,HDR::PCB,;MALE,RTANG,2 X 5,0.1 CTR,0.3	00779	86479-3
A26J6000	131-1857-00			CONN,HDR::PCB,;MALE,STR,1 X 36,0.1 CTR,0.23	58050	082-3644-SS10
A26L6210	108-1382-00			COIL,RF:FIXED,42NH,10%,AXIAL	0JR03	108-1382-00
A26L6220	108-5018-00			COIL,RF:FXD,4.7UH,20%, Q=50, SRF 45 MHZ, DC	54583	NL453232T-4R7M
A26L6230	108-5018-00			COIL,RF:FXD,4.7UH,20%, Q=50, SRF 45 MHZ, DC	54583	NL453232T-4R7M
A26P5990	131-3957-00			BUS,CONDUCTOR:SHUNT,1 X 2,0.1 CTR	22526	68786-202
A26P6000	131-3957-00			BUS,CONDUCTOR:SHUNT,1 X 2,0.1 CTR (QUANTITY OF 2)	22526	68786-202
A26Q5370	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MMBT3904T1/T2
A26Q5400	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q5442	151-5656-00			TRANSISTOR,SIG:JFET,N-CHANNEL;	04713	MMBF4391LT1,T2
A26Q5512	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q5515	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q5518	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q5528	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q5530	151-5656-00			TRANSISTOR,SIG:JFET,N-CHANNEL;	04713	MMBF4391LT1,T2
A26Q5532	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MMBT3904T1/T2
A26Q5720	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1

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A26Q5736	151-5656-00			TRANSISTOR,SIG:JFET,N-CHANNEL;	04713	MMBF4391LT1,T2
A26Q5740	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q5870	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MMBT3904T1/T2
A26Q5875	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MMBT3904T1/T2
A26Q5880	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MMBT3904T1/T2
A26Q5885	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MMBT3904T1/T2
A26Q5920	151-5029-00			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MMBT2369LT1
A26Q5921	151-5022-00			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MMBT918LT1
A26Q5980	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q5981	151-5029-00			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MMBT2369LT1
A26Q5982	151-5022-00			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MMBT918LT1
A26Q5983	151-5029-00			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MMBT2369LT1
A26Q5984	151-5029-00	B050000	B051160	TRANSISTOR,SIG:BIPOLAR,NPN	04713	MMBT2369LT1
A26Q6090	151-5022-00			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MMBT918LT1
A26Q6091	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q6092	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q6093	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q6180	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MMBT3904T1/T2
A26Q6181	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MMBT3904T1/T2
A26Q6190	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q6191	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q6270	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q6271	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q6272	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q6273	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q6274	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q6290	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q6291	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MMBT3906LT1
A26Q6292	151-5029-00			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MMBT2369LT1
A26R5319	321-5031-00			RES,FXD,FILM:12.1K,1%,0.125W	91637	CRCW12061212FT
A26R5329	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R5330	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5332	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5334	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5335	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5370	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5371	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5419	321-5049-00			RES,FXD,FILM:1 MEG,1%,0.125W	57668	MCR18FXEA1M
A26R5420	321-5049-00			RES,FXD,FILM:1 MEG,1%,0.125W	57668	MCR18FXEA1M
A26R5421	321-5049-00			RES,FXD,FILM:1 MEG,1%,0.125W	57668	MCR18FXEA1M
A26R5422	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5423	321-5167-00			RES,FXD,FILM:221K OHM,1%,0.125W	91637	CRCW1206-22102F
A26R5424	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5425	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5426	321-5027-00			RES,FXD,FILM:5.62K,1%,0.125W	91637	CRCW12065621FT
A26R5427	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5429	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R5432	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R5433	321-5048-00			RES,FXD,FILM:332K,1%,0.125W	91637	CRCW1206-3323FT
A26R5434	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5436	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R5437	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5438	321-5016-00			RES,FXD,FILM:681 OHM,1%,0.125W	91637	CRCW12066810FT
A26R5439	321-5016-00			RES,FXD,FILM:681 OHM,1%,0.125W	91637	CRCW12066810FT
A26R5440	321-5016-00			RES,FXD,FILM:681 OHM,1%,0.125W	91637	CRCW12066810FT

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A26R5442	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5443	321-5167-00			RES,FXD,FILM:221K OHM,1%,0.125W	91637	CRCW1206-22102F
A26R5444	321-5048-00			RES,FXD,FILM:332K,1%,0.125W	91637	CRCW1206-3323FT
A26R5445	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5458	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5460	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5462	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5464	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5466	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5468	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5519	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5523	321-5019-00			RES,FXD,FILM:1.21K,1%,0.125W	91637	CRCW12061211FT
A26R5524	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5525	321-5010-00			RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R5530	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5540	321-5035-00			RES,FXD,FILM:27.4K,1%,0.125W	91637	CRCW12062742FT
A26R5541	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5542	321-5007-00			RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R5544	321-5007-00			RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R5557	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5575	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5608	311-5039-00			RES,VAR,NONWW:TRMR,1K OHM,25%,0.1W	32997	3314J-1-102E
A26R5610	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5611	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5612	321-5021-00			RES,FXD,FILM:1.82K,1%,0.125W	91637	CRCW12061821FT
A26R5614	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5616	321-5038-00			RES,FXD,FILM:47.5K,1%,0.125W	91637	CRCW12064752FT
A26R5618	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5620	321-5017-00			RES,FXD,FILM:825 OHM,1%,0.125W	91637	CRCW12068250FT
A26R5622	321-5029-00			RES,FXD,FILM:8.25K,1%,0.125W	91637	CRCW12068251FT
A26R5623	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5624	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R5626	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R5627	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5628	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5629	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5632	321-5000-00	B050000	B050812	RES,FXD,FILM:10 OHM,1%,0.125W	91637	CRCW120610R0FT
A26R5632	321-5051-00	B050813		RES,FXD,FILM:0 OHM,1%,0.125W	09969	CRCW1206 JUMPER
A26R5652	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5657	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5720	321-5036-00			RES,FXD,FILM:33.2K,1%,0.125W	91637	CRCW12063322FT
A26R5722	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5723	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R5725	321-5035-00			RES,FXD,FILM:27.4K,1%,0.125W	91637	CRCW12062742FT
A26R5729	321-5169-00			RES,FXD,FILM:475K OHM,1%,0.125W	91637	CRCW1206-47502F
A26R5730	321-5000-00	B050000	B050812	RES,FXD,FILM:10 OHM,1%,0.125W	91637	CRCW120610R0FT
A26R5730	321-5051-00	B050813		RES,FXD,FILM:0 OHM,1%,0.125W	09969	CRCW1206 JUMPER
A26R5732	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5733	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5735	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5736	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5737	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5738	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5739	321-5037-00			RES,FXD,FILM:39.2K,1%,0.125W	91637	CRCW12063922FT
A26R5750	321-5166-00			RES,FXD,FILM:150K OHM,1%,0.125W	91637	CRCW1206-15002F

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26R5751	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5752	321-5028-00			RES,FXD,FILM:6.81K,1%,0.125W	91637	CRCW12066811FT
A26R5753	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5754	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R5755	321-5039-00			RES,FXD,FILM:56.2K,1%,0.125W	91637	CRCW12065622FT
A26R5756	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5758	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R5771	321-5036-00			RES,FXD,FILM:33.2K,1%,0.125W	91637	CRCW12063322FT
A26R5810	321-5024-00			RES,FXD,FILM:3.32K,1%,0.125W	91637	CRCW12063321FT
A26R5811	321-5000-00			RES,FXD,FILM:10 OHM,1%,0.125W	91637	CRCW120610R0FT
A26R5812	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5813	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5814	321-5000-00			RES,FXD,FILM:10 OHM,1%,0.125W	91637	CRCW120610R0FT
A26R5815	321-5000-00			RES,FXD,FILM:10 OHM,1%,0.125W	91637	CRCW120610R0FT
A26R5820	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5822	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5823	321-5040-00			RES,FXD,FILM:68.1K,1%,0.125W	91637	CRCW12066812FT
A26R5824	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5825	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5826	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5827	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5828	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R5829	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5830	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5831	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5832	321-5031-00			RES,FXD,FILM:12.1K,1%,0.125W	91637	CRCW12061212FT
A26R5833	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5834	321-5016-00			RES,FXD,FILM:681 OHM,1%,0.125W	91637	CRCW12066810FT
A26R5847	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5849	321-5169-00			RES,FXD,FILM:475K OHM,1%,0.125W	91637	CRCW1206-47502F
A26R5850	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5851	321-5036-00			RES,FXD,FILM:33.2K,1%,0.125W	91637	CRCW12063322FT
A26R5852	321-5031-00			RES,FXD,FILM:12.1K,1%,0.125W	91637	CRCW12061212FT
A26R5853	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5854	321-5170-00			RES,FXD,FILM:825K OHM,1%,0.125W	91637	CRCW1206-82502F
A26R5864	321-5023-00			RES,FXD,FILM:2.74K,1%,0.125W	91637	CRCW12062741FT
A26R5868	321-5040-00			RES,FXD,FILM:68.1K,1%,0.125W	91637	CRCW12066812FT
A26R5870	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5871	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5872	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5873	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5874	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5875	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5876	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5877	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5878	321-5064-00			RES,FXD,FILM:200K,1%,0.125W,1206,8MM	91637	CRCW1206-2003FT
A26R5880	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5882	321-5017-00			RES,FXD,FILM:825 OHM,1%,0.125W	91637	CRCW12068250FT
A26R5883	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5884	321-5024-00			RES,FXD,FILM:3.32K,1%,0.125W	91637	CRCW12063321FT
A26R5885	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R5886	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R5887	321-5024-00			RES,FXD,FILM:3.32K,1%,0.125W	91637	CRCW12063321FT
A26R5888	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5889	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT

Component Number	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26R5890	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5892	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5893	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5920	321-5031-00			RES,FXD,FILM:12.1K,1%,0.125W	91637	CRCW12061212FT
A26R5921	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5925	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5926	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5930	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5931	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5932	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5933	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5934	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5935	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5936	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5937	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5938	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5939	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5951	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5952	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5953	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5954	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5955	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5956	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5957	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5958	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5959	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5960	321-5009-00	B050000	B051451	RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R5960	321-5007-00	B051452		RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R5961	321-5007-00			RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R5962	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5963	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5964	321-5169-00			RES,FXD,FILM:475K OHM,1%,0.125W	91637	CRCW1206-47502F
A26R5970	321-5045-00			RES,FXD,FILM:68.1 OHM,1%,0.125W	91637	CRCW120668R1FT
A26R5971	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5972	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5973	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5980	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5981	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5982	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5983	321-5045-00			RES,FXD,FILM:68.1 OHM,1%,0.125W	91637	CRCW120668R1FT
A26R5984	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5985	321-5169-00			RES,FXD,FILM:475K OHM,1%,0.125W	91637	CRCW1206-47502F
A26R5991	321-5050-00			RES,FXD,FILM:33.2 OHM,1%,0.125W	91637	CRCW120633R2FT
A26R5992	321-5008-00	B050000	B051451	RES,FXD,FILM:150 OHM,1%,0.125W	91637	CRCW12061500FT
A26R5992	321-5014-00	B051452		RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R5993	321-5194-00			RES,FXD,FILM:49.9 OHM,1%,0.125W,1206,8MM	91637	CRCW-1206-49R-9
A26R6020	321-5038-00			RES,FXD,FILM:47.5K,1%,0.125W	91637	CRCW12064752FT
A26R6021	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6022	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6042	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6050	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6051	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6052	321-5019-00			RES,FXD,FILM:1.21K,1%,0.125W	91637	CRCW12061211FT
A26R6060	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6062	321-5007-00			RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26R6063	321-5009-00	B050000	B051451	RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R6063	321-5007-00	B051452		RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6082	321-5010-00			RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6083	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R6090	321-5046-00			RES,FXD,FILM:82.5 OHM,1%,0.125W	91637	CRCW120682R5FT
A26R6091	321-5009-00			RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R6092	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R6093	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6094	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R6102	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6104	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R6105	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6106	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6107	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6108	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6109	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6113	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6114	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6115	321-5018-00	B050000	B051160	RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6116	321-5018-00	B050000	B051160	RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6122	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6123	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6127	321-5008-00	B050000	B051451	RES,FXD,FILM:150 OHM,1%,0.125W	91637	CRCW12061500FT
A26R6130	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6132	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6133	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6134	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6137	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6140	321-5194-00			RES,FXD,FILM:49.9 OHM,1%,0.125W,1206,8MM	91637	CRCW-1206-49R-9
A26R6164	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6165	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6166	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6170	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6172	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6180	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6181	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R6182	321-5044-00			RES,FXD,FILM:56.2 OHM,1%,0.125W	91637	CRCW120656R2FT
A26R6183	321-5044-00			RES,FXD,FILM:56.2 OHM,1%,0.125W	91637	CRCW120656R2FT
A26R6184	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6191	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6192	321-5010-00			RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6193	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6194	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6195	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6197	321-5027-00			RES,FXD,FILM:5.62K,1%,0.125W	91637	CRCW12065621FT
A26R6198	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6199	321-5027-00			RES,FXD,FILM:5.62K,1%,0.125W	91637	CRCW12065621FT
A26R6221	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6222	321-5064-00			RES,FXD,FILM:200K,1%,0.125W,1206,8MM	91637	CRCW1206-2003FT
A26R6230	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6231	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R6232	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6233	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6245	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R6250	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT

Component Number	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26R6251	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6264	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6266	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6267	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6271	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R6273	321-5194-00			RES,FXD,FILM:49.9 OHM,1%,0.125W,1206,8MM	91637	CRCW-1206-49R-9
A26R6274	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R6275	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R6277	321-5028-00			RES,FXD,FILM:6.81K,1%,0.125W	91637	CRCW12066811FT
A26R6290	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6291	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6293	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6294	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6295	321-5010-00	B050000	B051409	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6296	321-5010-00	B050000	B051409	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6296	321-5007-00	B051410		RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6297	321-5010-00	B050000	B051409	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6297	321-5009-00	B051410	B051451	RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R6297	321-5007-00	B051452		RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6298	321-5010-00	B050000	B051409	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6298	321-5007-00	B051410		RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6299	321-5010-00	B050000	B051409	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6300	321-5010-00	B050000	B051409	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6300	321-5009-00	B051410	B051451	RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R6300	321-5007-00	B051452		RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6301	321-5012-00			RES,FXD,FILM:332 OHM,1%,0.125W	91637	CRCW12063320FT
A26R6302	321-5021-00			RES,FXD,FILM:1.82K,1%,0.125W	91637	CRCW12061821FT
A26R6303	321-5017-00			RES,FXD,FILM:825 OHM,1%,0.125W	91637	CRCW12068250FT
A26R6304	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6305	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6306	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6307	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6308	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26U5300	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U5302	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U5310	156-5487-01			MICROCKT,LINEAR:BIPOLAR,XCONDUCTANCE	34371	CA3080AM96
A26U5315	156-5714-00			IC,LINEAR:BIPOLAR,VOLTAGE REGULATOR	27014	LM317LM
A26U5410	156-5487-01			MICROCKT,LINEAR:BIPOLAR,XCONDUCTANCE	34371	CA3080AM96
A26U5427	156-5692-01			IC,LINEAR:BIPOLAR,TRANSISTOR ARRAY	34371	CA3083M96
A26U5436	156-5837-01			IC,LINEAR:BIPOLAR,AMPLIFIER	80009	156583701
A26U5445	156-5485-01			MICROCKT,LINEAR:3 NPN & 2 PNP TRANS ARRAY	34371	CA3096M96
A26U5456	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP	18324	74HCT74DT
A26U5459	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U5460	156-5088-01			IC,DIGITAL:HCTCMOS,DEMUX/DECODER	18324	74HCT138DT
A26U5464	156-5147-01			IC,DIGITAL:FLIP FLOP;OCTAL D-TYPE	18324	74HCT273DT
A26U5468	156-5043-01			IC,CONVERTER:BIPOLAR,D/A	06665	DAC08-360SR(STD
A26U5565	160-5879-00			IC,MEMORY:CMOS,EPROM;8K X 8	TK0161	160-5879-00
A26U5575	156-1426-00			MICROCKT,DGTL:NMOSPRGM TIMER MDL	04713	MC68B40 (L OR P
A26U5580	156-5081-01			IC,DIGITAL:HCTMOS,GATE;HEX INVERTER	18324	74HCT04DT
A26U5590	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP	18324	74HCT74DT
A26U5634	156-2051-01			MICROCKT,LINEAR:OPERATIONAL AMPL	04713	MC34004DR2
A26U5636	156-5138-01			IC,LINEAR:BIFET,OP-AMP	04713	MC34002DR2
A26U5645	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP	18324	74HCT74DT
A26U5712	156-5485-01			MICROCKT,LINEAR:3 NPN & 2 PNP TRANS ARRAY	34371	CA3096M96
A26U5728	156-5485-01			MICROCKT,LINEAR:3 NPN & 2 PNP TRANS ARRAY	34371	CA3096M96

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A26U5755	156-5487-01			MICROCKT,LINEAR:BIPOLAR,XCONDUCTANCE	34371	CA3080AM96
A26U5756	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP	18324	74HCT74DT
A26U5764	156-5147-01			IC,DIGITAL:FLIP FLOP	18324	74HCT273DT
A26U5775	156-5098-01			IC,DIGITAL:HCTCMOS,GATE	18324	74HCT00DT
A26U5790	156-5783-00			IC,DIGITAL:HCTCMOS,GATE	18324	74HCT132D
A26U5838	156-5290-01			IC,DIGITAL:HCTCMOS,GATE	18324	74HCT27DT
A26U5845	156-5517-01			MICROCKT,LINEAR:CMOS,PHASE LOCK LOOP	04713	MC14046BDWR (X1
A26U5855	156-5487-01			MICROCKT,LINEAR:BIPOLAR,XCONDUCTANCE	34371	CA3080AM96
A26U5870	156-2051-01			MICROCKT,LINEAR:OPERATIONAL AMPL	04713	MC34004DR2
A26U5875	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP	18324	74HCT74DT
A26U5880	160-5878-00			MICROCKT,DGTL:LOGIC DEVICE,PRGM	TK0161	160-5878-00
A26U5890	156-5198-01			IC,DIGITAL:HCTCMOS,GATE;QUAD 2-INPUT XOR	34371	CD74HCT86M96
A26U5910	156-5566-01			IC,DIGITAL:HCTCMOS,COUNTER	18324	74HCT390DT
A26U5930	160-5880-00			MICROCKT,DGTL:16K X 8 X 4 EPROM,PRGM	80009	160588000
A26U5940	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U5942	160-5878-00			MICROCKT,DGTL:LOGIC DEVICE,PRGM	TK0161	160-5878-00
A26U5950	156-5088-01			IC,DIGITAL:HCTCMOS,DEMUX/DECODER	18324	74HCT138DT
A26U5952	156-5147-01			IC,DIGITAL:FLIP FLOP	18324	74HCT273DT
A26U5990	156-5085-01			IC,DIGITAL:HCTCMOS,GATE	18324	74HCT32DT
A26U6010	156-5518-01			IC,DIGITAL:TTL,MISC;PHASE-FREQ DET	04713	MC4044DR (X1 OR
A26U6070	156-5471-01			IC,DIGITAL:ECL,MUX/ENCODER	04713	MC10H174FNR1, 2
A26U6120	156-5486-01			IC,DIGITAL:ECL,MISC;VOLTAGE CONT	80009	156548601
A26U6130	156-1248-00			IC,DIGITAL:ECL,MISC;PRESCALER/DIVIDE (U6130 USED ONLY WHEN U6131 & W6131 ARE PRESENT)	53469	SP8629
A26U6131	156-1248-00			IC,DIGITAL:ECL,MISC;PRESCALER/DIVIDE	53469	SP8629
A26U6140	156-5493-00			MICROCKT,DGTL:NMOS,PERIPHERIAL,TIMER	34335	AM9513AJC
A26U6190	160-1748-00			MICROCKT,DGTL:MACROCELL GATE ARRAY,PRGM	04713	SC32205-001
A26U6230	156-5138-01			IC,LINEAR:BIFET,OP-AMP;DUAL	04713	MC34002DR2
A26U6250	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U6252	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP;DUAL D-TYPE	18324	74HCT74DT
A26U6290	156-5262-01			MICROCKT,LINEAR:BIPOLAR,QUAD CONPARATOR	04713	LM339DR1,2
A26W5500	174-1555-00			CA ASSY,SP,ELEC:2,26 AWG,4.0 L	80009	174155500
A26W5970	321-5051-00			RES,FXD,FILM:0 OHM,1%,0.125W	09969	CRCW1206 JUMPER
A26W5980	321-5051-00			RES,FXD,FILM:0 OHM,1%,0.125W	09969	CRCW1206 JUMPER
A26W6127	321-5051-00	B051452		RES,FXD,FILM:0 OHM,1%,0.125W	09969	CRCW1206 JUMPER
A26XU5930	136-0755-00			SOCKET,DIP::PCB,;28 POS,2 X 14,0.1 X 0.6 CT	09922	DILB28P-108
A26Y5910	158-0269-00			XTAL UNIT,QTZ:13.10669MHZ, +/- 0.001 %	14301	011-668-03371
A27	671-1341-00	B050000	B051160	CIRCUIT BD ASSY:CTT	80009	671134100
A27	671-1341-01	B051161		CIRCUIT BD ASSY:CTT (OPTION 06/09 ONLY) (FOR SUBPARTS SEE A26)	80009	671134101
A29	670-7835-10			CIRCUIT BD ASSY:DMM (OPTION 01 ONLY)	80009	670783510
A29C4910	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A29C4911	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	SA101A201JAA
A29C4912	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	SA101A201JAA
A29C4913	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C4914	285-0558-00			CAP,FXD,PLASTIC:0.05 UF 2%,50V	75498	ORDER BY DESCRI
A29C4915	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A29C4932	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A29C4960	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	TK1743	CGB103KEX
A29C4961	283-0177-00			CAP,FXD,CER DI:1UF,+80-20%,25V	04222	SR305E105ZAA

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A29C4962	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C4963	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5015	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	TK1743	CGB103KEX
A29C5020	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5031	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A29C5050	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5052	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5060	283-0220-02			CAP,FXD,CER DI:0.01UF,20%,50V	04222	AR205C103MAATRS
A29C5070	285-0753-00			CAP,FXD,PLASTIC:0.01UF,3.5%,100V	75498	ORDER BY DESCRI
A29C5071	285-0753-00			CAP,FXD,PLASTIC:0.01UF,3.5%,100V	75498	ORDER BY DESCRI
A29C5110	290-0532-00			CAP,FXD,ELCTLT:150UF,20%,6V	31433	T354J157M006AS
A29C5111	290-0876-00			CAP,FXD,ELCTLT:15UF,20%,25 WVDC	31433	T330C156M025AS
A29C5112	290-0876-00			CAP,FXD,ELCTLT:15UF,20%,25 WVDC	31433	T330C156M025AS
A29C5122	283-0177-00			CAP,FXD,CER DI:1UF,+80-20%,25V	04222	SR305E105ZAA
A29C5124	283-0177-00			CAP,FXD,CER DI:1UF,+80-20%,25V	04222	SR305E105ZAA
A29C5130	281-0772-00			CAP,FXD,CER DI:4700PF,10%,100V	04222	SA101C472KAA
A29C5140	290-0523-00			CAP,FXD,ELCTLT:2.2UF,20%,20V	D5243	ETP-1B 2.2UF 25
A29C5142	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5150	290-0876-00			CAP,FXD,ELCTLT:15UF,20%,25 WVDC	31433	T330C156M025AS
A29C5151	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5152	290-0534-00			CAP,FXD,ELCTLT:1UF,20%,35V	D5243	ETP-1A 1UF 35V
A29C5153	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5155	290-0523-00			CAP,FXD,ELCTLT:2.2UF,20%,20V	D5243	ETP-1B 2.2UF 25
A29C5160	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	SA101A101KAA
A29C5170	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	SA101A201JAA
A29C5171	285-1106-00			CAP,FXD,PLASTIC:0.022UF,20%,600V	14752	230B1F223
A29C5220	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5222	290-0536-00			CAP,FXD,ELCTLT:10UF,20%,25V TANTALUM	D5243	ETP-3F 10UF 25V
A29C5224	281-0785-00			CAP,FXD,CER DI:68PF,10%,100V	04222	SA101A680KAA
A29C5230	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5231	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5232	281-0791-00			CAP,FXD,CER DI:270PF,10%,100V	04222	SA101C271KAA
A29C5250	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5251	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5280	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5281	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5290	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29CR4952	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR4970	152-0674-00			SEMICOND DVC,DI:RECT,SI,800V,1.0A	25403	BYV96D (1N4947
A29CR4971	152-0674-00			SEMICOND DVC,DI:RECT,SI,800V,1.0A	25403	BYV96D (1N4947
A29CR4980	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	27014	FDH5227.03
A29CR4981	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	27014	FDH5227.03
A29CR4982	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5030	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5031	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5110	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	27014	FDH-6012
A29CR5111	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	27014	FDH-6012
A29CR5112	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	27014	FDH-6012
A29CR5113	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	27014	FDH-6012
A29CR5114	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	27014	FDH-6012
A29CR5115	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	27014	FDH-6012
A29CR5130	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5163	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	27014	FDH5227.03
A29CR5164	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	27014	FDH5227.03
A29CR5170	152-0307-00			DIODE,SIG:,ULTRA FAST;100V,4.0NS,1.5PF,DUAL	04713	SSD1150

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A29CR5210	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5211	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5212	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5221	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29DS5201	150-1014-00			LT EMITTING DIO:RED,695NM,100MA MAX	58361	Q6444/MV5054-1
A29F4990	159-0224-01			FUSE,CARTRIDGE:5AG,3A,600V,FAST	71400	BBS-3
A29F5220	159-0159-00			FUSE,WIRE LEAD:1.5A,125V,5 SEC	75915	25501.5
A29J5210	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR,0.025 (QUANTITY OF 2)	22526	48283-036
A29J5220	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR,0.025 (QUANTITY OF 3)	22526	48283-036
A29J5290	131-3323-00			CONN,HDR::PCB,;MALE,STR,2 X 20,0.1 CTR	22526	66506-025
A29J5291	131-3323-00			CONN,HDR::PCB,;MALE,STR,2 X 20,0.1 CTR,0.36	22526	66506-025
A29K4980	148-0146-00			RELAY,REED:1 FORM A,500VDC,COIL 5VDC	12617	ORDER BY DESC
A29K4981	148-0149-00			RELAY,ARMATURE:1 FORM A,1 FORM B,8A,250VAC	61529	ST1E-DC12V
A29K4990	148-0149-00			RELAY,ARMATURE:1 FORM A,1 FORM B,8A,250VAC	61529	ST1E-DC12V
A29K5080	148-0149-00			RELAY,ARMATURE:1 FORM A,1 FORM B,8A,250VAC	61529	ST1E-DC12V
A29K5090	148-0149-00			RELAY,ARMATURE:1 FORM A,1 FORM B,8A,250VAC	61529	ST1E-DC12V
A29K5091	148-0149-00			RELAY,ARMATURE:1 FORM A,1 FORM B,8A,250VAC	61529	ST1E-DC12V
A29K5190	148-0141-00			RELAY,REED:1 FORM A,COIL 15 VDC 2200 OHM	12617	R7620-2
A29K5191	148-0141-00			RELAY,REED:1 FORM A,COIL 15 VDC 2200 OHM	12617	R7620-2
A29P5290	174-1376-00			CA ASSY,SP,ELEC:40,28 AWG,18.875 L	53387	ORDER BY DESC
A29Q4920	151-0354-00			TRANSISTOR:PNP,SI,DUAL,TO-78	04713	2N3810A
A29Q4922	151-1054-00			TRANSISTOR:FET,N-CHAN,SI,TO-7	TK1864	SNJ1609
A29Q4930	151-0188-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	2N3906
A29Q4932	151-0221-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	SPS246(EL8251)
A29Q4934	151-1103-00			TRANSISTOR:FET,N CHANNEL,SI	TK0987	1S017
A29Q4936	151-0188-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	2N3906
A29Q4950	151-0190-00			TRANSISTOR,SIG:BIPOLAR,NPN	2D532	2N3904
A29Q4952	151-1078-00			TRANSISTOR:FET,N-CHAN,SI,TO-92	04713	SPF3040
A29Q4960	151-0254-00			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MPSA14
A29Q4970	151-1103-00			TRANSISTOR:FET,N CHANNEL,SI	TK0987	1S017
A29Q4971	151-1103-00			TRANSISTOR:FET,N CHANNEL,SI	TK0987	1S017
A29Q4972	151-1063-00			TRANSISTOR,PWR:MOS,N-CH	04713	IRFD113
A29Q4973	151-1063-00			TRANSISTOR,PWR:MOS,N-CH	04713	IRFD113
A29Q4980	151-1136-00			TRANSISTOR,PWR:MOS,N-CH	04713	IRF530
A29Q5020	151-0342-02			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MPS4249RLRP
A29Q5070	151-1077-01			TRANSISTOR:FET,N-CHAN,SI	80009	151-1077-01
A29Q5124	151-1059-00			TRANSISTOR:FET,N-CHAN,30MW,TO-92 CASE	04713	MPF4391
A29Q5130	151-0221-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	SPS246(EL8251)
A29Q5210	151-0254-03			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MPSA14RLRP
A29Q5230	151-0221-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	SPS246(EL8251)
A29R4910	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4910	315-0823-00			RES,FXD,FILM:82K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4911	315-0681-00			RES,FXD,FILM:680 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4913	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4914	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4915	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4916	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4917	315-0221-00			RES,FXD,FILM:220 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4920	315-0221-00			RES,FXD,FILM:220 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4921	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29R4922	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4923	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4924	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4925	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4926	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4927	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4930	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4932	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4934	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4950	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4951	325-0252-00			RES,FXD,FILM:6.95K OHM,0.1%,0.1W	91637	PTF56,6.95K, T1
A29R4952	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4953	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4954	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4955	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4957	307-0765-00			RES NTWK,FXD,FI:1K OHM & 9K OHM,5% EA,0.1W	11502	4168
A29R4958	307-0765-00			RES NTWK,FXD,FI:1K OHM & 9K OHM,5% EA,0.1W	11502	4168
A29R4960	307-0934-00			RES NTWK,FXD,FI:SINGLE INLINE	19647	1787-31
A29R4971	315-0334-00			RES,FXD,FILM:330K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4972	315-0164-00			RES,FXD,FILM:160K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4973	321-0924-02			RES,FXD,FILM:40K OHM,0.5%,0.125W,TC=T2	19701	5033RC40K00D
A29R4974	321-0318-00			RES,FXD,FILM:20.0K OHM,1%,0.125W,TC=T0	91637	CMF55116G20001F
A29R4975	307-0346-02			RES,FXD,FILM:1 OHM,0.1%	75498	ORDER BY DESC
A29R4976	321-0289-09			RES,FXD,FILM:10.0K OHM,1%,0.125W,TC=T9	19701	5033RE10K00F
A29R4977	322-0481-07			RES,FXD,FILM:1M OHM,0.1%,0.25W,TC=T9	19701	5043RE1M000B
A29R4978	323-0385-00			RES,FXD,FILM:100K OHM,1%,0.5W,TC=T0	91637	CMF65116G10002F
A29R4979	317-0101-00			RES,FXD,CMPSN:100 OHM,5%,0.125W	TK1727	SFR16 2322-180-
A29R4980	307-0662-00			RES,THERMAL:1K OHM,40%SAFETY	50157	180Q10216
A29R4980	315-0102-00			CONTROLLED	TK1727	SFR25 2322-181-
A29R5010	315-0103-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
				RES,FXD,FILM:10K OHM,5%,0.25W		
A29R5011	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5012	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5013	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5014	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5015	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5016	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5017	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5020	321-0225-00			RES,FXD,FILM:2.15K	91637	CMF55116G21500F
A29R5021	315-0152-00			OHM,1%,0.125W,TC=T0SAFET	TK1727	SFR25 2322-181-
A29R5030	315-0681-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	TK1727	SFR25 2322-181-
				RES,FXD,FILM:680 OHM,5%,0.25W		
A29R5032	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5033	321-0325-00			RES,FXD,FILM:23.7K OHM,1%,0.125W,TC=T0	91637	CMF55116G23701F
A29R5034	321-0318-00			RES,FXD,FILM:20.0K OHM,1%,0.125W,TC=T0	91637	CMF55116G20001F
A29R5035	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5036	321-0239-00			RES,FXD,FILM:3.01K OHM,1%,0.125W,TC=T0	91637	CMF55116G30100F
A29R5039	321-0296-00			RES,FXD,FILM:11.8K OHM,1%,0.125W,TC=T0	91637	CMF55116G11801F
A29R5041	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5042	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5043	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5044	321-0753-06			RES,FXD,FILM:9K OHM,0.25%,0.125W,TC=T9	19701	5033RE9K000C

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29R5045	321-0193-07			RES,FXD,FILM:1K OHM,0.1%,0.125W,TC=T9	19701	5033RE1K000B
A29R5047	321-0277-00			RES,FXD,FILM:7.50K OHM,1%,0.125W,TC=T0	91637	CMF55116G75000F
A29R5048	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5049	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5054	325-0394-00			RES,FXD,FILM:4.95K OHM,1%,0.1W,T-13	17745	CC55 T-13 4.95
A29R5055	325-0079-00			RES,FXD,FILM:1.8K OHM,1%,0.1W,TC-13	17745	CC55 T-13 1.8 K
A29R5056	325-0393-00			RES,FXD,FILM:200 OHM,1%,0.1W,T-13	17745	CC55 T-13 200 O
A29R5057	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5058	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5060	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25WSAFETY CONTROL	TK1727	SFR25 2322-181-
A29R5063	321-0753-06			RES,FXD,FILM:9K OHM,0.25%,0.125W,TC=T9	19701	5033RE9K000C
A29R5064	321-0193-00			RES,FXD,FILM:1K OHM,1%,0.125W,TC=T0	91637	CMF55116G10000F
A29R5066	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5070	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5071	315-0155-00			RES,FXD,FILM:1.5M OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5072	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5073	315-0563-00			RES,FXD,FILM:56K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5075	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5080	325-0034-00			RES SET,MATCHED:1 EA,9M,900K,99K OHM,1%	03888	ADVISE
A29R5081				(PART OF A29R5080)		
A29R5082				(PART OF A29R5080)		
A29R5083	322-0673-03			RES,FXD,FILM:500K OHM,0.25%,0.25W,TC=T2	91637	CMF55 116D5003C
A29R5090	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5122	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5124	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5130	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5131	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5132	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5133	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5134	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5150	321-0753-06			RES,FXD,FILM:9K OHM,0.25%,0.125W,TC=T9	19701	5033RE9K000C
A29R5151	321-0193-07			RES,FXD,FILM:1K OHM,0.1%,0.125W,TC=T9	19701	5033RE1K000B
A29R5167	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5168	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5170	315-0182-00			RES,FXD,FILM:1.8K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5171	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5172	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5173	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5174	315-0106-00			RES,FXD,FILM:10M OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5176	315-0682-00			RES,FXD,FILM:6.8K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5177	321-0289-09			RES,FXD,FILM:10.0K OHM,1%,0.125W,TC=T9	19701	5033RE10K00F
A29R5180	307-0662-00			RES,THERMAL:1K OHM,40%SAFETY	50157	180Q10216
A29R5181	324-0620-09			CONTROLLED	03888	PME75 990 K +-
A29R5182	315-0102-00			RES,FXD,FILM:990K OHM,1%,1W,TC=T9	TK1727	SFR25 2322-181-
A29R5190	322-0673-03			RES,FXD,FILM:1K OHM,5%,0.25W	91637	CMF55 116D5003C
				RES,FXD,FILM:500K OHM,0.25%,0.25W,TC=T2		
A29R5191	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5210	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5211	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5212	307-0103-00			RES,FXD,CMPSN:2.7 OHM,5%,0.25W	01121	CB27G5
A29R5220	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29R5222	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5223	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5224	315-0151-00			RES,FXD,FILM:150 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5230	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5231	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5232	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5233	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5251	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5252	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5270	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5271	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29T5210	120-1494-00			TRANSFORMER,PWR:ISOLATION HF,POT CORE	TK2425	ORDER BY DESC
A29T5230	120-1533-00			XFMR,ISOLATION:2KV,1:1 RATIO,DUAL SIGNAL	TK1601	63820
A29TP4910	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR,0.025	22526	48283-036
A29TP4960	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR,0.025	22526	48283-036
A29TP4980	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR,0.025	22526	48283-036
A29TP5140	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR,0.025	22526	48283-036
A29TP5210	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR,0.025	22526	48283-036
A29TP5270	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR,0.025	22526	48283-036
A29TP5271	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR,0.025	22526	48283-036
A29TP5290	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR,0.025	22526	48283-036
A29U4920	156-0383-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NOR	01295	SN74LS02N
A29U4930	156-0422-00			IC,DIGITAL:LSTTL,COUNTER	01295	SN74LS191N
A29U4932	156-1611-00			IC,DIGITAL:FTTL,FLIP FLOP;DUAL D-TYPE	04713	MC74F74N
A29U4940	156-0796-00			IC,DIGITAL:CMOS,SHIFT REGISTER	04713	MC14094BCP
A29U4942	156-0515-00			IC,MISC:CMOS,ANALOG MUX;TRIPLE SPDT	04713	MC14053BCP
A29U4944	156-0048-00			MICROCKT,LINEAR:5 XSTR ARRAY	04713	MC3346P
A29U4950	156-1850-00			IC,MISC:CMOS,ANALOG SWITCH;QUAD	17856	SDG21107/DG211C
A29U4960	156-1978-01			MICROCKT,LINEAR:OP AMP,LOW BIAS CURRENT	80009	156-1978-01
A29U4970	156-1838-01			MICROCKT,LINEAR:OPERATIONAL AMPLIFIER	80009	156-1838-01
A29U5010	156-1225-00			IC,LINEAR:BIPOLAR,COMPARATOR	01295	LM393P
A29U5020	156-0513-00			IC,MISC:CMOS,ANALOG MUX;8 CHANNEL	04713	MC14051B (CP OR
A29U5030	156-1191-01			MICROCKT,LINEAR:BIFET,DUAL OPNL AMPL	80009	156119101
A29U5040	156-0854-00			IC,LINEAR:BIPOLAR,OP-AMP	27014	LM308AN
A29U5050	156-0783-00			IC,LINEAR:BIPOLAR,VOLTAGE REF	64155	LM399H
A29U5060	156-1191-01			MICROCKT,LINEAR:BIFET,DUAL OPNL AMPL	80009	156119101
A29U5110	156-1207-00			IC,LINEAR:BIPOLAR,VOLTAGE REG	27014	LM320H-12
A29U5112	156-1160-00			IC,LINEAR:BIPOLAR,VOLTAGE REG	27014	LM78L12ACH
A29U5120	156-0796-00			IC,DIGITAL:CMOS,SHIFT REGISTER;8-STAGE SHIF	04713	MC14094BCP
A29U5122	156-0796-00			IC,DIGITAL:CMOS,SHIFT REGISTER;8-STAGE SHIF	04713	MC14094BCP
A29U5124	156-0934-00			IC,DIGITAL:BIPOLAR,DUAL RS-232 LINE RCVR	01295	SN75152
A29U5130	156-0745-00			IC,DIGITAL:CMOS,GATES;HEX INV	04713	MC14069UBCP
A29U5132	156-1245-00			IC,LINEAR:BIPOLAR,TRANSISTOR ARRAY	0CVK3	ULN2003A
A29U5140	156-1457-01			IC,MISC:BIPOLAR,MISC	24355	AD41134
A29U5150	156-1850-00			IC,MISC:CMOS,ANALOG SWITCH;QUAD	17856	SDG21107/DG211C
A29U5151	156-1191-01			MICROCKT,LINEAR:BIFET,DUAL OPNL AMPL	80009	156119101
A29U5170	156-0130-00			MICROCKT,LINEAR:MODULATOR/DEMODULATOR	04713	MC1496G
A29U5222	156-0388-00			IC,DIGITAL:LSTTL,FLIP FLOP	01295	SN74LS74AN
A29U5224	156-0844-00			IC,DIGITAL:LSTTL,COUNTER;SYNCH 4-BIT BINARY	01295	SN74LS161AN
A29U5230	156-0302-00			IC,DIGITAL:TTL,DRIVER;DUAL 2-INPUT NAND PER	01295	SN75452N
A29U5231	156-0895-00			IC,DIGITAL:CMOS,COUNTER;14-BIT BINARY	04713	MC14020BCP
A29U5232	156-0386-00			IC,DIGITAL:LSTTL,GATES;TRIPLE 3-INPUT NAND	01295	SN74LS10N
A29U5240	156-0789-00			IC,DIGITAL:LSTTL,SHIFT REGISTER;	01295	SN74LS165N
A29U5241	156-0469-00			IC,DIGITAL:LSTTL,DEMUX/DECODER	01295	SN74LS138 (N OR
A29U5242	156-0480-00			IC,DIGITAL:LSTTL,GATES	01295	SN74LS08N

Component Number	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29U5250	156-0465-00			IC,DIGITAL:LSTTL,GATES;8-INPUT NAND	01295	SN74LS30N
A29U5251	156-0388-00			IC,DIGITAL:LSTTL,FLIP FLOP;DUAL D W/SET & C	01295	SN74LS74AN
A29U5252	156-0385-00			IC,DIGITAL:LSTTL,GATES;HEX INV	01295	SN74LS04N
A29U5260	156-0852-00			IC,DIGITAL:LSTTL,GATES;NONINV, HEX BUS DRIV	01295	SN74LS367N
A29U5270	156-0385-00			IC,DIGITAL:LSTTL,GATES;HEX INV	01295	SN74LS04N
A29U5271	156-0479-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT OR	01295	SN74LS32N
A29U5272	156-1426-00			MICROCKT,DGTL:NMOS,PRGM TIMER MDL	04713	MC68B40 (L OR P
A29U5273	156-0388-00			IC,DIGITAL:LSTTL,FLIP FLOP	01295	SN74LS74AN
A29U5274	156-1172-00			IC,DIGITAL:LSTTL,COUNTER;DUAL 4-BIT BINARY	01295	SN74LS393N
A29U5281	160-5935-00			MICROCKT,DGTL:32K X 8 EPROM,PRGM (NOT PART OF A29, ORDER SEPARATELY)	80009	160593500
A29U5282	156-1111-00			IC,DIGITAL:LSTTL,TRANSCEIVER	01295	SN74LS245N
A29VR5010	152-0175-00			DIODE,ZENER:,;5.6V,5%,0.4W	04713	SZG35008 (1N752
A29VR5020	152-0760-00			DIODE,ZENER:,;6.2V,2%,0.4W	04713	SZG30205
A29VR5031	152-0662-00			DIODE,ZENER:,;5V,1%,0.4W	04713	SZG195RL
A29VR5160	152-0217-00			DIODE,ZENER:,;8.2V,5%,0.4W	04713	SZG20
A29VR5162	152-0217-00			DIODE,ZENER:,;8.2V,5%,0.4W	04713	SZG20
A29VR5210	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	27014	FDH5227.03
A29W4980	195-0964-00			LEAD,ELECTRICAL:26 AWG,2.0 L,9-1	80009	195096400
A29W5070	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225L	24546	OMA 07
A29W5075	195-1259-00			LEAD,ELECTRICAL:26 AWG,1.5 L,9-4	80009	195125900
A29W5260	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225L	24546	OMA 07
A29Y4910	158-0261-00			XTAL UNIT,QTZ:3.579MHZ,01%	33096	CCAT101773(HC18
A30	670-7894-02			CIRCUIT BD ASSY:FRONT PANEL (OPTION 01 ONLY)	80009	670789402
A30C4310	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A30LS4330	119-1427-01			XDCR,AUDIO:1-4.2KHZ,30MA,6V	63791	QMB-06
A30P4300	131-0589-00			TERMINAL,PIN:PRESSFIT/PCB,;MALE,STR,0.025 (QUANTITY OF 2)	22526	48283-029
A30R4320	307-0542-00			RES NTWK,FXD,FI:(5)10K OHM,5%,0.125W	91637	CSC06AO1-103J (
A30S4302	260-2171-00			SWITCH,PUSH:3 BUTTON,1 POLE,RANGE	71590	2LL9CCB1000123
A30S4303	260-2170-00			SWITCH,PUSH:5 BUTTON,I POLE,INPUT SEL	71590	2LL9EEB1000122
A30S4304	260-2088-00			SWITCH,PUSH:1 BTN,1 POLE,TRIGGER	71590	2LL199NB021068
A30S4305	260-2088-00			SWITCH,PUSH:1 BTN,1 POLE,TRIGGER	71590	2LL199NB021068
A30S4306	260-2171-00			SWITCH,PUSH:3 BUTTON,1 POLE,RANGE	71590	2LL9CCB1000123
A30U4300	156-1080-00			IC,DIGITAL:TTL,BUFFER/DRIVER;HEX, OC, HIGH	01295	SN7407N
A30U4310	156-0541-00			IC,DIGITAL:LSTTL,DEMUX/DECODER	01295	SN74LS139AN
A30U4320	156-1220-00			IC,DIGITAL:LSTTL,BUFFER/DRIVER;HEX BUS DRIV	01295	SN74LS365A(N OR
A30W4330	174-1392-00			CA ASSY,SP,ELEC:16,28 AWG,10.75 L	53387	ORDER BY DESC
A32	670-7999-00			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE (OPTION 09 ONLY)	80009	670799900
A32C6303	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50VDIP STYLE	04222	MD015E224ZAA
A32C6334	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50VDIP STYLE	04222	MD015E224ZAA
A32C6338	281-0767-00			CAP,FXD,CER DI:330PF,20%,100V	04222	SA102C331MAA
A32CR6330	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A32CR6335	152-0664-00			SEMICOND DVC,DI:SCHOTTKY,SW,SI,70V,DO-35	50434	5082-2800-T01
A32CR6340	152-0664-00			SEMICOND DVC,DI:SCHOTTKY,SW,SI,70V,DO-35	50434	5082-2800-T01
A32J6300	131-3046-00			CONN,HDR::PCB,;MALE,RTANG,1 X 10,0.15 CTR	22526	ORDER BY DESC
A32J6370	131-1425-00			CONN,HDR::PCB,;MALE,RTANG,1 X 36,0.1 CTR (LOCATION A)	22526	65521-136
A32J6370	131-1426-00			CONN,HDR::PCB,;MALE,RTANG,1 X 36,0.1 CTR (LOCATION B)	22526	65524-136

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A32J6380	131-3045-00			CONN,BOX::PCB,;FEMALE,RTANG,1 X 5,0.1 CTR	00779	1-380949-5
A32J6385	136-0547-00			CONN,RCPT,ELEC:CKT BOARD,6 CONTACT	00779	1-380949-6
A32L6354	108-0245-00			CHOKE,RF:FIXED,3.9UH, +/- 10 %, Q 35, DCR	0JR03	108-0245-00
A32Q6334	151-0190-00			TRANSISTOR,SIG:BIPOLAR,NPN	2D532	2N3904
A32R6301	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6302	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6303	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6304	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6305	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6306	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6307	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6308	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6325	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6330	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6336	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6340	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6350	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32U6310	156-1707-00			IC,DIGITAL:FTTL,GATE;QUAD 2-INPUT NAND	04713	MC74F00 (N OR J
A32U6315	156-1707-00			IC,DIGITAL:FTTL,GATE;QUAD 2-INPUT NAND	04713	MC74F00 (N OR J
A32U6320	156-0441-00			IC,DIGITAL:FTTL,COMPARATOR	04713	MC74F521N
A32U6325	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER	27014	MM74C164(NA+)
A32U6330	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER	27014	MM74C164(NA+)
A32U6335	156-1724-00			IC,DIGITAL:FTTL,GATES	04713	MC74F32N
A32U6350	156-1611-00			IC,DIGITAL:FTTL,FLIP FLOP	04713	MC74F74N
A32U6356	156-1743-00			IC,DIGITAL:FTTL,GATES	04713	MC74F02N
A33	670-7998-01			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE (OPTION 09 ONLY)	80009	670799801
A33C6410	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50VDIP STYLE	04222	MD015E224ZAA
A33C6440	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50VDIP STYLE	04222	MD015E224ZAA
A33J6400	131-3046-00			CONN,HDR::PCB,;MALE,RTANG,1 X 10,0.15 CTR	22526	ORDER BY DESC
A33P6380	131-3153-00			CONN,HDR::PCB,;MALE,RTANG,1 X 36,0.1 CTR	58050	082-3643-RS20
A33P6385	131-3153-00			CONN,HDR::PCB,;MALE,RTANG,1 X 36,0.1 CTR	58050	082-3643-RS20
A33R6400	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6401	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6402	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6403	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6404	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6405	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6406	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6407	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6408	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6432	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6443	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33U6405	156-1707-00			IC,DIGITAL:FTTL,GATE;QUAD 2-INPUT NAND	04713	MC74F00 (N OR J
A33U6409	156-1707-00			IC,DIGITAL:FTTL,GATE;QUAD 2-INPUT NAND	04713	MC74F00 (N OR J
A33U6415	156-0441-00			IC,DIGITAL:FTTL,COMPARATOR	04713	MC74F521N
A33U6420	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER;8-BIT SIPO	27014	MM74C164(NA+)
A33U6425	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER;8-BIT SIPO	27014	MM74C164(NA+)
A33U6430	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER;8-BIT SIPO	27014	MM74C164(NA+)
A33U6435	156-1800-00			IC,DIGITAL:FTTL,GATES;QUAD 2-INPUT XOR	04713	MC74F86N
F4991	159-0016-00			FUSE,CARTRIDGE:3AG,1.5,250V,FAST BLOW (OPTION 01)	75915	31201.5
P4241	174-1375-00			CA ASSY,SP,ELEC:40,28 AWG,14.375 L	53387	ORDER BY DESC

REPLACEABLE ELECTRICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

When ordering parts, 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 Mfg. Code Number to Manufacturer Cross 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 parts list)

Example a. **component number**

A23R1234 **A23** **R1234**

Assembly number **Circuit number**

Read: Resistor 1234 of Assembly 23

Example b. **component number**

A23A2R1234 **A23** **A2** **R1234** **Circuit number**

Assembly number **Subassembly number**

Read: Resistor 1234 of Subassembly 2 of Assembly 23

The circuit component's number appears 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 parts list)

Indicates part number to be used when ordering replacement part from Tektronix.

SERIAL NO. (columns three and four of the 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 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 Catalog handbook H6-1 can be utilized where possible.

MFR. CODE (column six of the 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 NO. (column seven of the parts list)

Indicates actual manufacturer's part number.

CROSS INDEX – MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
D5243	ROEDERSTEIN E SPEZIALFABRIK FUER KONDENSATOREN GMBN	LUDMILLASTRASSE 23-25	8300 LANDSHUT GERMANY
TK0161	WYLE LABORATORIES ELECTRONICS MARKETING GROUP LOS ANGELES DIV	124 MARYLAND ST	EL SEGUNDO CA 90245-4115
TK0987	TOPAZ SEMICONDUCTOR SUB OF HYTEK MICROSYSTEMS INC	1971 N CAPITOL AVE	SAN JOSE CA 95132-3799
TK1601	PULSE ENGINEERING INC	2801 MOORPARK AVE SUITE 7	SAN JOSE CA 95128
TK1727	PHILIPS NEDERLAND BV AFD ELONCO	POSTBUS 90050	5600 PB EINDHOVEN THE NETHERLANDS
TK1743	UNITRODE (UK) LTD	6 CRESSWELL PARK BLACKHEATH	LONDON SE 3 9RD ENGLAND
TK1864	INTERFET CORP	322 GOLD ST	GARLAND TX 75042
TK2425	CHUNG HING INDUSTRY CO LTD PHONE: 5-564114/8 FAX: 852-5-713679	1ST FLOOR, SUNRIDGE IND BLDG 10 HONG MAN STREET	CHAIWAN HONG KONG
0CVK3	SPRAGUE ELECTRIC CO INTERGRATED CIRCUIS DIVISION	115 NE CUTOFF	WORCHESTER MA 01606
0JR03	ZMAN AND ASSOCIATES	7633 S 180th	KENT WA 98032
0JR04	TOSHIBA AMERICA INC ELECTRONICS COMPONENTS DIV BUSINESS SECTOR	2692 DOW AVE	TUSTIN CA 92680
0J7N9	MCX INC	30608 SAN ANTONIO ST	HAYWARD CA 94544
0J9R5	MARCON AMERICA CORP	3 PEARL COURT	ALLENDALE NJ 07401
00779	AMP INC	2800 FULLING MILL PO BOX 3608	HARRISBURG PA 17105
01121	ALLEN-BRADLEY CO	1201 S 2ND ST	MILWAUKEE WI 53204-2410
01295	TEXAS INSTRUMENTS INC SEMICONDUCTOR GROUP	13500 N CENTRAL EXPY PO BOX 655012	DALLAS TX 75265
03888	KDI ELECTRONICS	60 S JEFFERSON RD	WHIPPANY NJ 07981-1001
04222	AVX CERAMICS DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
04713	MOTOROLA INC SEMICONDUCTOR PRODUCTS SECTOR	5005 E MCDOWELL RD	PHOENIX AZ 85008-4229
06665	PRECISION MONOLITHICS INC SUB OF BOURNS INC	1500 SPACE PARK DR	SANTA CLARA CA 95050
09922	BURNDY CORP	RICHARDS AVE	NORWALK CT 06852
09969	DALE ELECTRONICS INC	EAST HIGHWAY 50 P O BOX 180	YANKTON SD 57078
11502	INTERNATIONAL RESISTIVE CO INC	GREENWAY RD PO BOX 1860	BOONE NC 28607-1860
12617	HAMLIN INC	612 EAST LAKE STREET	LAKE MILLS WI 53551
14301	ANDERSON ELECTRONICS INC	310 PENN ST PO BOX 89	HOLLIDAYSBURG PA 16648-2009
14752	ELECTRO CUBE INC	1710 S DEL MAR AVE	SAN GABRIEL CA 91776-3825

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
17745	ANGSTROHM PRECISION INC	ONE PRECISION PLACE P O BOX 1827	HAGERSTOWN MD 21740
17856	SILICONIX INC	2201 LAURELWOOD RD	SANTA CLARA CA 95054-1516
18324	SIGNETICS CORP MILITARY PRODUCTS DIV	4130 S MARKET COURT	SACRAMENTO CA 95834-1222
19647	CADDOCK ELECTRONICS INC	1717 CHICAGO AVE	RIVERSIDE CA 92507-2302
19701	PHILIPS COMPONENTS DISCRETE PRODUCTS DIV RESISTIVE PRODUCTS FACILITY AIRPORT ROAD	PO BOX 760	MINERAL WELLS TX 76067-0760
2D532	SPRAGUE ELECTRIC CO SEMICONDUCTOR DIVISION	70 PEMBROKE ROAD	CONCORD NH 03301
22526	DU PONT E I DE NEMOURS AND CO INC DU PONT ELECTRONICS DEPT	515 FISHING CREEK RD	NEW CUMBERLAND PA 17070-3007
24355	ANALOG DEVICES INC	RT 1 INDUSTRIAL PK PO BOX 9106	NORWOOD MA 02062
24546	CORNING GLASS WORKS	550 HIGH ST	BRADFORD PA 16701-3737
25088	SIEMENS CORP	186 WOOD AVE S	ISELIN NJ 08830-2704
25403	PHILIPS COMPONENTS DISCRETE PRODUCTS DIV DISCRETE SEMICONDUCTOR GROUP	GEORGE WASHINGTON HWY	SMITHFIELD RI 02917
27014	NATIONAL SEMICONDUCTOR CORP	2900 SEMICONDUCTOR DR	SANTA CLARA CA 95051-0606
31433	KEMET ELECTRONICS CORP NATIONAL SALES HEADQUARTERS	PO BOX 5928	GREENVILLE SC 29606
32997	BOURNS INC TRIMPOT DIV	1200 COLUMBIA AVE	RIVERSIDE CA 92507-2114
33096	COLORADO CRYSTAL CORP	2303 W 8TH ST	LOVELAND CO 80537-5268
34335	ADVANCED MICRO DEVICES	901 THOMPSON PL	SUNNYVALE CA 94086-4518
34371	HARRIS CORP HARRIS SEMICONDUCTOR PRODUCTS GROUP	200 PALM BAY BLVD PO BOX 883	MELBOURNE FL 32919
50157	MIDWEST COMPONENTS INC	1981 PORT CITY BLVD P O BOX 787	MUSKEGON MI 49443
50434	HEWLETT-PACKARD CO OPTOELECTRONICS DIV	370 W TRIMBLE RD	SAN JOSE CA 95131
53387	MINNESOTA MINING MFG CO	PO BOX 2963	AUSTIN TX 78769-2963
53469	PLESSEY SEMICONDUCTOR	SEQUOIA RESEARCH PARK 1500 GREEN HILLS ROAD	SCOTTS VALLEY CA 95066
54583	TDK ELECTRONICS CORP	12 HARBOR PARK DR	PORT WASHINGTON NY 11550
56289	SPRAGUE ELECTRIC CO WORLD HEADQUARTERS	92 HAYDEN AVE	LEXINGTON MA 02173-7929
57668	ROHM CORP	8 WHATNEY PO BOX 19515	IRVINE CA 92713
58050	TEKA PRODUCTS INC	45 SALEM ST	PROVIDENCE RI 02907
58361	QUALITY TECHNOLOGIES CORP	3400 HILLVIEW AVE	PALO ALTO CA 94304-1319
61529	AROMAT CORP	250 SHEFFIELD ST	MOUNTAINSIDE NJ 07092-2303

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
63791	STAR MICRONICS INC	200 PARK AVE SUITE 2308	NEW YORK NY 10166-0001
64155	LINEAR TECHNOLOGY CORP	1630 MCCARTHY BLVD	MILPITAS CA 95035-7417
71400	BUSSMANN DIV OF COOPER INDUSTRIES INC	114 OLD STATE RD PO BOX 14460	ST LOUIS MO 63178
71590	CRL COMPONENTS INC	HWY 20 W PO BOX 858	FORT DODGE IA 50501
75498	MULTICOMP INC	3005 SW 154TH TERRACE #3	BEAVERTON OR 97006
75915	LITTELFUSE INC SUB TRACOR INC	800 E NORTHWEST HWY	DES PLAINES IL 60016-3049
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077-0001
91637	DALE ELECTRONICS INC	2064 12TH AVE PO BOX 609	COLUMBUS NE 68601-3632

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A2	672-0076-10			CIRCUIT BD ASSY:LV PWR SPLY MODULE (OPTION 01 ONLY)	80009	672007610
A22	670-8159-00			CIRCUIT BD ASSY:LED (OPTION 10 ONLY)	80009	670815900
A23	670-0981-00			CIRCUIT BD ASSY:GPIB OPTION 10 (OPTION 10 ONLY)	80009	670098100
A25	671-1340-00			CIRCUIT BD ASSY:TV (OPTION 05 ONLY) (FOR SUBPARTS SEE A26)	80009	671134000
A26	671-0982-00			CIRCUIT BD ASSY:TV/CTT (OPTION 05/06/09)	80009	671098200
A27	671-1341-00			CIRCUIT BD ASSY:CTT (OPTION 06/09 ONLY) (FOR SUBPARTS SEE A26)	80009	671134100
A29	670-7835-10			CIRCUIT BD ASSY:DMM (OPTION 01 ONLY)	80009	670783510
A30	670-7894-02			CIRCUIT BD ASSY:FRONT PANEL (OPTION 01 ONLY)	80009	670789402
A32	670-7999-00			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE (OPTION 09 ONLY)	80009	670799900
A33	670-7998-01			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE (OPTION 09 ONLY)	80009	670799801

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A2	672-0076-10			CIRCUIT BD ASSY:LV PWR SPLY MODULE (OPTION 01 ONLY)	80009	672007610
A22	670-8159-00			CIRCUIT BD ASSY:LED (OPTION 10 ONLY)	80009	670815900
A22DS4540	150-1061-00			LT EMITTING DIO:RED,660NM,50MA MAX	50434	HLMP-1301
A22DS4542	150-1061-00			LT EMITTING DIO:RED,660NM,50MA MAX	50434	HLMP-1301
A22DS4545	150-1061-00			LT EMITTING DIO:RED,660NM,50MA MAX	50434	HLMP-1301
A23	671-0981-00			CIRCUIT BD ASSY:GPIB OPTION 10 (OPTION 10 ONLY)	80009	671098100
A23C4625	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4626	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4705	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4706	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4708	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4730	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4735	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4738	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4745	283-0203-00			CAP,FXD,CER DI:0.47UF,20%,50V	04222	SR305SC474MAA
A23C4747	290-0847-00			CAP,FXD,ELCTLT:47UF,+50-20%,10WVDC	0J9R5	CE02W1A470MD
A23C4801	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4805	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4808	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4831	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4838	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23J4243	131-3323-00			CONN,HDR::PCB,;MALE,STR,2 X 20,0.1 CTR,0.36	22526	66506-025
A23J4540	131-2919-01			CONN,HDR::PCB,;MALE,STR,1 X 4,0.1 CTR,0.235	53387	2404-6112 UB
A23J4800	131-4114-00			CONN,HDR::PCB,;MALE,STR,2 X 12,0.1 CTR,0.36	53387	3589-6002
A23P4243	174-1375-00			CA ASSY,SP,ELEC:40,28 AWG,14.375 L	53387	ORDER BY DESC
A23P4800	174-1450-00			CA ASSY,SP,ELEC:24,28 AWG,8.25 L,RIBBON	53387	ORDER BY DESC
A23Q4743	151-0622-00			TRANSISTOR:PNP,SI,40V,1A,TO-226AE/237	04713	MPS6727
A23Q4745	151-0736-00			TRANSISTOR:NPN,SI,TO-92	04713	2N4401
A23R4513	313-1101-00			RES,FXD,FILM:100 OHM,5%,0.2W	91637	CCF50-2-100R0J
A23R4543	313-1201-00			RES,FXD,FILM:200 OHM,5%,0.2W	91637	CCF50-2-200R0J
A23R4544	313-1201-00			RES,FXD,FILM:200 OHM,5%,0.2W	91637	CCF50-2-200R0J
A23R4545	313-1201-00			RES,FXD,FILM:200 OHM,5%,0.2W	91637	CCF50-2-200R0J
A23R4732	313-1103-00			RES,FXD,FILM:10K OHM,5%,0.2W	91637	CCF50-2-10001J
A23R4734	313-1131-00			RES,FXD,FILM:130 OHM,5%,0.26	91637	CCF501G130R0J
A23R4735	313-1271-00			RES,FXD,FILM:270 OHM,5%,0.2W	91637	CCF50-2-270R0J
A23R4740	313-1152-00			RES,FXD,FILM:1.5K OHM,5%,0.2W	91637	CCF50-2-15000J
A23R4743	313-1152-00			RES,FXD,FILM:1.5K OHM,5%,0.2W	91637	CCF50-2-15000J
A23R4750	313-1103-00			RES,FXD,FILM:10K OHM,5%,0.2W	91637	CCF50-2-10001J
A23U4501	156-1065-00			IC,DIGITAL:LSTTL,LATCH;OCTAL D TRANSPARENT	01295	SN74LS373N
A23U4505	156-1065-00			IC,DIGITAL:LSTTL,LATCH;OCTAL D TRANSPARENT	01295	SN74LS373N
A23U4601	156-0866-00			IC,DIGITAL:LSTTL,GATES;13-INPUT NAND	04713	SN74LS133N
A23U4605	156-0386-00			IC,DIGITAL:LSTTL,GATES;TRIPLE 3-INPUT NAND	01295	SN74LS10N
A23U4606	156-0385-00			IC,DIGITAL:LSTTL,GATES;HEX INV	01295	SN74LS04N
A23U4608	156-1111-00			IC,DIGITAL:LSTTL,TRANSCEIVER;OCTAL NONINV	01295	SN74LS245N
A23U4625	156-1221-00			IC,DIGITAL:LSTTL,FLIP FLOP;HEX D, POS EDGE	01295	SN74LS378N
A23U4626	156-1221-00			IC,DIGITAL:LSTTL,FLIP FLOP;HEX D, POS EDGE	01295	SN74LS378N
A23U4701	156-1277-00			MICROCKT,DGTL:LSTTL,3-STATE OCTAL BFR	27014	DM81LS95AN
A23U4705	156-0480-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT AND	01295	SN74LS08N
A23U4706	156-0382-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NAND	01295	SN74LS00N
A23U4708	156-0469-00			IC,DIGITAL:LSTTL,DEMUX/DECODER	01295	SN74LS138 (N OR

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A23U4710	160-5881-01			MICROCKT,DGTL:8K X 8 EPROM,PRGM (NOT PARTS OF BOARD, ORDER SEPERATELY)	80009	160588101
A23U4715	160-5882-01			MICROCKT,DGTL:32K X 8 EPROM,PRGM (NOT PARTS OF BOARD, ORDER SEPERATELY)	80009	160588201
A23U4730	156-0467-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NAND	01295	SN74LS38N
A23U4735	156-0382-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NAND	01295	SN74LS00N
A23U4738	156-0386-00			IC,DIGITAL:LSTTL,GATES;TRIPLE 3-INPUT NAND	01295	SN74LS10N
A23U4801	156-0865-00			IC,DIGITAL:LSTTL,FLIP FLOP;OCTAL D-TYPE, CL	01295	SN74LS273N
A23U4805	156-1415-00			IC,DIGITAL:LSTTL,TRANSCEIVER	01295	SN75161BN
A23U4808	156-1414-00			IC,DIGITAL:LSTTL,TRANSCEIVER	01295	SN75160B (N OR
A23U4811	156-2473-00			IC,MEMORY:CMOS,SRAM;8K X 8,200NS,10UA	0JR04	TC5564PL-20
A23U4818	156-1444-01			IC,PROCESSOR:NMOS,CONTROLLER	01295	TMS9914A (NL OR
A23U4831	156-0479-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT OR	01295	SN74LS32N
A23U4838	156-0388-00			IC,DIGITAL:LSTTL,FLIP FLOP;DUAL D W/SET & C	01295	SN74LS74AN
A23W4244	174-1697-00			CA ASSY,SP,ELEC:3,26 AWG,5.25 L	80009	174169700
A23W4540	174-0128-00			CA ASSY,SP,ELEC:4,26 AWG,9.0 L,9-N	0J7N9	ORDER BY DESC
A23W4750	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225L	24546	OMA 07
A23XU4710	136-0755-00			SOCKET,DIP::PCB,;28 POS,2 X 14,0.1 X 0.6 CT	09922	DILB28P-108
A23XU4715	136-0755-00			SOCKET,DIP::PCB,;28 POS,2 X 14,0.1 X 0.6 CT	09922	DILB28P-108
A25	671-1340-00			CIRCUIT BD ASSY:TV (OPTION 05 ONLY) (FOR SUBPARTS SEE A26)	80009	671134000
A26	671-0982-00			CIRCUIT BD ASSY:TV/CTT (OPTION 05/06/09)	80009	671098200
A26C5332	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5371	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5372	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5373	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5374	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5419	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5433	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5438	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5458	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5460	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5462	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5465	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5468	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5490	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5543	283-5188-00			CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C5545	283-5068-00			CAP,FXD,CER DI:2200PF,10%,50V	04222	W1206X222K2B04
A26C5612	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5613	283-5187-00			CAP,FXD,CER DI:15PF,5%,100V	04222	W1206C150J3B04
A26C5614	283-5108-00			CAP,FXD,CER DI:68PF,5%,100V	04222	W1206C680J3B04
A26C5625	283-5106-00			CAP,FXD,CER DI:470PF,5%,100V	04222	W1206C470J3B04
A26C5626	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5627	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5628	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5630	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5631	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5633	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5638	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5640	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C5651	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26C5690	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5720	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5724	283-5188-00			CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C5726	283-5108-00			CAP,FXD,CER DI:68PF,5%,100V	04222	W1206C680J3B04
A26C5728	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5731	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5734	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5735	283-5107-00			CAP,FXD,CER DI:22PF,5%,100V	04222	W1206C220J3B04
A26C5740	283-5105-00			CAP,FXD,CER DI:1UF,+80/-20%,50V	04222	W1825Z105Z2B04
A26C5755	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5757	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5758	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5770	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5771	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5772	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5773	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5774	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5775	283-5113-00			CAP,FXD,CER DI:0.047UF,10%,50V,X7R,1206 PKT	04222	W1206X473K2B04
A26C5776	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5777	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5778	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5779	283-5188-00			CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C5808	283-5105-00			CAP,FXD,CER DI:1UF,+80/-20%,50V	04222	W1825Z105Z2B04
A26C5810	283-5105-00			CAP,FXD,CER DI:1UF,+80/-20%,50V	04222	W1825Z105Z2B04
A26C5830	283-5109-00			CAP,FXD,CER DI:680PF,5%,100V	04222	W1206C681J3B04
A26C5848	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5849	283-5196-00			CAP,FXD,CER DI:47PF,5%,100V	04222	W1206C470J3B04
A26C5850	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C5853	283-5105-00			CAP,FXD,CER DI:1UF,+80/-20%,50V	04222	W1825Z105Z2B04
A26C5865	283-5203-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	W1206X102K2B04
A26C5872	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C5875	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5910	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5920	283-5195-00			CAP,FXD,CER DI:10PF,5%,100V	04222	W1206C100J3B04
A26C5922	283-5107-00			CAP,FXD,CER DI:22PF,5%,100V	04222	W1206C220J3B04
A26C5923	283-5197-00			CAP,FXD,CER DI:330PF,5%,100V	04222	W1206C331J3B04
A26C5924	283-5197-00			CAP,FXD,CER DI:330PF,5%,100V	04222	W1206C331J3B04
A26C5930	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5940	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5942	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5950	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5952	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5958	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5960	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5961	283-5188-00			CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C5980	283-5196-00			CAP,FXD,CER DI:47PF,5%,100V	04222	W1206C470J3B04
A26C5981	283-5196-00			CAP,FXD,CER DI:47PF,5%,100V	04222	W1206C470J3B04
A26C5990	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5991	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5992	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C6010	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6021	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6030	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C6070	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6111	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04

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A26C6113	283-5203-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	W1206X102K2B04
A26C6114	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6115	283-5188-00			CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C6121	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6122	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6130	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6131	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6140	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6180	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6190	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6223	283-5202-00			CAP,FXD,CER DI:0.022UF,10%,50VDC	04222	W1206X223K2B04
A26C6230	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6231	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6233	283-5203-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	W1206X102K2B04
A26C6250	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6252	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6291	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6300	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26CR5522	152-5005-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR5526	152-5004-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5590	152-5004-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5623	152-5004-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5653	152-5005-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR5721	152-5004-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5735	152-5004-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5751	152-5000-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV70T3
A26CR5772	152-5000-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV70T3
A26CR5825	152-5005-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR5867	152-5004-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5870	152-5004-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5872	152-5004-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5874	152-5004-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5876	152-5004-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5878	152-5004-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5930	152-5005-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR5960	152-5000-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV70T3
A26CR5970	152-5005-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR5990	152-5005-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR5995	152-5005-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR6010	152-5005-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR6020	152-5005-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR6162	152-5005-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR6181	152-5004-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR6190	152-5005-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR6210	152-0269-00			SEMICOND DVC,DI:VVC,SI,35V,33PF AT 4V,DO-7	04713	SMV1263RL
A26CR6211	152-5005-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR6273	152-5005-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26J4232	131-3360-00			CONN,HDR::PCB,;MALE,STR,2 X 10,0.1 CTR	53387	3592-6002
A26J4234	131-2920-00			CONN,HDR::PCB,;MALE,RTANG,2 X 5,0.1 CTR	00779	86479-3
A26J4242	131-3181-00			CONN,HDR::PCB,;MALE,RTANG,2 X 20,0.1 CTR	22526	69155-040
A26J5800	131-3766-00			CONN,HDR::PCB,;MALE,RTANG,1 X 2,0.1 CTR	00779	87232-2
A26J5990	131-2920-00			CONN,HDR::PCB,;MALE,RTANG,2 X 5,0.1 CTR	00779	86479-3
A26J6000	131-1857-00			CONN,HDR::PCB,;MALE,STR,1 X 36,0.1 CTR	58050	082-3644-SS10
A26L6210	108-1382-00			COIL,RF:FIXED,42NH,10%,AXIAL	0JR03	108-1382-00
A26L6220	108-5018-00			COIL,RF:FXD,4.7UH,20%, Q=50, SRF 45 MHZ	54583	NL453232T-4R7M

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A26L6230	108-5018-00			COIL,RF:FXD,4.7UH,20%, Q=50, SRF 45 MHZ	54583	NL453232T-4R7M
A26P5990	131-3957-00			BUS,CONDUCTOR:SHUNT,1 X 2,0.1 CTR	22526	68786-202
A26P6000	131-3957-00			BUS,CONDUCTOR:SHUNT,1 X 2,0.1 CTR (QUANTITY OF 2)	22526	68786-202
A26Q5370	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q5400	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5442	151-5656-00			TRANSISTOR,SIG:JFET,N-CHANNEL;	04713	MMBF4391LT1,T2
A26Q5512	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5515	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5518	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5528	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5530	151-5656-00			TRANSISTOR,SIG:JFET,N-CHANNEL;	04713	MMBF4391LT1,T2
A26Q5532	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q5720	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5736	151-5656-00			TRANSISTOR,SIG:JFET,N-CHANNEL;	04713	MMBF4391LT1,T2
A26Q5740	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5870	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q5875	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q5880	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q5885	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q5920	151-5029-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,500MA	04713	MMBT2369LT1
A26Q5921	151-5022-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,50MA	04713	MMBT918LT1
A26Q5980	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5981	151-5029-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,500MA	04713	MMBT2369LT1
A26Q5982	151-5022-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,50MA	04713	MMBT918LT1
A26Q5983	151-5029-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,500MA	04713	MMBT2369LT1
A26Q5984	151-5029-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,500MA	04713	MMBT2369LT1
A26Q6090	151-5022-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,50MA	04713	MMBT918LT1
A26Q6091	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6092	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6093	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6180	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q6181	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q6190	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6191	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6270	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6271	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6272	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6273	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6274	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6290	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6291	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6292	151-5029-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,500MA	04713	MMBT2369LT1
A26R5319	321-5031-00			RES,FXD,FILM:12.1K,1%,0.125W	91637	CRCW12061212FT
A26R5329	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R5330	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5332	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5334	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5335	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5370	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5371	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5419	321-5049-00			RES,FXD,FILM:1 MEG,1%,0.125W	57668	MCR18FXEA1M
A26R5420	321-5049-00			RES,FXD,FILM:1 MEG,1%,0.125W	57668	MCR18FXEA1M
A26R5421	321-5049-00			RES,FXD,FILM:1 MEG,1%,0.125W	57668	MCR18FXEA1M
A26R5422	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5423	321-5167-00			RES,FXD,FILM:221K OHM,1%,0.125W	91637	CRCW1206-22102F

Component Number	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26R5424	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5425	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5426	321-5027-00			RES,FXD,FILM:5.62K,1%,0.125W	91637	CRCW12065621FT
A26R5427	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5429	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R5432	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R5433	321-5048-00			RES,FXD,FILM:332K,1%,0.125W	91637	CRCW1206-3323FT
A26R5434	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5436	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R5437	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5438	321-5016-00			RES,FXD,FILM:681 OHM,1%,0.125W	91637	CRCW12066810FT
A26R5439	321-5016-00			RES,FXD,FILM:681 OHM,1%,0.125W	91637	CRCW12066810FT
A26R5440	321-5016-00			RES,FXD,FILM:681 OHM,1%,0.125W	91637	CRCW12066810FT
A26R5442	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5443	321-5167-00			RES,FXD,FILM:221K OHM,1%,0.125W	91637	CRCW1206-22102F
A26R5444	321-5048-00			RES,FXD,FILM:332K,1%,0.125W	91637	CRCW1206-3323FT
A26R5445	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5458	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5460	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5462	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5464	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5466	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5468	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5519	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5523	321-5019-00			RES,FXD,FILM:1.21K,1%,0.125W	91637	CRCW12061211FT
A26R5524	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5525	321-5010-00			RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R5530	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5540	321-5035-00			RES,FXD,FILM:27.4K,1%,0.125W	91637	CRCW12062742FT
A26R5541	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5542	321-5007-00			RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R5544	321-5007-00			RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R5557	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5575	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5608	311-5039-00			RES,VAR,NONWW:TRMR,1K OHM,25%,0.1W	32997	3314J-1-102E
A26R5610	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5611	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5612	321-5021-00			RES,FXD,FILM:1.82K,1%,0.125W	91637	CRCW12061821FT
A26R5614	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5616	321-5038-00			RES,FXD,FILM:47.5K,1%,0.125W	91637	CRCW12064752FT
A26R5618	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5620	321-5017-00			RES,FXD,FILM:825 OHM,1%,0.125W	91637	CRCW12068250FT
A26R5622	321-5029-00			RES,FXD,FILM:8.25K,1%,0.125W	91637	CRCW12068251FT
A26R5623	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5624	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R5626	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R5627	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5628	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5629	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5632	321-5000-00			RES,FXD,FILM:10 OHM,1%,0.125W	91637	CRCW120610R0FT
A26R5652	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5657	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5720	321-5036-00			RES,FXD,FILM:33.2K,1%,0.125W	91637	CRCW12063322FT
A26R5722	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5723	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT

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A26R5725	321-5035-00			RES,FXD,FILM:27.4K,1%,0.125W	91637	CRCW12062742FT
A26R5729	321-5169-00			RES,FXD,FILM:475K OHM,1%,0.125W	91637	CRCW1206-47502F
A26R5730	321-5000-00			RES,FXD,FILM:10 OHM,1%,0.125W	91637	CRCW120610R0FT
A26R5732	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5733	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5735	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5736	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5737	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5738	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5739	321-5037-00			RES,FXD,FILM:39.2K,1%,0.125W	91637	CRCW12063922FT
A26R5750	321-5166-00			RES,FXD,FILM:150K OHM,1%,0.125W	91637	CRCW1206-15002F
A26R5751	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5752	321-5028-00			RES,FXD,FILM:6.81K,1%,0.125W	91637	CRCW12066811FT
A26R5753	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5754	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R5755	321-5039-00			RES,FXD,FILM:56.2K,1%,0.125W	91637	CRCW12065622FT
A26R5756	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5758	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R5771	321-5036-00			RES,FXD,FILM:33.2K,1%,0.125W	91637	CRCW12063322FT
A26R5810	321-5024-00			RES,FXD,FILM:3.32K,1%,0.125W	91637	CRCW12063321FT
A26R5811	321-5000-00			RES,FXD,FILM:10 OHM,1%,0.125W	91637	CRCW120610R0FT
A26R5812	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5813	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5814	321-5000-00			RES,FXD,FILM:10 OHM,1%,0.125W	91637	CRCW120610R0FT
A26R5815	321-5000-00			RES,FXD,FILM:10 OHM,1%,0.125W	91637	CRCW120610R0FT
A26R5820	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5822	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5823	321-5040-00			RES,FXD,FILM:68.1K,1%,0.125W	91637	CRCW12066812FT
A26R5824	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5825	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5826	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5827	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5828	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R5829	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5830	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5831	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5832	321-5031-00			RES,FXD,FILM:12.1K,1%,0.125W	91637	CRCW12061212FT
A26R5833	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5834	321-5016-00			RES,FXD,FILM:681 OHM,1%,0.125W	91637	CRCW12066810FT
A26R5847	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5849	321-5169-00			RES,FXD,FILM:475K OHM,1%,0.125W	91637	CRCW1206-47502F
A26R5850	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5851	321-5036-00			RES,FXD,FILM:33.2K,1%,0.125W	91637	CRCW12063322FT
A26R5852	321-5031-00			RES,FXD,FILM:12.1K,1%,0.125W	91637	CRCW12061212FT
A26R5853	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5854	321-5170-00			RES,FXD,FILM:825K OHM,1%,0.125W	91637	CRCW1206-82502F
A26R5864	321-5023-00			RES,FXD,FILM:2.74K,1%,0.125W	91637	CRCW12062741FT
A26R5868	321-5040-00			RES,FXD,FILM:68.1K,1%,0.125W	91637	CRCW12066812FT
A26R5870	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5871	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5872	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5873	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5874	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5875	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5876	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26R5877	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5878	321-5064-00			RES,FXD,FILM:200K,1%,0.125W,1206,8MM	91637	CRCW1206-2003FT
A26R5880	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5882	321-5017-00			RES,FXD,FILM:825 OHM,1%,0.125W	91637	CRCW12068250FT
A26R5883	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5884	321-5024-00			RES,FXD,FILM:3.32K,1%,0.125W	91637	CRCW12063321FT
A26R5885	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R5886	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R5887	321-5024-00			RES,FXD,FILM:3.32K,1%,0.125W	91637	CRCW12063321FT
A26R5888	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5889	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5890	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5892	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5893	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5920	321-5031-00			RES,FXD,FILM:12.1K,1%,0.125W	91637	CRCW12061212FT
A26R5921	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5925	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5926	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5930	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5931	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5932	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5933	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5934	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5935	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5936	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5937	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5938	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5939	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5951	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5952	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5953	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5954	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5955	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5956	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5957	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5958	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5959	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5960	321-5009-00			RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R5961	321-5007-00			RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R5962	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5963	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5964	321-5169-00			RES,FXD,FILM:475K OHM,1%,0.125W	91637	CRCW1206-47502F
A26R5970	321-5045-00			RES,FXD,FILM:68.1 OHM,1%,0.125W	91637	CRCW120668R1FT
A26R5971	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5972	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5973	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5980	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5981	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5982	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5983	321-5045-00			RES,FXD,FILM:68.1 OHM,1%,0.125W	91637	CRCW120668R1FT
A26R5984	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5985	321-5169-00			RES,FXD,FILM:475K OHM,1%,0.125W	91637	CRCW1206-47502F
A26R5991	321-5050-00			RES,FXD,FILM:33.2 OHM,1%,0.125W	91637	CRCW120633R2FT
A26R5992	321-5008-00			RES,FXD,FILM:150 OHM,1%,0.125W	91637	CRCW12061500FT
A26R5993	321-5194-00			RES,FXD,FILM:49.9 OHM,1%,0.125W,1206,8MM	91637	CRCW-1206-49R-9

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26R6020	321-5038-00			RES,FXD,FILM:47.5K,1%,0.125W	91637	CRCW12064752FT
A26R6021	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6022	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6042	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6050	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6051	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6052	321-5019-00			RES,FXD,FILM:1.21K,1%,0.125W	91637	CRCW12061211FT
A26R6060	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6062	321-5007-00			RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6063	321-5009-00			RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R6082	321-5010-00			RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6083	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R6090	321-5046-00			RES,FXD,FILM:82.5 OHM,1%,0.125W	91637	CRCW120682R5FT
A26R6091	321-5009-00			RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R6092	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R6093	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6094	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R6102	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6104	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R6105	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6106	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6107	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6108	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6109	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6113	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6114	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6115	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6116	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6122	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6123	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6127	321-5008-00			RES,FXD,FILM:150 OHM,1%,0.125W	91637	CRCW12061500FT
A26R6130	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6132	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6133	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6134	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6137	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6140	321-5194-00			RES,FXD,FILM:49.9 OHM,1%,0.125W,1206,8MM	91637	CRCW-1206-49R-9
A26R6164	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6165	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6166	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6170	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6172	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6180	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6181	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R6182	321-5044-00			RES,FXD,FILM:56.2 OHM,1%,0.125W	91637	CRCW120656R2FT
A26R6183	321-5044-00			RES,FXD,FILM:56.2 OHM,1%,0.125W	91637	CRCW120656R2FT
A26R6184	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6191	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6192	321-5010-00			RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6193	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6194	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6195	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6197	321-5027-00			RES,FXD,FILM:5.62K,1%,0.125W	91637	CRCW12065621FT
A26R6198	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6199	321-5027-00			RES,FXD,FILM:5.62K,1%,0.125W	91637	CRCW12065621FT

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26R6221	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6222	321-5064-00			RES,FXD,FILM:200K,1%,0.125W,1206,8MM	91637	CRCW1206-2003FT
A26R6230	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6231	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R6232	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6233	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6245	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R6250	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6251	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6264	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6266	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6267	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6271	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R6273	321-5194-00			RES,FXD,FILM:49.9 OHM,1%,0.125W,1206,8MM	91637	CRCW-1206-49R-9
A26R6274	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R6275	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R6277	321-5028-00			RES,FXD,FILM:6.81K,1%,0.125W	91637	CRCW12066811FT
A26R6290	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6291	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6293	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6294	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6296	321-5007-00			RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6297	321-5009-00			RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R6298	321-5007-00			RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6300	321-5009-00			RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R6301	321-5012-00			RES,FXD,FILM:332 OHM,1%,0.125W	91637	CRCW12063320FT
A26R6302	321-5021-00			RES,FXD,FILM:1.82K,1%,0.125W	91637	CRCW12061821FT
A26R6303	321-5017-00			RES,FXD,FILM:825 OHM,1%,0.125W	91637	CRCW12068250FT
A26R6304	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6305	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6306	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6307	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6308	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26U5300	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U5302	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U5310	156-5487-01			MICROCKT,LINEAR:BIPOLAR,XCONDUCTANCE	34371	CA3080AM96
A26U5315	156-5714-00			IC,LINEAR:BIPOLAR,VOLTAGE REGULATOR	27014	LM317LM
A26U5410	156-5487-01			MICROCKT,LINEAR:BIPOLAR,XCONDUCTANCE	34371	CA3080AM96
A26U5427	156-5692-01			IC,LINEAR:BIPOLAR,TRANSISTOR ARRAY	34371	CA3083M96
A26U5436	156-5837-01			IC,LINEAR:BIPOLAR,AMPLIFIER	80009	156583701
A26U5445	156-5485-01			MICROCKT,LINEAR:3 NPN & 2 PNP TRANS ARRAY	34371	CA3096M96
A26U5456	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP	18324	74HCT74DT
A26U5459	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U5460	156-5088-01			IC,DIGITAL:HCTCMOS,DEMUX/DECODER	18324	74HCT138DT
A26U5464	156-5147-01			IC,DIGITAL:FLIP FLOP;OCTAL D-TYPE	18324	74HCT273DT
A26U5468	156-5043-01			IC,CONVERTER:BIPOLAR,D/A	06665	DAC08-360SR(STD
A26U5565	160-5879-00			IC,MEMORY:CMOS,EPROM;8K X 8	TK0161	160-5879-00
A26U5575	156-1426-00			MICROCKT,DGTL:NMOS,PRGM TIMER MDL	04713	MC68B40 (L OR P
A26U5580	156-5081-01			IC,DIGITAL:HCTMOS,GATE;HEX INVERTER	18324	74HCT04DT
A26U5590	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP;DUAL D-TYPE	18324	74HCT74DT
A26U5634	156-2051-01			MICROCKT,LINEAR:OPERATIONAL AMPL	04713	MC34004DR2
A26U5636	156-5138-01			IC,LINEAR:BIFET,OP-AMP;DUAL	04713	MC34002DR2
A26U5645	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP;DUAL D-TYPE	18324	74HCT74DT
A26U5712	156-5485-01			MICROCKT,LINEAR:3 NPN & 2 PNP TRANS ARRAY	34371	CA3096M96
A26U5728	156-5485-01			MICROCKT,LINEAR:3 NPN & 2 PNP TRANS ARRAY	34371	CA3096M96

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26U5755	156-5487-01			MICROCKT,LINEAR:BIPOLAR,XCONDUCTANCE	34371	CA3080AM96
A26U5756	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP	18324	74HCT74DT
A26U5764	156-5147-01			IC,DIGITAL:FLIP FLOP;OCTAL D-TYPE	18324	74HCT273DT
A26U5775	156-5098-01			IC,DIGITAL:HCTCMOS,GATE;QUAD 2-INPUT NAND	18324	74HCT00DT
A26U5790	156-5783-00			IC,DIGITAL:HCTCMOS,GATE;QUAD 2-INPUT NAND	18324	74HCT132D
A26U5838	156-5290-01			IC,DIGITAL:HCTCMOS,GATE;TRIPLE 3-INPUT NOR	18324	74HCT27DT
A26U5845	156-5517-01			MICROCKT,LINEAR:CMOS,PHASE LOCK LOOP	04713	MC14046BDWR (X1
A26U5855	156-5487-01			MICROCKT,LINEAR:BIPOLAR,XCONDUCTANCE	34371	CA3080AM96
A26U5870	156-2051-01			MICROCKT,LINEAR:OPERATIONAL AMPL	04713	MC34004DR2
A26U5875	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP;DUAL D-TYPE	18324	74HCT74DT
A26U5880	160-5878-00			MICROCKT,DGTL:LOGIC DEVICE,PRGM	TK0161	160-5878-00
A26U5890	156-5198-01			IC,DIGITAL:HCTCMOS,GATE;QUAD 2-INPUT XOR	34371	CD74HCT86M96
A26U5910	156-5566-01			IC,DIGITAL:HCTCMOS,COUNTER	18324	74HCT390DT
A26U5930	160-5880-00			MICROCKT,DGTL:16K X 8 X 4 EPROM,PRGM	80009	160588000
A26U5940	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U5942	160-5878-00			MICROCKT,DGTL:LOGIC DEVICE,PRGM	TK0161	160-5878-00
A26U5950	156-5088-01			IC,DIGITAL:HCTCMOS,DEMUX/DECODER	18324	74HCT138DT
A26U5952	156-5147-01			IC,DIGITAL:FLIP FLOP;OCTAL D-TYPE	18324	74HCT273DT
A26U5990	156-5085-01			IC,DIGITAL:HCTCMOS,GATE;QUAD 2-INPUT OR	18324	74HCT32DT
A26U6010	156-5518-01			IC,DIGITAL:TTL,MISC;PHASE-FREQ DETECTOR	04713	MC4044DR (X1 OR
A26U6070	156-5471-01			IC,DIGITAL:ECL,MUX/ENCODER	04713	MC10H174FNR1, 2
A26U6120	156-5486-01			IC,DIGITAL:ECL,MISC;VOLTAGE CONT	80009	156548601
A26U6130	156-1248-00			IC,DIGITAL:ECL,MISC;PRESCALER/DIVIDE BY 100 (U6130 USED ONLY WHEN U6131 & W6131 ARE	53469	SP8629
A26U6131	156-1248-00			IC,DIGITAL:ECL,MISC;PRESCALER/DIVIDE BY 100	53469	SP8629
A26U6140	156-5493-00			MICROCKT,DGTL:NMOS,PERIPHERIAL,TIMER	34335	AM9513AJC
A26U6190	160-1748-00			MICROCKT,DGTL:MACROCELL GATE ARRAY	04713	SC32205-001
A26U6230	156-5138-01			IC,LINEAR:BIFET,OP-AMP;DUAL	04713	MC34002DR2
A26U6250	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U6252	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP;DUAL D-TYPE	18324	74HCT74DT
A26U6290	156-5262-01			MICROCKT,LINEAR:BIPOLAR,QUAD CONPARATOR	04713	LM339DR1,2
A26W5500	174-1555-00			CA ASSY,SP,ELEC:2,26 AWG,4.0 L	80009	174155500
A26W5970	321-5051-00			RES,FXD,FILM:0 OHM,1%,0.125W	09969	CRCW1206 JUMPER
A26W5980	321-5051-00			RES,FXD,FILM:0 OHM,1%,0.125W	09969	CRCW1206 JUMPER
A26XU5930	136-0755-00			SOCKET,DIP::PCB,;28 POS,2 X 14,0.1 X 0.6 CT	09922	DILB28P-108
A26Y5910	158-0269-00			XTAL UNIT,QTZ:13.10669MHZ, +/- 0.001 %, PAR	14301	011-668-03371
A27	671-1341-00			CIRCUIT BD ASSY:CTT (OPTION 06/09 ONLY) (FOR SUBPARTS SEE A26)	80009	671134100
A29	670-7835-10			CIRCUIT BD ASSY:DMM (OPTION 01 ONLY)	80009	670783510
A29C4910	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A29C4911	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	SA101A201JAA
A29C4912	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	SA101A201JAA
A29C4913	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C4914	285-0558-00			CAP,FXD,PLASTIC:0.05 UF 2%,50V	75498	ORDER BY DESC
A29C4915	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A29C4932	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A29C4960	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	TK1743	CGB103KEX
A29C4961	283-0177-00			CAP,FXD,CER DI:1UF,+80-20%,25V	04222	SR305E105ZAA
A29C4962	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C4963	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5015	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	TK1743	CGB103KEX
A29C5020	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5031	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA

Component Number	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29C5050	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5052	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5060	283-0220-02			CAP,FXD,CER DI:0.01UF,20%,50V	04222	AR205C103MAATRS
A29C5070	285-0753-00			CAP,FXD,PLASTIC:0.01UF,3.5%,100V	75498	ORDER BY DESCRI
A29C5071	285-0753-00			CAP,FXD,PLASTIC:0.01UF,3.5%,100V	75498	ORDER BY DESCRI
A29C5110	290-0532-00			CAP,FXD,ELCTLT:150UF,20%,6V	31433	T354J157M006AS
A29C5111	290-0876-00			CAP,FXD,ELCTLT:15UF,20%,25 WVDC	31433	T330C156M025AS
A29C5112	290-0876-00			CAP,FXD,ELCTLT:15UF,20%,25 WVDC	31433	T330C156M025AS
A29C5122	283-0177-00			CAP,FXD,CER DI:1UF,+80-20%,25V	04222	SR305E105ZAA
A29C5124	283-0177-00			CAP,FXD,CER DI:1UF,+80-20%,25V	04222	SR305E105ZAA
A29C5130	281-0772-00			CAP,FXD,CER DI:4700PF,10%,100V	04222	SA101C472KAA
A29C5140	290-0523-00			CAP,FXD,ELCTLT:2.2UF,20%,20V	D5243	ETP-1B 2.2UF 25
A29C5142	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5150	290-0876-00			CAP,FXD,ELCTLT:15UF,20%,25 WVDC	31433	T330C156M025AS
A29C5151	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5152	290-0534-00			CAP,FXD,ELCTLT:1UF,20%,35V	D5243	ETP-1A 1UF 35V
A29C5153	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5155	290-0523-00			CAP,FXD,ELCTLT:2.2UF,20%,20V	D5243	ETP-1B 2.2UF 25
A29C5160	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	SA101A101KAA
A29C5170	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	SA101A201JAA
A29C5171	285-1106-00			CAP,FXD,PLASTIC:0.022UF,20%,600V	14752	230B1F223
A29C5220	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5222	290-0536-00			CAP,FXD,ELCTLT:10UF,20%,25V TANTALUM	D5243	ETP-3F 10UF 25V
A29C5224	281-0785-00			CAP,FXD,CER DI:68PF,10%,100V	04222	SA101A680KAA
A29C5230	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5231	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5232	281-0791-00			CAP,FXD,CER DI:270PF,10%,100V	04222	SA101C271KAA
A29C5250	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5251	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5280	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5281	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5290	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29CR4952	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR4970	152-0674-00			SEMICOND DVC,DI:RECT,SI,800V,1.0A	25403	BYV96D (1N4947
A29CR4971	152-0674-00			SEMICOND DVC,DI:RECT,SI,800V,1.0A	25403	BYV96D (1N4947
A29CR4980	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	27014	FDH5227.03
A29CR4981	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	27014	FDH5227.03
A29CR4982	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5030	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5031	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5110	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	27014	FDH-6012
A29CR5111	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	27014	FDH-6012
A29CR5112	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	27014	FDH-6012
A29CR5113	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	27014	FDH-6012
A29CR5114	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	27014	FDH-6012
A29CR5115	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	27014	FDH-6012
A29CR5130	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5163	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	27014	FDH5227.03
A29CR5164	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	27014	FDH5227.03
A29CR5170	152-0307-00			DIODE,SIG:,ULTRA FAST;100V,4.0NS,1.5PF,DUAL	04713	SSD1150
A29CR5210	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5211	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5212	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5221	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29DS5201	150-1014-00			LT EMITTING DIO:RED,695NM,100MA MAX	58361	Q6444/MV5054-1

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29F4990	159-0224-01			FUSE,CARTRIDGE:5AG,3A,600V,FAST	71400	BBS-3
A29F5220	159-0159-00			FUSE,WIRE LEAD:1.5A,125V,5 SEC	75915	25501.5
A29J5210	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR (QUANTITY OF 2)	22526	48283-036
A29J5220	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR (QUANTITY OF 3)	22526	48283-036
A29J5290	131-3323-00			CONN,HDR::PCB,;MALE,STR,2 X 20,0.1 CTR	22526	66506-025
A29J5291	131-3323-00			CONN,HDR::PCB,;MALE,STR,2 X 20,0.1 CTR	22526	66506-025
A29K4980	148-0146-00			RELAY,REED:1 FORM A,500VDC,COIL 5VDC	12617	ORDER BY DESC
A29K4981	148-0149-00			RELAY,ARMATURE:1 FORM A,1 FORM B,8A,250VAC,	61529	ST1E-DC12V
A29K4990	148-0149-00			RELAY,ARMATURE:1 FORM A,1 FORM B,8A,250VAC,	61529	ST1E-DC12V
A29K5080	148-0149-00			RELAY,ARMATURE:1 FORM A,1 FORM B,8A,250VAC,	61529	ST1E-DC12V
A29K5090	148-0149-00			RELAY,ARMATURE:1 FORM A,1 FORM B,8A,250VAC,	61529	ST1E-DC12V
A29K5091	148-0149-00			RELAY,ARMATURE:1 FORM A,1 FORM B,8A,250VAC,	61529	ST1E-DC12V
A29K5190	148-0141-00			RELAY,REED:1 FORM A,COIL 15 VDC 2200 OHM	12617	R7620-2
A29K5191	148-0141-00			RELAY,REED:1 FORM A,COIL 15 VDC 2200 OHM	12617	R7620-2
A29P5290	174-1376-00			CA ASSY,SP,ELEC:40,28 AWG,18.875 LFLAT CABL	53387	ORDER BY DESC
A29Q4920	151-0354-00			TRANSISTOR:PNP,SI,DUAL,TO-78	04713	2N3810A
A29Q4922	151-1054-00			TRANSISTOR:FET,N-CHAN,SI,TO-7	TK1864	SNJ1609
A29Q4930	151-0188-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	2N3906
A29Q4932	151-0221-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	SPS246(EL8251)
A29Q4934	151-1103-00			TRANSISTOR:FET,N CHANNEL,SI	TK0987	1S017
A29Q4936	151-0188-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	2N3906
A29Q4950	151-0190-00			TRANSISTOR,SIG:BIPOLAR,NPN	2D532	2N3904
A29Q4952	151-1078-00			TRANSISTOR:FET,N-CHAN,SI,TO-92	04713	SPF3040
A29Q4960	151-0254-00			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MPSA14
A29Q4970	151-1103-00			TRANSISTOR:FET,N CHANNEL,SI	TK0987	1S017
A29Q4971	151-1103-00			TRANSISTOR:FET,N CHANNEL,SI	TK0987	1S017
A29Q4972	151-1063-00			TRANSISTOR,PWR:MOS,N-CH	04713	IRFD113
A29Q4973	151-1063-00			TRANSISTOR,PWR:MOS,N-CH	04713	IRFD113
A29Q4980	151-1136-00			TRANSISTOR,PWR:MOS,N-CH	04713	IRF530
A29Q5020	151-0342-02			TRANSISTOR,SIG:BIPOLAR,PNP	04713	MPS4249RLRP
A29Q5070	151-1077-01			TRANSISTOR:FET,N-CHAN,SI	80009	151-1077-01
A29Q5124	151-1059-00			TRANSISTOR:FET,N-CHAN,30MW	04713	MPF4391
A29Q5130	151-0221-00			TRANSISTOR,SIG:BIPOLAR,PNP;12V,80MA	04713	SPS246(EL8251)
A29Q5210	151-0254-03			TRANSISTOR,SIG:BIPOLAR,NPN;30V,500MA	04713	MPSA14RLRP
A29Q5230	151-0221-00			TRANSISTOR,SIG:BIPOLAR,PNP;12V,80MA	04713	SPS246(EL8251)
A29R4910	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4910	315-0823-00			RES,FXD,FILM:82K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4911	315-0681-00			RES,FXD,FILM:680 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4913	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4914	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4915	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4916	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4917	315-0221-00			RES,FXD,FILM:220 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4920	315-0221-00			RES,FXD,FILM:220 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4921	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4922	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4923	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4924	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4925	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4926	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29R4927	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4930	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4932	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4934	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4950	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4951	325-0252-00			RES,FXD,FILM:6.95K OHM,0.1%,0.1W	91637	PTF56,6.95K, T1
A29R4952	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4953	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4954	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4955	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4957	307-0765-00			RES NTWK,FXD,FI:1K OHM & 9K OHM,5% EA,0.1W	11502	4168
A29R4958	307-0765-00			RES NTWK,FXD,FI:1K OHM & 9K OHM,5% EA,0.1W	11502	4168
A29R4960	307-0934-00			RES NTWK,FXD,FI:SINGLE INLINE	19647	1787-31
A29R4971	315-0334-00			RES,FXD,FILM:330K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4972	315-0164-00			RES,FXD,FILM:160K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4973	321-0924-02			RES,FXD,FILM:40K OHM,0.5%,0.125W,TC=T2	19701	5033RC40K00D
A29R4974	321-0318-00			RES,FXD,FILM:20.0K OHM,1%,0.125W,TC=T0	91637	CMF55116G20001F
A29R4975	307-0346-02			RES,FXD,FILM:1 OHM,0.1%	75498	ORDER BY DESC
A29R4976	321-0289-09			RES,FXD,FILM:10.0K OHM,1%,0.125W,TC=T9	19701	5033RE10K00F
A29R4977	322-0481-07			RES,FXD,FILM:1M OHM,0.1%,0.25W,TC=T9	19701	5043RE1M000B
A29R4978	323-0385-00			RES,FXD,FILM:100K OHM,1%,0.5W,TC=T0	91637	CMF65116G10002F
A29R4979	317-0101-00			RES,FXD,CMPSN:100 OHM,5%,0.125W	TK1727	SFR16 2322-180-
A29R4980	307-0662-00			RES,THERMAL:1K OHM,40%	50157	180Q10216
A29R4980	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5010	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5011	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5012	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5013	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5014	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5015	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5016	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5017	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5020	321-0225-00			RES,FXD,FILM:2.15K OHM,1%,0.125W	91637	CMF55116G21500F
A29R5021	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5030	315-0681-00			RES,FXD,FILM:680 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5032	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5033	321-0325-00			RES,FXD,FILM:23.7K OHM,1%,0.125W,TC=T0	91637	CMF55116G23701F
A29R5034	321-0318-00			RES,FXD,FILM:20.0K OHM,1%,0.125W,TC=T0	91637	CMF55116G20001F
A29R5035	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5036	321-0239-00			RES,FXD,FILM:3.01K OHM,1%,0.125W,TC=T0	91637	CMF55116G30100F
A29R5039	321-0296-00			RES,FXD,FILM:11.8K OHM,1%,0.125W,TC=T0	91637	CMF55116G11801F
A29R5041	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5042	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5043	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5044	321-0753-06			RES,FXD,FILM:9K OHM,0.25%,0.125W,TC=T9	19701	5033RE9K000C
A29R5045	321-0193-07			RES,FXD,FILM:1K OHM,0.1%,0.125W,TC=T9	19701	5033RE1K000B
A29R5047	321-0277-00			RES,FXD,FILM:7.50K OHM,1%,0.125W,TC=T0	91637	CMF55116G75000F
A29R5048	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5049	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5054	325-0394-00			RES,FXD,FILM:4.95K OHM,1%,0.1W,T-13	17745	CC55 T-13 4.95
A29R5055	325-0079-00			RES,FXD,FILM:1.8K OHM,1%,0.1W,TC-13	17745	CC55 T-13 1.8 K
A29R5056	325-0393-00			RES,FXD,FILM:200 OHM,1%,0.1W,T-13	17745	CC55 T-13 200 O
A29R5057	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5058	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5060	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	TK1727	SFR25 2322-181-

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29R5063	321-0753-06			RES,FXD,FILM:9K OHM,0.25%,0.125W,TC=T9	19701	5033RE9K000C
A29R5064	321-0193-00			RES,FXD,FILM:1K OHM,1%,0.125W,TC=T0	91637	CMF55116G10000F
A29R5066	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5070	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5071	315-0155-00			RES,FXD,FILM:1.5M OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5072	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5073	315-0563-00			RES,FXD,FILM:56K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5075	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5080	325-0034-00			RES SET,MATCHED:1 EA,9M,900K,99K OHM,1%	03888	ADVISE
A29R5081				(PART OF A29R5080)		
A29R5082				(PART OF A29R5080)		
A29R5083	322-0673-03			RES,FXD,FILM:500K OHM,0.25%,0.25W,TC=T2	91637	CMF55 116D5003C
A29R5090	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5122	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5124	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5130	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5131	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5132	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5133	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5134	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5150	321-0753-06			RES,FXD,FILM:9K OHM,0.25%,0.125W,TC=T9	19701	5033RE9K000C
A29R5151	321-0193-07			RES,FXD,FILM:1K OHM,0.1%,0.125W,TC=T9	19701	5033RE1K000B
A29R5167	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5168	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5170	315-0182-00			RES,FXD,FILM:1.8K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5171	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5172	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5173	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5174	315-0106-00			RES,FXD,FILM:10M OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5176	315-0682-00			RES,FXD,FILM:6.8K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5177	321-0289-09			RES,FXD,FILM:10.0K OHM,1%,0.125W,TC=T9	19701	5033RE10K00F
A29R5180	307-0662-00			RES,THERMAL:1K OHM,40%SAFETY	50157	180Q10216
A29R5181	324-0620-09			CONTROLLED	03888	PME75 990 K +-
A29R5182	315-0102-00			RES,FXD,FILM:990K OHM,1%,1W,TC=T9	TK1727	SFR25 2322-181-
A29R5190	322-0673-03			RES,FXD,FILM:1K OHM,5%,0.25W	91637	CMF55 116D5003C
				RES,FXD,FILM:500K OHM,0.25%,0.25W,TC=T2		
A29R5191	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5210	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5211	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5212	307-0103-00			RES,FXD,CMPSN:2.7 OHM,5%,0.25W	01121	CB27G5
A29R5220	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5222	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5223	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5224	315-0151-00			RES,FXD,FILM:150 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5230	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5231	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5232	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5233	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5251	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5252	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5270	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5271	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29T5210	120-1494-00			TRANSFORMER,PWR:ISOLATION HF,POT CORE	TK2425	ORDER BY DESC
A29T5230	120-1533-00			XFMR,ISOLATION:2KV,1:1 RATIO,DUAL SIGNAL	TK1601	63820
A29TP4910	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR	22526	48283-036
A29TP4960	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR	22526	48283-036

Component Number	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29TP4980	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR	22526	48283-036
A29TP5140	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR	22526	48283-036
A29TP5210	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR	22526	48283-036
A29TP5270	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR	22526	48283-036
A29TP5271	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR,	22526	48283-036
A29TP5290	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR	22526	48283-036
A29U4920	156-0383-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NOR	01295	SN74LS02N
A29U4930	156-0422-00			IC,DIGITAL:LSTTL,COUNTER	01295	SN74LS191N
A29U4932	156-1611-00			IC,DIGITAL:FTTL,FLIP FLOP	04713	MC74F74N
A29U4940	156-0796-00			IC,DIGITAL:CMOS,SHIFT REGISTER	04713	MC14094BCP
A29U4942	156-0515-00			IC,MISC:CMOS,ANALOG MUX	04713	MC14053BCP
A29U4944	156-0048-00			MICROCKT,LINEAR:5 XSTR ARRAY	04713	MC3346P
A29U4950	156-1850-00			IC,MISC:CMOS,ANALOG SWITCH;QUAD	17856	SDG21107/DG211C
A29U4960	156-1978-01			MICROCKT,LINEAR:OP AMP,LOW BIAS CURRENT	80009	156-1978-01
A29U4970	156-1838-01			MICROCKT,LINEAR:OPERATIONAL AMPLIFIER	80009	156-1838-01
A29U5010	156-1225-00			IC,LINEAR:BIPOLAR,COMPARATOR	01295	LM393P
A29U5020	156-0513-00			IC,MISC:CMOS,ANALOG MUX;8 CHANNEL	04713	MC14051B (CP OR
A29U5030	156-1191-01			MICROCKT,LINEAR:BIFET,DUAL OPNL AMPL	80009	156119101
A29U5040	156-0854-00			IC,LINEAR:BIPOLAR,OP-AMP	27014	LM308AN
A29U5050	156-0783-00			IC,LINEAR:BIPOLAR,VOLTAGE REF	64155	LM399H
A29U5060	156-1191-01			MICROCKT,LINEAR:BIFET,DUAL OPNL AMPL	80009	156119101
A29U5110	156-1207-00			IC,LINEAR:BIPOLAR,VOLTAGE REG	27014	LM320H-12
A29U5112	156-1160-00			IC,LINEAR:BIPOLAR,VOLTAGE REG	27014	LM78L12ACH
A29U5120	156-0796-00			IC,DIGITAL:CMOS,SHIFT REGISTER	04713	MC14094BCP
A29U5122	156-0796-00			IC,DIGITAL:CMOS,SHIFT REGISTER	04713	MC14094BCP
A29U5124	156-0934-00			IC,DIGITAL:BIPOLAR,DUAL RS-232 LINE REC	01295	SN75152
A29U5130	156-0745-00			IC,DIGITAL:CMOS,GATES;HEX INV	04713	MC14069UBCP
A29U5132	156-1245-00			IC,LINEAR:BIPOLAR,TRANSISTOR ARRAY	0CVK3	ULN2003A
A29U5140	156-1457-01			IC,MISC:BIPOLAR,MISC	24355	AD41134
A29U5150	156-1850-00			IC,MISC:CMOS,ANALOG SWITCH	17856	SDG21107/DG211C
A29U5151	156-1191-01			MICROCKT,LINEAR:BIFET,DUAL OPNL AMPL	80009	156119101
A29U5170	156-0130-00			MICROCKT,LINEAR:MODULATOR/DEMODULATOR	04713	MC1496G
A29U5222	156-0388-00			IC,DIGITAL:LSTTL,FLIP FLOP	01295	SN74LS74AN
A29U5224	156-0844-00			IC,DIGITAL:LSTTL,COUNTER	01295	SN74LS161AN
A29U5230	156-0302-00			IC,DIGITAL:TTL,DRIVER	01295	SN75452N
A29U5231	156-0895-00			IC,DIGITAL:CMOS,COUNTER	04713	MC14020BCP
A29U5232	156-0386-00			IC,DIGITAL:LSTTL,GATES	01295	SN74LS10N
A29U5240	156-0789-00			IC,DIGITAL:LSTTL,SHIFT REGISTER	01295	SN74LS165N
A29U5241	156-0469-00			IC,DIGITAL:LSTTL,DEMUX/DECODER	01295	SN74LS138 (N OR
A29U5242	156-0480-00			IC,DIGITAL:LSTTL,GATES	01295	SN74LS08N
A29U5250	156-0465-00			IC,DIGITAL:LSTTL,GATES	01295	SN74LS30N
A29U5251	156-0388-00			IC,DIGITAL:LSTTL,FLIP FLOP	01295	SN74LS74AN
A29U5252	156-0385-00			IC,DIGITAL:LSTTL,GATES	01295	SN74LS04N
A29U5260	156-0852-00			IC,DIGITAL:LSTTL,GATES	01295	SN74LS367N
A29U5270	156-0385-00			IC,DIGITAL:LSTTL,GATES	01295	SN74LS04N
A29U5271	156-0479-00			IC,DIGITAL:LSTTL,GATES	01295	SN74LS32N
A29U5272	156-1426-00			MICROCKT,DGTL:NMOS,PRGM TIMER MDL	04713	MC68B40 (L OR P
A29U5273	156-0388-00			IC,DIGITAL:LSTTL,FLIP FLOP	01295	SN74LS74AN
A29U5274	156-1172-00			IC,DIGITAL:LSTTL,COUNTER	01295	SN74LS393N
A29U5281	160-5935-00			MICROCKT,DGTL:32K X 8 EPROM (NOT PART OF A29, ORDER SEPARATELY)	80009	160593500
A29U5282	156-1111-00			IC,DIGITAL:LSTTL,TRANSCEIVER	01295	SN74LS245N
A29VR5010	152-0175-00			DIODE,ZENER:,;5.6V,5%,0.4W	04713	SZG35008 (1N752
A29VR5020	152-0760-00			DIODE,ZENER:,;6.2V,2%,0.4W	04713	SZG30205
A29VR5031	152-0662-00			DIODE,ZENER:,;5V,1%,0.4W	04713	SZG195RL
A29VR5160	152-0217-00			DIODE,ZENER:,;8.2V,5%,0.4W	04713	SZG20

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29VR5162	152-0217-00			DIODE,ZENER:,;8.2V,5%,0.4W	04713	SZG20
A29VR5210	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	27014	FDH5227.03
A29W4980	195-0964-00			LEAD,ELECTRICAL:26 AWG,2.0 L,9-1	80009	195096400
A29W5070	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225L	24546	OMA 07
A29W5075	195-1259-00			LEAD,ELECTRICAL:26 AWG,1.5 L,9-4	80009	195125900
A29W5260	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225L	24546	OMA 07
A29Y4910	158-0261-00			XTAL UNIT,QTZ:3.579MHZ,01%	33096	CCAT101773(HC18
A30	670-7894-02			CIRCUIT BD ASSY:FRONT PANEL (OPTION 01 ONLY)	80009	670789402
A30C4310	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A30LS4330	119-1427-01			XDCR,AUDIO:1-4.2KHZ,30MA,6V	63791	QMB-06
A30P4300	131-0589-00			TERMINAL,PIN:PRESSFIT/PCB,;MALE,STR,0.025 S (QUANTITY OF 2)	22526	48283-029
A30R4320	307-0542-00			RES NTWK,FXD,FI:(5)10K OHM,5%,0.125W	91637	CSC06AO1-103J (
A30S4302	260-2171-00			SWITCH,PUSH:3 BUTTON,1 POLE,RANGE	71590	2LL9CCB1000123
A30S4303	260-2170-00			SWITCH,PUSH:5 BUTTON,I POLE,INPUT SEL	71590	2LL9EEB1000122
A30S4304	260-2088-00			SWITCH,PUSH:1 BTN,1 POLE,TRIGGER	71590	2LL199NB021068
A30S4305	260-2088-00			SWITCH,PUSH:1 BTN,1 POLE,TRIGGER	71590	2LL199NB021068
A30S4306	260-2171-00			SWITCH,PUSH:3 BUTTON,1 POLE,RANGE	71590	2LL9CCB1000123
A30U4300	156-1080-00			IC,DIGITAL:TTL,BUFFER/DRIVER	01295	SN7407N
A30U4310	156-0541-00			IC,DIGITAL:LSTTL,DEMUX/DECODER	01295	SN74LS139AN
A30U4320	156-1220-00			IC,DIGITAL:LSTTL,BUFFER/DRIVER	01295	SN74LS365A(N OR
A30W4330	174-1392-00			CA ASSY,SP,ELEC:16,28 AWG,10.75 L	53387	ORDER BY DESC
A32	670-7999-00			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE (OPTION 09 ONLY)	80009	670799900
A32C6303	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50VDIP STYLE	04222	MD015E224ZAA
A32C6334	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50VDIP STYLE	04222	MD015E224ZAA
A32C6338	281-0767-00			CAP,FXD,CER DI:330PF,20%,100V	04222	SA102C331MAA
A32CR6330	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A32CR6335	152-0664-00			SEMICOND DVC,DI:SCHOTTKY,SW,SI,70V	50434	5082-2800-T01
A32CR6340	152-0664-00			SEMICOND DVC,DI:SCHOTTKY,SW,SI,70V	50434	5082-2800-T01
A32J6300	131-3046-00			CONN,HDR::PCB,;MALE,RTANG,1 X 10,0.15 CTR	22526	ORDER BY DESC
A32J6370	131-1425-00			CONN,HDR::PCB,;MALE,RTANG,1 X 36,0.1 CTR (LOCATION A)	22526	65521-136
A32J6370	131-1426-00			CONN,HDR::PCB,;MALE,RTANG,1 X 36,0.1 CTR (LOCATION B)	22526	65524-136
A32J6380	131-3045-00			CONN,BOX::PCB,;FEMALE,RTANG,1 X 5,0.1 CTR	00779	1-380949-5
A32J6385	136-0547-00			CONN,RCPT,ELEC:CKT BOARD,6 CONTACT	00779	1-380949-6
A32L6354	108-0245-00			CHOKE,RF:FIXED,3.9UH, +/- 10 %, Q 35, DCR 0	0JR03	108-0245-00
A32Q6334	151-0190-00			TRANSISTOR,SIG:BIPOLAR,NPN	2D532	2N3904
A32R6301	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6302	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6303	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6304	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6305	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6306	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6307	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6308	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6325	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6330	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6336	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	TK1727	SFR25 2322-181-

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A32R6340	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6350	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32U6310	156-1707-00			IC,DIGITAL:FTTL,GATE;QUAD 2-INPUT NAND	04713	MC74F00 (N OR J
A32U6315	156-1707-00			IC,DIGITAL:FTTL,GATE;QUAD 2-INPUT NAND	04713	MC74F00 (N OR J
A32U6320	156-0441-00			IC,DIGITAL:FTTL,COMPARATOR	04713	MC74F521N
A32U6325	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER	27014	MM74C164(NA+)
A32U6330	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER	27014	MM74C164(NA+)
A32U6335	156-1724-00			IC,DIGITAL:FTTL,GATES;QUAD 2-INPUT OR	04713	MC74F32N
A32U6350	156-1611-00			IC,DIGITAL:FTTL,FLIP FLOP;DUAL D-TYPE	04713	MC74F74N
A32U6356	156-1743-00			IC,DIGITAL:FTTL,GATES;QUAD 2-INPUT NOR	04713	MC74F02N
A33	670-7998-01			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE (OPTION 09 ONLY)	80009	670799801
A33C6410	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50VDIP STYLE	04222	MD015E224ZAA
A33C6440	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50VDIP STYLE	04222	MD015E224ZAA
A33J6400	131-3046-00			CONN,HDR::PCB,;MALE,RTANG,1 X 10,0.15 CTR,0	22526	ORDER BY DESC
A33P6380	131-3153-00			CONN,HDR::PCB,;MALE,RTANG,1 X 36,0.1 CTR,0.	58050	082-3643-RS20
A33P6385	131-3153-00			CONN,HDR::PCB,;MALE,RTANG,1 X 36,0.1 CTR,0.	58050	082-3643-RS20
A33R6400	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6401	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6402	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6403	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6404	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6405	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6406	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6407	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6408	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6432	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6443	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33U6405	156-1707-00			IC,DIGITAL:FTTL,GATE;QUAD 2-INPUT NAND	04713	MC74F00 (N OR J
A33U6409	156-1707-00			IC,DIGITAL:FTTL,GATE;QUAD 2-INPUT NAND	04713	MC74F00 (N OR J
A33U6415	156-0441-00			IC,DIGITAL:FTTL,COMPARATOR;8-BIT IDENTITY,	04713	MC74F521N
A33U6420	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER;8-BIT SIPO	27014	MM74C164(NA+)
A33U6425	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER;8-BIT SIPO	27014	MM74C164(NA+)
A33U6430	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER;8-BIT SIPO	27014	MM74C164(NA+)
A33U6435	156-1800-00			IC,DIGITAL:FTTL,GATES;QUAD 2-INPUT XOR	04713	MC74F86N
F4991	159-0016-00			FUSE,CARTRIDGE:3AG,1.5,250V,FAST BLOW (OPTION 01)	75915	31201.5
P4241	174-1375-00			CA ASSY,SP,ELEC:40,28 AWG,14.375 L	53387	ORDER BY DESC

REPLACEABLE ELECTRICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

When ordering parts, 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 Mfg. Code Number to Manufacturer Cross 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 parts list)

Example a. **component number**

A23R1234 **A23** **R1234**

Assembly number **Circuit number**

Read: Resistor 1234 of Assembly 23

Example b. **component number**

A23A2R1234 **A23** **A2** **R1234** **Circuit number**

Assembly number **Subassembly number**

Read: Resistor 1234 of Subassembly 2 of Assembly 23

The circuit component's number appears 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 parts list)

Indicates part number to be used when ordering replacement part from Tektronix.

SERIAL NO. (columns three and four of the 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 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 Catalog handbook H6-1 can be utilized where possible.

MFR. CODE (column six of the 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 NO. (column seven of the parts list)

Indicates actual manufacturer's part number.

CROSS INDEX – MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
D5243	ROEDERSTEIN E SPEZIALFABRIK FUER KONDENSATOREN GMBN	LUDMILLASTRASSE 23-25	8300 LANDSHUT GERMANY
TK0161	WYLE LABORATORIES ELECTRONICS MARKETING GROUP LOS ANGELES DIV	124 MARYLAND ST	EL SEGUNDO CA 90245-4115
TK0987	TOPAZ SEMICONDUCTOR SUB OF HYTEK MICROSYSTEMS INC	1971 N CAPITOL AVE	SAN JOSE CA 95132-3799
TK1601	PULSE ENGINEERING INC	2801 MOORPARK AVE SUITE 7	SAN JOSE CA 95128
TK1727	PHILIPS NEDERLAND BV AFD ELONCO	POSTBUS 90050	5600 PB EINDHOVEN THE NETHERLANDS
TK1743	UNITRODE (UK) LTD	6 CRESSWELL PARK BLACKHEATH	LONDON SE 3 9RD ENGLAND
TK1864	INTERFET CORP	322 GOLD ST	GARLAND TX 75042
TK2425	CHUNG HING INDUSTRY CO LTD PHONE: 5-564114/8 FAX: 852-5-713679	1ST FLOOR, SUNRIDGE IND BLDG 10 HONG MAN STREET	CHAIWAN HONG KONG
0CVK3	SPRAGUE ELECTRIC CO INTERGRATED CIRCUIS DIVISION	115 NE CUTOFF	WORCHESTER MA 01606
0JR03	ZMAN AND ASSOCIATES	7633 S 180th	KENT WA 98032
0JR04	TOSHIBA AMERICA INC ELECTRONICS COMPONENTS DIV BUSINESS SECTOR	2692 DOW AVE	TUSTIN CA 92680
0J7N9	MCX INC	30608 SAN ANTONIO ST	HAYWARD CA 94544
0J9R5	MARCON AMERICA CORP	3 PEARL COURT	ALLENDALE NJ 07401
00779	AMP INC	2800 FULLING MILL PO BOX 3608	HARRISBURG PA 17105
01121	ALLEN-BRADLEY CO	1201 S 2ND ST	MILWAUKEE WI 53204-2410
01295	TEXAS INSTRUMENTS INC SEMICONDUCTOR GROUP	13500 N CENTRAL EXPY PO BOX 655012	DALLAS TX 75265
03888	KDI ELECTRONICS	60 S JEFFERSON RD	WHIPPANY NJ 07981-1001
04222	AVX CERAMICS DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
04713	MOTOROLA INC SEMICONDUCTOR PRODUCTS SECTOR	5005 E MCDOWELL RD	PHOENIX AZ 85008-4229
06665	PRECISION MONOLITHICS INC SUB OF BOURNS INC	1500 SPACE PARK DR	SANTA CLARA CA 95050
09922	BURNDY CORP	RICHARDS AVE	NORWALK CT 06852
09969	DALE ELECTRONICS INC	EAST HIGHWAY 50 P O BOX 180	YANKTON SD 57078
11502	INTERNATIONAL RESISTIVE CO INC	GREENWAY RD PO BOX 1860	BOONE NC 28607-1860
12617	HAMLIN INC	612 EAST LAKE STREET	LAKE MILLS WI 53551
14301	ANDERSON ELECTRONICS INC	310 PENN ST PO BOX 89	HOLLIDAYSBURG PA 16648-2009
14752	ELECTRO CUBE INC	1710 S DEL MAR AVE	SAN GABRIEL CA 91776-3825

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
17745	ANGSTROHM PRECISION INC	ONE PRECISION PLACE P O BOX 1827	HAGERSTOWN MD 21740
17856	SILICONIX INC	2201 LAURELWOOD RD	SANTA CLARA CA 95054-1516
18324	SIGNETICS CORP MILITARY PRODUCTS DIV	4130 S MARKET COURT	SACRAMENTO CA 95834-1222
19647	CADDOCK ELECTRONICS INC	1717 CHICAGO AVE	RIVERSIDE CA 92507-2302
19701	PHILIPS COMPONENTS DISCRETE PRODUCTS DIV RESISTIVE PRODUCTS FACILITY AIRPORT ROAD	PO BOX 760	MINERAL WELLS TX 76067-0760
2D532	SPRAGUE ELECTRIC CO SEMICONDUCTOR DIVISION	70 PEMBROKE ROAD	CONCORD NH 03301
22526	DU PONT E I DE NEMOURS AND CO INC DU PONT ELECTRONICS DEPT	515 FISHING CREEK RD	NEW CUMBERLAND PA 17070-3007
24355	ANALOG DEVICES INC	RT 1 INDUSTRIAL PK PO BOX 9106	NORWOOD MA 02062
24546	CORNING GLASS WORKS	550 HIGH ST	BRADFORD PA 16701-3737
25088	SIEMENS CORP	186 WOOD AVE S	ISELIN NJ 08830-2704
25403	PHILIPS COMPONENTS DISCRETE PRODUCTS DIV DISCRETE SEMICONDUCTOR GROUP	GEORGE WASHINGTON HWY	SMITHFIELD RI 02917
27014	NATIONAL SEMICONDUCTOR CORP	2900 SEMICONDUCTOR DR	SANTA CLARA CA 95051-0606
31433	KEMET ELECTRONICS CORP NATIONAL SALES HEADQUARTERS	PO BOX 5928	GREENVILLE SC 29606
32997	BOURNS INC TRIMPOT DIV	1200 COLUMBIA AVE	RIVERSIDE CA 92507-2114
33096	COLORADO CRYSTAL CORP	2303 W 8TH ST	LOVELAND CO 80537-5268
34335	ADVANCED MICRO DEVICES	901 THOMPSON PL	SUNNYVALE CA 94086-4518
34371	HARRIS CORP HARRIS SEMICONDUCTOR PRODUCTS GROUP	200 PALM BAY BLVD PO BOX 883	MELBOURNE FL 32919
50157	MIDWEST COMPONENTS INC	1981 PORT CITY BLVD P O BOX 787	MUSKEGON MI 49443
50434	HEWLETT-PACKARD CO OPTOELECTRONICS DIV	370 W TRIMBLE RD	SAN JOSE CA 95131
53387	MINNESOTA MINING MFG CO	PO BOX 2963	AUSTIN TX 78769-2963
53469	PLESSEY SEMICONDUCTOR	SEQUOIA RESEARCH PARK 1500 GREEN HILLS ROAD	SCOTTS VALLEY CA 95066
54583	TDK ELECTRONICS CORP	12 HARBOR PARK DR	PORT WASHINGTON NY 11550
56289	SPRAGUE ELECTRIC CO WORLD HEADQUARTERS	92 HAYDEN AVE	LEXINGTON MA 02173-7929
57668	ROHM CORP	8 WHATNEY PO BOX 19515	IRVINE CA 92713
58050	TEKA PRODUCTS INC	45 SALEM ST	PROVIDENCE RI 02907
58361	QUALITY TECHNOLOGIES CORP	3400 HILLVIEW AVE	PALO ALTO CA 94304-1319
61529	AROMAT CORP	250 SHEFFIELD ST	MOUNTAINSIDE NJ 07092-2303

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
63791	STAR MICRONICS INC	200 PARK AVE SUITE 2308	NEW YORK NY 10166-0001
64155	LINEAR TECHNOLOGY CORP	1630 MCCARTHY BLVD	MILPITAS CA 95035-7417
71400	BUSSMANN DIV OF COOPER INDUSTRIES INC	114 OLD STATE RD PO BOX 14460	ST LOUIS MO 63178
71590	CRL COMPONENTS INC	HWY 20 W PO BOX 858	FORT DODGE IA 50501
75498	MULTICOMP INC	3005 SW 154TH TERRACE #3	BEAVERTON OR 97006
75915	LITTELFUSE INC SUB TRACOR INC	800 E NORTHWEST HWY	DES PLAINES IL 60016-3049
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077-0001
91637	DALE ELECTRONICS INC	2064 12TH AVE PO BOX 609	COLUMBUS NE 68601-3632

Component Number	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A2	672-0076-10			CIRCUIT BD ASSY:LV PWR SPLY MODULE (OPTION 01 ONLY)	80009	672007610
A22	670-8159-00			CIRCUIT BD ASSY:LED (OPTION 10 ONLY)	80009	670815900
A23	671-0981-00			CIRCUIT BD ASSY:GPIB OPTION 10 (OPTION 10 ONLY)	80009	671098100
A25	671-1340-00	B050000	B050255	CIRCUIT BD ASSY:TV	80009	671134000
A25	671-1340-01	B050256		CIRCUIT BD ASSY:TV (OPTION 05 ONLY) (FOR SUBPARTS SEE A26)	80009	671134001
A26	671-0982-00	B050000	B050255	CIRCUIT BD ASSY:TV/CTT	80009	671098200
A26	671-0982-01	B050256		CIRCUIT BD ASSY:CTT/TV (OPTION 05/06/09)	80009	671098201
A27	671-1341-00	B050000	B050255	CIRCUIT BD ASSY:CTT	80009	671134100
A27	671-1341-01	B050256		CIRCUIT BD ASSY:CTT (OPTION 06/09 ONLY) (FOR SUBPARTS SEE A26)	80009	671134101
A29	670-7835-10			CIRCUIT BD ASSY:DMM (OPTION 01 ONLY)	80009	670783510
A30	670-7894-02			CIRCUIT BD ASSY:FRONT PANEL (OPTION 01 ONLY)	80009	670789402
A32	670-7999-00			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE (OPTION 09 ONLY)	80009	670799900
A33	670-7998-01			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE (OPTION 09 ONLY)	80009	670799801

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A2	672-0076-10			CIRCUIT BD ASSY:LV PWR SPLY MODULE (OPTION 01 ONLY)	80009	672007610
A22	670-8159-00			CIRCUIT BD ASSY:LED (OPTION 10 ONLY)	80009	670815900
A22DS4540	150-1061-00			LT EMITTING DIO:RED,660NM,50MA MAX	50434	HLMP-1301
A22DS4542	150-1061-00			LT EMITTING DIO:RED,660NM,50MA MAX	50434	HLMP-1301
A22DS4545	150-1061-00			LT EMITTING DIO:RED,660NM,50MA MAX	50434	HLMP-1301
A23	671-0981-00			CIRCUIT BD ASSY:GPIB OPTION 10 (OPTION 10 ONLY)	80009	671098100
A23C4625	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4626	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4705	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4706	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4708	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4730	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4735	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4738	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4745	283-0203-00			CAP,FXD,CER DI:0.47UF,20%,50V	04222	SR305SC474MAA
A23C4747	290-0847-00			CAP,FXD,ELCTLT:47UF,+50-20%,10WVDC	0J9R5	CE02W1A470MD
A23C4801	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4805	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4808	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4831	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4838	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23J4243	131-3323-00			CONN,HDR::PCB,;MALE,STR,2 X 20,0.1 CTR,0.36	22526	66506-025
A23J4540	131-2919-01			CONN,HDR::PCB,;MALE,STR,1 X 4,0.1 CTR,0.235	53387	2404-6112 UB
A23J4800	131-4114-00			CONN,HDR::PCB,;MALE,STR,2 X 12,0.1 CTR,0.36	53387	3589-6002
A23P4243	174-1375-00			CA ASSY,SP,ELEC:40,28 AWG,14.375 L	53387	ORDER BY DESC
A23P4800	174-1450-00			CA ASSY,SP,ELEC:24,28 AWG,8.25 L,RIBBON	53387	ORDER BY DESC
A23Q4743	151-0622-00			TRANSISTOR:PNP,SI,40V,1A,TO-226AE/237	04713	MPS6727
A23Q4745	151-0736-00			TRANSISTOR:NPN,SI,TO-92	04713	2N4401
A23R4513	313-1101-00			RES,FXD,FILM:100 OHM,5%,0.2W	91637	CCF50-2-100R0J
A23R4543	313-1201-00			RES,FXD,FILM:200 OHM,5%,0.2W	91637	CCF50-2-200R0J
A23R4544	313-1201-00			RES,FXD,FILM:200 OHM,5%,0.2W	91637	CCF50-2-200R0J
A23R4545	313-1201-00			RES,FXD,FILM:200 OHM,5%,0.2W	91637	CCF50-2-200R0J
A23R4732	313-1103-00			RES,FXD,FILM:10K OHM,5%,0.2W	91637	CCF50-2-10001J
A23R4734	313-1131-00			RES,FXD,FILM:130 OHM,5%,0.26	91637	CCF501G130R0J
A23R4735	313-1271-00			RES,FXD,FILM:270 OHM,5%,0.2W	91637	CCF50-2-270R0J
A23R4740	313-1152-00			RES,FXD,FILM:1.5K OHM,5%,0.2W	91637	CCF50-2-15000J
A23R4743	313-1152-00			RES,FXD,FILM:1.5K OHM,5%,0.2W	91637	CCF50-2-15000J
A23R4750	313-1103-00			RES,FXD,FILM:10K OHM,5%,0.2W	91637	CCF50-2-10001J
A23U4501	156-1065-00			IC,DIGITAL:LSTTL,LATCH	01295	SN74LS373N
A23U4505	156-1065-00			IC,DIGITAL:LSTTL,LATCH	01295	SN74LS373N
A23U4601	156-0866-00			IC,DIGITAL:LSTTL,GATES;13-INPUT NAND	04713	SN74LS133N
A23U4605	156-0386-00			IC,DIGITAL:LSTTL,GATES;TRIPLE 3-INPUT NAND	01295	SN74LS10N
A23U4606	156-0385-00			IC,DIGITAL:LSTTL,GATES;HEX INV	01295	SN74LS04N
A23U4608	156-1111-00			IC,DIGITAL:LSTTL,TRANSCEIVER	01295	SN74LS245N
A23U4625	156-1221-00			IC,DIGITAL:LSTTL,FLIP FLOP;HEX D, POS EDGE	01295	SN74LS378N
A23U4626	156-1221-00			IC,DIGITAL:LSTTL,FLIP FLOP;HEX D, POS EDGE	01295	SN74LS378N
A23U4701	156-1277-00			MICROCKT,DGTL:LSTTL,3-STATE OCTAL BFR	27014	DM81LS95AN
A23U4705	156-0480-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT AND	01295	SN74LS08N
A23U4706	156-0382-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NAND	01295	SN74LS00N
A23U4708	156-0469-00			IC,DIGITAL:LSTTL,DEMUX/DECODER	01295	SN74LS138 (N OR

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A23U4710	160-5881-01	B050000	B050209	MICROCKT,DGTL:8K X 8 EPROM,PRGM	80009	160588101
A23U4710	160-5881-02	B050210		MICROCKT,DGTL:8K X 8 EPROM,PRGM (NOT PARTS OF BOARD, ORDER SEPERATELY)	80009	160588102
A23U4715	160-5882-01	B050000	B050209	MICROCKT,DGTL:32K X 8 EPROM,PRGM	80009	160588201
A23U4715	160-5882-02	B050210		MICROCKT,DGTL:32K X 8 EPROM,PRGM (NOT PARTS OF BOARD, ORDER SEPERATELY)	80009	160588202
A23U4730	156-0467-00			IC,DIGITAL:LSTTL,GATES	01295	SN74LS38N
A23U4735	156-0382-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NAND	01295	SN74LS00N
A23U4738	156-0386-00			IC,DIGITAL:LSTTL,GATES;TRIPLE 3-INPUT NAND	01295	SN74LS10N
A23U4801	156-0865-00			IC,DIGITAL:LSTTL,FLIP FLOP	01295	SN74LS273N
A23U4805	156-1415-00			IC,DIGITAL:LSTTL,TRANSCEIVER	01295	SN75161BN
A23U4808	156-1414-00			IC,DIGITAL:LSTTL,TRANSCEIVER	01295	SN75160B (N OR
A23U4811	156-2473-00			IC,MEMORY:CMOS,SRAM	0JR04	TC5564PL-20
A23U4818	156-1444-01			IC,PROCESSOR:NMOS,CONTROLLER	01295	TMS9914A (NL OR
A23U4831	156-0479-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT OR	01295	SN74LS32N
A23U4838	156-0388-00			IC,DIGITAL:LSTTL,FLIP FLOP	01295	SN74LS74AN
A23W4244	174-1697-00			CA ASSY,SP,ELEC:3,26 AWG,5.25 L	80009	174169700
A23W4540	174-0128-00			CA ASSY,SP,ELEC:4,26 AWG,9.0 L,9-N	0J7N9	ORDER BY DESC
A23W4750	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225L	24546	OMA 07
A23XU4710	136-0755-00			SOCKET,DIP::PCB,;28 POS,2 X 14,0.1 X 0.6 CT	09922	DILB28P-108
A23XU4715	136-0755-00			SOCKET,DIP::PCB,;28 POS,2 X 14,0.1 X 0.6 CT	09922	DILB28P-108
A25	671-1340-00	B050000	B050255	CIRCUIT BD ASSY:TV	80009	671134000
A25	671-1340-01	B050256		CIRCUIT BD ASSY:TV (OPTION 05 ONLY) (FOR SUBPARTS SEE A26)	80009	671134001
A26	671-0982-00	B050000	B050255	CIRCUIT BD ASSY:TV/CTT	80009	671098200
A26	671-0982-01	B050256		CIRCUIT BD ASSY:CTT/TV (OPTION 05/06/09)	80009	671098201
A26C5332	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5371	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5372	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5373	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5374	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5419	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5433	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5438	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5458	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5460	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5462	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5465	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5468	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5490	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5543	283-5188-00			CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C5545	283-5068-00			CAP,FXD,CER DI:2200PF,10%,50V	04222	W1206X222K2B04
A26C5612	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5613	283-5187-00			CAP,FXD,CER DI:15PF,5%,100V	04222	W1206C150J3B04
A26C5614	283-5108-00			CAP,FXD,CER DI:68PF,5%,100V	04222	W1206C680J3B04
A26C5625	283-5106-00			CAP,FXD,CER DI:470PF,5%,100V	04222	W1206C470J3B04
A26C5626	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5627	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5628	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5630	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01

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A26C5631	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5633	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5638	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5640	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C5651	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5690	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5720	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5724	283-5188-00			CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C5726	283-5108-00			CAP,FXD,CER DI:68PF,5%,100V	04222	W1206C680J3B04
A26C5728	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5731	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5734	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5735	283-5107-00			CAP,FXD,CER DI:22PF,5%,100V	04222	W1206C220J3B04
A26C5740	283-5105-00			CAP,FXD,CER DI:1UF,+80/-20%,50V	04222	W1825Z105Z2B04
A26C5755	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5757	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5758	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5770	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5771	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5772	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5773	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5774	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5775	283-5113-00			CAP,FXD,CER DI:0.047UF,10%,50V	04222	W1206X473K2B04
A26C5776	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5777	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5778	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5779	283-5188-00			CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C5804	283-5098-00	B050256		CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5806	283-5098-00	B050256		CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5808	283-5105-00			CAP,FXD,CER DI:1UF,+80/-20%,50V	04222	W1825Z105Z2B04
A26C5810	283-5105-00			CAP,FXD,CER DI:1UF,+80/-20%,50V	04222	W1825Z105Z2B04
A26C5812	283-5098-00	B050256		CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5814	283-5098-00	B050256		CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5830	283-5109-00			CAP,FXD,CER DI:680PF,5%,100V	04222	W1206C681J3B04
A26C5848	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5849	283-5196-00			CAP,FXD,CER DI:47PF,5%,100V	04222	W1206C470J3B04
A26C5850	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C5853	283-5105-00			CAP,FXD,CER DI:1UF,+80/-20%,50V	04222	W1825Z105Z2B04
A26C5865	283-5203-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	W1206X102K2B04
A26C5872	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C5875	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5910	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5920	283-5195-00			CAP,FXD,CER DI:10PF,5%,100V	04222	W1206C100J3B04
A26C5922	283-5107-00			CAP,FXD,CER DI:22PF,5%,100V	04222	W1206C220J3B04
A26C5923	283-5197-00			CAP,FXD,CER DI:330PF,5%,100V	04222	W1206C331J3B04
A26C5924	283-5197-00			CAP,FXD,CER DI:330PF,5%,100V	04222	W1206C331J3B04
A26C5930	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5940	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5942	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5950	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5952	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5958	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5960	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5961	283-5188-00			CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C5980	283-5196-00			CAP,FXD,CER DI:47PF,5%,100V	04222	W1206C470J3B04

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A26C5981	283-5196-00			CAP,FXD,CER DI:47PF,5%,100V	04222	W1206C470J3B04
A26C5990	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5991	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5992	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C6010	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6021	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6030	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C6070	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6111	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6113	283-5203-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	W1206X102K2B04
A26C6114	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6115	283-5188-00	B050000	B050255	CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C6121	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6122	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6130	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6131	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6140	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6180	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6190	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6223	283-5202-00			CAP,FXD,CER DI:0.022UF,10%,50VDC	04222	W1206X223K2B04
A26C6230	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6231	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6233	283-5203-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	W1206X102K2B04
A26C6250	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6252	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6291	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6300	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26CR5522	152-5005-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR5522	152-5062-00	B051266		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR5526	152-5004-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5526	152-5018-00	B051266		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5590	152-5004-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5590	152-5018-00	B051266		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5623	152-5004-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5623	152-5018-00	B051266		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5653	152-5005-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR5653	152-5062-00	B051266		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR5721	152-5004-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5721	152-5018-00	B051266		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5735	152-5004-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5735	152-5018-00	B051266		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5751	152-5000-00	B050000	B053106	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-CAT	25088	BAV70T3
A26CR5751	152-5047-00	B053107		SEMICOND DVC,DI:SGNL,FAST RCVRY	27014	FDSO1204.LA
A26CR5772	152-5000-00	B050000	B053106	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-CAT	25088	BAV70T3
A26CR5772	152-5047-00	B053107		SEMICOND DVC,DI:SGNL,FAST RCVRY	27014	FDSO1204.LA
A26CR5825	152-5005-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR5825	152-5062-00	B051266		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR5867	152-5004-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5867	152-5018-00	B051266		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5870	152-5004-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5870	152-5018-00	B051266		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5872	152-5004-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5872	152-5018-00	B051266		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5874	152-5004-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5874	152-5018-00	B051266		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA

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A26CR5876	152-5004-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5876	152-5018-00	B051266		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5878	152-5004-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR5878	152-5018-00	B051266		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5930	152-5005-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR5930	152-5062-00	B051266		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR5960	152-5000-00	B050000	B053106	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-CAT	25088	BAV70T3
A26CR5960	152-5047-00	B053107		SEMICOND DVC,DI:SGNL,FAST RCVRY	27014	FDSO1204.LA
A26CR5970	152-5005-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR5970	152-5062-00	B051266		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR5990	152-5005-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR5990	152-5062-00	B051266		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR5995	152-5005-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR5995	152-5062-00	B051266		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR6010	152-5005-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR6010	152-5062-00	B051266		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR6020	152-5005-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR6020	152-5062-00	B051266		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR6162	152-5005-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR6162	152-5062-00	B051266		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR6181	152-5004-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,SER-PAI	25088	BAV99-E6327
A26CR6181	152-5018-00	B051266		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR6190	152-5005-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR6190	152-5062-00	B051266		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR6210	152-0269-00			SEMICOND DVC,DI:VVC,SI,35V,33PF AT 4V,DO-7	04713	SMV1263RL
A26CR6211	152-5005-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR6211	152-5062-00	B051266		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26CR6273	152-5005-00	B050000	B051265	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS,COM-ANO	04713	MBAW56LT1
A26CR6273	152-5062-00	B051266		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF,COM-AN	27014	FDSO1205.LA
A26J4232	131-3360-00			CONN,HDR::PCB,;MALE,STR,2 X 10,0.1 CTR,0.36	53387	3592-6002
A26J4234	131-2920-00			CONN,HDR::PCB,;MALE,RTANG,2 X 5,0.1 CTR,0.3	00779	86479-3
A26J4242	131-3181-00			CONN,HDR::PCB,;MALE,RTANG,2 X 20,0.1 CTR,0.	22526	69155-040
A26J5800	131-3766-00			CONN,HDR::PCB,;MALE,RTANG,1 X 2,0.1 CTR,0.2	00779	87232-2
A26J5990	131-2920-00			CONN,HDR::PCB,;MALE,RTANG,2 X 5,0.1 CTR,0.3	00779	86479-3
A26J6000	131-1857-00			CONN,HDR::PCB,;MALE,STR,1 X 36,0.1 CTR,0.23	58050	082-3644-SS10
A26L6210	108-1382-00			COIL,RF:FIXED,42NH,10%,AXIAL	0JR03	108-1382-00
A26L6220	108-5018-00			COIL,RF:FXD,4.7UH,20%, Q=50, SRF 45 MHZ, DC	54583	NL453232T-4R7M
A26L6230	108-5018-00			COIL,RF:FXD,4.7UH,20%, Q=50, SRF 45 MHZ, DC	54583	NL453232T-4R7M
A26P5990	131-3957-00			BUS,CONDUCTOR:SHUNT,1 X 2,0.1 CTR	22526	68786-202
A26P6000	131-3957-00			BUS,CONDUCTOR:SHUNT,1 X 2,0.1 CTR (QUANTITY OF 2)	22526	68786-202
A26Q5370	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q5400	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5442	151-5656-00			TRANSISTOR,SIG:JFET,N-CHANNEL;	04713	MMBF4391LT1,T2
A26Q5512	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5515	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5518	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5528	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5530	151-5656-00			TRANSISTOR,SIG:JFET,N-CHANNEL;	04713	MMBF4391LT1,T2
A26Q5532	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q5720	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5736	151-5656-00			TRANSISTOR,SIG:JFET,N-CHANNEL;	04713	MMBF4391LT1,T2
A26Q5740	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5870	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q5875	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q5880	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2

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A26Q5885	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q5920	151-5029-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,500MA	04713	MMBT2369LT1
A26Q5921	151-5022-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,50MA	04713	MMBT918LT1
A26Q5980	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5981	151-5029-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,500MA	04713	MMBT2369LT1
A26Q5982	151-5022-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,50MA	04713	MMBT918LT1
A26Q5983	151-5029-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,500MA	04713	MMBT2369LT1
A26Q5984	151-5029-00	B050000	B050255	TRANSISTOR,SIG:BIPOLAR,NPN;15V,500MA	04713	MMBT2369LT1
A26Q6090	151-5022-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,50MA	04713	MMBT918LT1
A26Q6091	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6092	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6093	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6180	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q6181	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q6190	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6191	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6270	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6271	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6272	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6273	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6274	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6290	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6291	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6292	151-5029-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,500MA	04713	MMBT2369LT1
A26R5319	321-5031-00			RES,FXD,FILM:12.1K,1%,0.125W	91637	CRCW12061212FT
A26R5329	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R5330	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5332	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5334	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5335	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5370	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5371	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5419	321-5049-00			RES,FXD,FILM:1 MEG,1%,0.125W	57668	MCR18FXEA1M
A26R5420	321-5049-00			RES,FXD,FILM:1 MEG,1%,0.125W	57668	MCR18FXEA1M
A26R5421	321-5049-00			RES,FXD,FILM:1 MEG,1%,0.125W	57668	MCR18FXEA1M
A26R5422	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5423	321-5167-00			RES,FXD,FILM:221K OHM,1%,0.125W	91637	CRCW1206-22102F
A26R5424	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5425	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5426	321-5027-00			RES,FXD,FILM:5.62K,1%,0.125W	91637	CRCW12065621FT
A26R5427	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5429	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R5432	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R5433	321-5048-00			RES,FXD,FILM:332K,1%,0.125W	91637	CRCW1206-3323FT
A26R5434	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5436	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R5437	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5438	321-5016-00			RES,FXD,FILM:681 OHM,1%,0.125W	91637	CRCW12066810FT
A26R5439	321-5016-00			RES,FXD,FILM:681 OHM,1%,0.125W	91637	CRCW12066810FT
A26R5440	321-5016-00			RES,FXD,FILM:681 OHM,1%,0.125W	91637	CRCW12066810FT
A26R5442	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5443	321-5167-00			RES,FXD,FILM:221K OHM,1%,0.125W	91637	CRCW1206-22102F
A26R5444	321-5048-00			RES,FXD,FILM:332K,1%,0.125W	91637	CRCW1206-3323FT
A26R5445	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5458	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT

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A26R5460	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5462	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5464	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5466	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5468	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5519	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5523	321-5019-00			RES,FXD,FILM:1.21K,1%,0.125W	91637	CRCW12061211FT
A26R5524	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5525	321-5010-00			RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R5530	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5540	321-5035-00			RES,FXD,FILM:27.4K,1%,0.125W	91637	CRCW12062742FT
A26R5541	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5542	321-5007-00			RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R5544	321-5007-00			RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R5557	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5575	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5608	311-5039-00			RES,VAR,NONWW:TRMR,1K OHM,25%,0.1W	32997	3314J-1-102E
A26R5610	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5611	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5612	321-5021-00			RES,FXD,FILM:1.82K,1%,0.125W	91637	CRCW12061821FT
A26R5614	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5616	321-5038-00			RES,FXD,FILM:47.5K,1%,0.125W	91637	CRCW12064752FT
A26R5618	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5620	321-5017-00			RES,FXD,FILM:825 OHM,1%,0.125W	91637	CRCW12068250FT
A26R5622	321-5029-00			RES,FXD,FILM:8.25K,1%,0.125W	91637	CRCW12068251FT
A26R5623	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5624	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R5626	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R5627	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5628	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5629	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5632	321-5051-00			RES,FXD,FILM:0 OHM,1%,0.125W	09969	CRCW1206 JUMPER
A26R5652	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5657	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5720	321-5036-00			RES,FXD,FILM:33.2K,1%,0.125W	91637	CRCW12063322FT
A26R5722	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5723	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R5725	321-5035-00			RES,FXD,FILM:27.4K,1%,0.125W	91637	CRCW12062742FT
A26R5729	321-5169-00			RES,FXD,FILM:475K OHM,1%,0.125W	91637	CRCW1206-47502F
A26R5730	321-5051-00			RES,FXD,FILM:0 OHM,1%,0.125W	09969	CRCW1206 JUMPER
A26R5732	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5733	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5735	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5736	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5737	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5738	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5739	321-5037-00			RES,FXD,FILM:39.2K,1%,0.125W	91637	CRCW12063922FT
A26R5750	321-5166-00			RES,FXD,FILM:150K OHM,1%,0.125W	91637	CRCW1206-15002F
A26R5751	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5752	321-5028-00			RES,FXD,FILM:6.81K,1%,0.125W	91637	CRCW12066811FT
A26R5753	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5754	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R5755	321-5039-00			RES,FXD,FILM:56.2K,1%,0.125W	91637	CRCW12065622FT
A26R5756	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5758	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT

Component Number	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26R5771	321-5036-00			RES,FXD,FILM:33.2K,1%,0.125W	91637	CRCW12063322FT
A26R5810	321-5024-00			RES,FXD,FILM:3.32K,1%,0.125W	91637	CRCW12063321FT
A26R5811	321-5000-00			RES,FXD,FILM:10 OHM,1%,0.125W	91637	CRCW120610R0FT
A26R5812	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5813	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5814	321-5000-00			RES,FXD,FILM:10 OHM,1%,0.125W	91637	CRCW120610R0FT
A26R5815	321-5000-00			RES,FXD,FILM:10 OHM,1%,0.125W	91637	CRCW120610R0FT
A26R5820	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5822	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5823	321-5040-00			RES,FXD,FILM:68.1K,1%,0.125W	91637	CRCW12066812FT
A26R5824	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5825	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5826	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5827	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5828	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R5829	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5830	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5831	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5832	321-5031-00			RES,FXD,FILM:12.1K,1%,0.125W	91637	CRCW12061212FT
A26R5833	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5834	321-5016-00			RES,FXD,FILM:681 OHM,1%,0.125W	91637	CRCW12066810FT
A26R5847	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5849	321-5169-00			RES,FXD,FILM:475K OHM,1%,0.125W	91637	CRCW1206-47502F
A26R5850	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5851	321-5036-00			RES,FXD,FILM:33.2K,1%,0.125W	91637	CRCW12063322FT
A26R5852	321-5031-00			RES,FXD,FILM:12.1K,1%,0.125W	91637	CRCW12061212FT
A26R5853	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5854	321-5170-00			RES,FXD,FILM:825K OHM,1%,0.125W	91637	CRCW1206-82502F
A26R5864	321-5023-00			RES,FXD,FILM:2.74K,1%,0.125W	91637	CRCW12062741FT
A26R5868	321-5040-00			RES,FXD,FILM:68.1K,1%,0.125W	91637	CRCW12066812FT
A26R5870	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5871	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5872	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5873	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5874	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5875	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5876	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5877	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5878	321-5064-00			RES,FXD,FILM:200K,1%,0.125W,1206,8MM	91637	CRCW1206-2003FT
A26R5880	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5882	321-5017-00			RES,FXD,FILM:825 OHM,1%,0.125W	91637	CRCW12068250FT
A26R5883	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5884	321-5024-00			RES,FXD,FILM:3.32K,1%,0.125W	91637	CRCW12063321FT
A26R5885	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R5886	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R5887	321-5024-00			RES,FXD,FILM:3.32K,1%,0.125W	91637	CRCW12063321FT
A26R5888	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5889	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5890	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5892	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5893	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5920	321-5031-00			RES,FXD,FILM:12.1K,1%,0.125W	91637	CRCW12061212FT
A26R5921	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5925	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5926	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT

Component Number	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26R5930	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5931	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5932	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5933	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5934	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5935	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5936	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5937	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5938	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5939	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5951	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5952	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5953	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5954	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5955	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5956	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5957	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5958	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5959	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5960	321-5009-00	B050000	B050305	RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R5960	321-5007-00	B050306		RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R5961	321-5007-00			RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R5962	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5963	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5964	321-5169-00			RES,FXD,FILM:475K OHM,1%,0.125W	91637	CRCW1206-47502F
A26R5970	321-5045-00			RES,FXD,FILM:68.1 OHM,1%,0.125W	91637	CRCW120668R1FT
A26R5971	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5972	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5973	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5980	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5981	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5982	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5983	321-5045-00			RES,FXD,FILM:68.1 OHM,1%,0.125W	91637	CRCW120668R1FT
A26R5984	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5985	321-5169-00			RES,FXD,FILM:475K OHM,1%,0.125W	91637	CRCW1206-47502F
A26R5991	321-5050-00			RES,FXD,FILM:33.2 OHM,1%,0.125W	91637	CRCW120633R2FT
A26R5992	321-5008-00	B050000	B050305	RES,FXD,FILM:150 OHM,1%,0.125W	91637	CRCW12061500FT
A26R5992	321-5014-00	B050306		RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R5993	321-5194-00			RES,FXD,FILM:49.9 OHM,1%,0.125W,1206,8MM	91637	CRCW-1206-49R-9
A26R6020	321-5038-00			RES,FXD,FILM:47.5K,1%,0.125W	91637	CRCW12064752FT
A26R6021	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6022	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6042	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6050	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6051	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6052	321-5019-00			RES,FXD,FILM:1.21K,1%,0.125W	91637	CRCW12061211FT
A26R6060	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6062	321-5007-00			RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6063	321-5009-00	B050000	B050305	RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R6063	321-5007-00	B050306		RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6082	321-5010-00			RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6083	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R6090	321-5046-00			RES,FXD,FILM:82.5 OHM,1%,0.125W	91637	CRCW120682R5FT
A26R6091	321-5009-00			RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R6092	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT

Component Number	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26R6093	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6094	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R6102	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6104	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R6105	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6106	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6107	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6108	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6109	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6113	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6114	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6115	321-5018-00	B050000	B050255	RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6116	321-5018-00	B050000	B050255	RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6122	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6123	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6127	321-5008-00	B050000	B050305	RES,FXD,FILM:150 OHM,1%,0.125W	91637	CRCW12061500FT
A26R6130	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6132	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6133	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6134	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6137	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6140	321-5194-00			RES,FXD,FILM:49.9 OHM,1%,0.125W,1206,8MM	91637	CRCW-1206-49R-9
A26R6164	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6165	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6166	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6170	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6172	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6180	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6181	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R6182	321-5044-00			RES,FXD,FILM:56.2 OHM,1%,0.125W	91637	CRCW120656R2FT
A26R6183	321-5044-00			RES,FXD,FILM:56.2 OHM,1%,0.125W	91637	CRCW120656R2FT
A26R6184	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6191	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6192	321-5010-00			RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6193	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6194	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6195	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6197	321-5027-00			RES,FXD,FILM:5.62K,1%,0.125W	91637	CRCW12065621FT
A26R6198	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6199	321-5027-00			RES,FXD,FILM:5.62K,1%,0.125W	91637	CRCW12065621FT
A26R6221	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6222	321-5064-00			RES,FXD,FILM:200K,1%,0.125W,1206,8MM	91637	CRCW1206-2003FT
A26R6230	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6231	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R6232	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6233	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6245	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R6250	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6251	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6264	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6266	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6267	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6271	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R6273	321-5194-00			RES,FXD,FILM:49.9 OHM,1%,0.125W,1206,8MM	91637	CRCW-1206-49R-9
A26R6274	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT

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A26R6275	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R6277	321-5028-00			RES,FXD,FILM:6.81K,1%,0.125W	91637	CRCW12066811FT
A26R6290	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6291	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6293	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6294	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6295	321-5010-00	B050000	B050255	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6296	321-5010-00	B050000	B050255	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6296	321-5007-00	B050256		RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6297	321-5010-00	B050000	B050255	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6297	321-5009-00	B050256	B050305	RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R6297	321-5007-00	B050306		RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6298	321-5010-00	B050000	B050255	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6298	321-5007-00	B050256		RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6299	321-5010-00	B050000	B050255	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6300	321-5010-00	B050000	B050255	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6300	321-5009-00	B050256	B050305	RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R6300	321-5007-00	B050306		RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6301	321-5012-00			RES,FXD,FILM:332 OHM,1%,0.125W	91637	CRCW12063320FT
A26R6302	321-5021-00			RES,FXD,FILM:1.82K,1%,0.125W	91637	CRCW12061821FT
A26R6303	321-5017-00			RES,FXD,FILM:825 OHM,1%,0.125W	91637	CRCW12068250FT
A26R6304	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6305	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6306	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6307	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6308	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26U5300	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U5302	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U5310	156-5487-01			MICROCKT,LINEAR:BIPOLAR,XCONDUCTANCE	34371	CA3080AM96
A26U5315	156-5714-00			IC,LINEAR:BIPOLAR,VOLTAGE REG	27014	LM317LM
A26U5410	156-5487-01			MICROCKT,LINEAR:BIPOLAR,XCONDUCTANCE	34371	CA3080AM96
A26U5427	156-5692-01			IC,LINEAR:BIPOLAR,TRANSISTOR ARRAY	34371	CA3083M96
A26U5436	156-5837-01			IC,LINEAR:BIPOLAR,AMPLIFIER	80009	156583701
A26U5445	156-5485-01			MICROCKT,LINEAR:3 NPN & 2 PNP TRANS ARRAY	34371	CA3096M96
A26U5456	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP	18324	74HCT74DT
A26U5459	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U5460	156-5088-01			IC,DIGITAL:HCTCMOS,DEMUX/DECODER	18324	74HCT138DT
A26U5464	156-5147-01			IC,DIGITAL:FLIP FLOP;OCTAL D-TYPE	18324	74HCT273DT
A26U5468	156-5043-01			IC,CONVERTER:BIPOLAR,D/A	06665	DAC08-360SR(STD
A26U5565	160-5879-00			IC,MEMORY:CMOS,EPROM	TK0161	160-5879-00
A26U5575	156-1426-00			MICROCKT,DGTL:NMOS,PRGM TIMER MDL	04713	MC68B40 (L OR P
A26U5580	156-5081-01			IC,DIGITAL:HCTMOS,GATE;HEX INVERTER	18324	74HCT04DT
A26U5590	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP	18324	74HCT74DT
A26U5634	156-2051-01			MICROCKT,LINEAR:OPERATIONAL AMPL	04713	MC34004DR2
A26U5636	156-5138-01			IC,LINEAR:BIFET,OP-AMP;DUAL	04713	MC34002DR2
A26U5645	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP;DUAL D-TYPE	18324	74HCT74DT
A26U5712	156-5485-01			MICROCKT,LINEAR:3 NPN & 2 PNP TRANS ARRAY	34371	CA3096M96
A26U5728	156-5485-01			MICROCKT,LINEAR:3 NPN & 2 PNP TRANS ARRAY	34371	CA3096M96
A26U5755	156-5487-01			MICROCKT,LINEAR:BIPOLAR,XCONDUCTANCE	34371	CA3080AM96
A26U5756	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP	18324	74HCT74DT
A26U5764	156-5147-01			IC,DIGITAL:FLIP FLOP;OCTAL D-TYPE	18324	74HCT273DT
A26U5775	156-5098-01			IC,DIGITAL:HCTCMOS,GATE	18324	74HCT00DT
A26U5790	156-5783-00			IC,DIGITAL:HCTCMOS,GATE	18324	74HCT132D
A26U5838	156-5290-01			IC,DIGITAL:HCTCMOS,GATE	18324	74HCT27DT
A26U5845	156-5517-01			MICROCKT,LINEAR:CMOS,PHASE LOCK LOOP	04713	MC14046BDWR (X1

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A26U5855	156-5487-01			MICROCKT,LINEAR:BIPOLAR,XCONDUCTANCE	34371	CA3080AM96
A26U5870	156-2051-01			MICROCKT,LINEAR:OPERATIONAL AMPL	04713	MC34004DR2
A26U5875	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP;DUAL D-TYPE	18324	74HCT74DT
A26U5880	160-5878-00			MICROCKT,DGTL:LOGIC DEVICE,PRGM	TK0161	160-5878-00
A26U5890	156-5198-01			IC,DIGITAL:HCTCMOS,GATE;QUAD 2-INPUT XOR	34371	CD74HCT86M96
A26U5910	156-5566-01			IC,DIGITAL:HCTCMOS,COUNTER	18324	74HCT390DT
A26U5930	160-5880-00			MICROCKT,DGTL:16K X 8 X 4 EPROM,PRGM	80009	160588000
A26U5940	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U5942	160-5878-00			MICROCKT,DGTL:LOGIC DEVICE,PRGM	TK0161	160-5878-00
A26U5950	156-5088-01			IC,DIGITAL:HCTCMOS,DEMUX/DECODER	18324	74HCT138DT
A26U5952	156-5147-01			IC,DIGITAL:FLIP FLOP;OCTAL D-TYPE	18324	74HCT273DT
A26U5990	156-5085-01			IC,DIGITAL:HCTCMOS,GATE;QUAD 2-INPUT OR	18324	74HCT32DT
A26U6010	156-5518-01			IC,DIGITAL:TTL,MISC;PHASE-FREQ DET	04713	MC4044DR (X1 OR
A26U6070	156-5471-01			IC,DIGITAL:ECL,MUX/ENCODER	04713	MC10H174FNR1, 2
A26U6120	156-5486-01			IC,DIGITAL:ECL,MISC;VOLTAGE CONT	80009	156548601
A26U6130	156-1248-00			IC,DIGITAL:ECL,MISC;PRESCALER/DIVIDE BY 100 (U6130 USED ONLY WHEN U6131 & W6131 ARE PRESENT)	53469	SP8629
A26U6131	156-1248-00			IC,DIGITAL:ECL,MISC;PRESCALER/DIVIDE BY 100	53469	SP8629
A26U6140	156-5493-00			MICROCKT,DGTL:NMOS,PERIPHERIAL,TIMER	34335	AM9513AJC
A26U6190	160-1748-00			MICROCKT,DGTL:MACROCELL GATE ARRAY,PRGM	04713	SC32205-001
A26U6230	156-5138-01			IC,LINEAR:BIFET,OP-AMP;DUAL	04713	MC34002DR2
A26U6250	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U6252	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP;DUAL D-TYPE	18324	74HCT74DT
A26U6290	156-5262-01			MICROCKT,LINEAR:BIPOLAR,QUAD CONPARATOR	04713	LM339DR1,2
A26W5500	174-1555-00			CA ASSY,SP,ELEC:2,26 AWG,4.0 L	80009	174155500
A26W5970	321-5051-00			RES,FXD,FILM:0 OHM,1%,0.125W	09969	CRCW1206 JUMPER
A26W5980	321-5051-00			RES,FXD,FILM:0 OHM,1%,0.125W	09969	CRCW1206 JUMPER
A26W6127	321-5051-00	B050306		RES,FXD,FILM:0 OHM,1%,0.125W	09969	CRCW1206 JUMPER
A26XU5930	136-0755-00			SOCKET,DIP::PCB,;28 POS,2 X 14,0.1 X 0.6 CT	09922	DILB28P-108
A26Y5910	158-0269-00			XTAL UNIT,QTZ:13.10669MHZ, +/- 0.001 %, PAR	14301	011-668-03371
A27	671-1341-00	B050000	B050255	CIRCUIT BD ASSY:CTT	80009	671134100
A27	671-1341-01	B050256		CIRCUIT BD ASSY:CTT (OPTION 06/09 ONLY) (FOR SUBPARTS SEE A26)	80009	671134101
A29	670-7835-10			CIRCUIT BD ASSY:DMM (OPTION 01 ONLY)	80009	670783510
A29C4910	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A29C4911	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	SA101A201JAA
A29C4912	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	SA101A201JAA
A29C4913	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C4914	285-0558-00			CAP,FXD,PLASTIC:0.05 UF 2%,50V	75498	ORDER BY DESC
A29C4915	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A29C4932	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A29C4960	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	TK1743	CGB103KEX
A29C4961	283-0177-00			CAP,FXD,CER DI:1UF,+80-20%,25V	04222	SR305E105ZAA
A29C4962	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C4963	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5015	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	TK1743	CGB103KEX
A29C5020	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5031	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA

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A29C5050	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5052	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5060	283-0220-02			CAP,FXD,CER DI:0.01UF,20%,50V	04222	AR205C103MAATRS
A29C5070	285-0753-00			CAP,FXD,PLASTIC:0.01UF,3.5%,100V	75498	ORDER BY DESCRI
A29C5071	285-0753-00			CAP,FXD,PLASTIC:0.01UF,3.5%,100V	75498	ORDER BY DESCRI
A29C5110	290-0532-00			CAP,FXD,ELCTLT:150UF,20%,6V	31433	T354J157M006AS
A29C5111	290-0876-00			CAP,FXD,ELCTLT:15UF,20%,25 WVDC	31433	T330C156M025AS
A29C5112	290-0876-00			CAP,FXD,ELCTLT:15UF,20%,25 WVDC	31433	T330C156M025AS
A29C5122	283-0177-00			CAP,FXD,CER DI:1UF,+80-20%,25V	04222	SR305E105ZAA
A29C5124	283-0177-00			CAP,FXD,CER DI:1UF,+80-20%,25V	04222	SR305E105ZAA
A29C5130	281-0772-00			CAP,FXD,CER DI:4700PF,10%,100V	04222	SA101C472KAA
A29C5140	290-0523-00			CAP,FXD,ELCTLT:2.2UF,20%,20V	D5243	ETP-1B 2.2UF 25
A29C5142	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5150	290-0876-00			CAP,FXD,ELCTLT:15UF,20%,25 WVDC	31433	T330C156M025AS
A29C5151	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5152	290-0534-00			CAP,FXD,ELCTLT:1UF,20%,35V	D5243	ETP-1A 1UF 35V
A29C5153	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5155	290-0523-00			CAP,FXD,ELCTLT:2.2UF,20%,20V	D5243	ETP-1B 2.2UF 25
A29C5160	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	SA101A101KAA
A29C5170	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	SA101A201JAA
A29C5171	285-1106-00			CAP,FXD,PLASTIC:0.022UF,20%,600V	14752	230B1F223
A29C5220	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5222	290-0536-00			CAP,FXD,ELCTLT:10UF,20%,25V TANTALUM	D5243	ETP-3F 10UF 25V
A29C5224	281-0785-00			CAP,FXD,CER DI:68PF,10%,100V	04222	SA101A680KAA
A29C5230	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5231	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5232	281-0791-00			CAP,FXD,CER DI:270PF,10%,100V	04222	SA101C271KAA
A29C5250	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5251	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5280	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5281	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29C5290	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A29CR4952	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR4970	152-0674-00			SEMICOND DVC,DI:RECT,SI,800V,1.0A	25403	BYV96D (1N4947
A29CR4971	152-0674-00			SEMICOND DVC,DI:RECT,SI,800V,1.0A	25403	BYV96D (1N4947
A29CR4980	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA	27014	FDH5227.03
A29CR4981	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA	27014	FDH5227.03
A29CR4982	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5030	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5031	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5110	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA	27014	FDH-6012
A29CR5111	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA	27014	FDH-6012
A29CR5112	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA	27014	FDH-6012
A29CR5113	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA	27014	FDH-6012
A29CR5114	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA	27014	FDH-6012
A29CR5115	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA	27014	FDH-6012
A29CR5130	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5163	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA	27014	FDH5227.03
A29CR5164	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA	27014	FDH5227.03
A29CR5170	152-0307-00			DIODE,SIG:,ULTRA FAST;100V,4.0NS,1.5PF	04713	SSD1150
A29CR5210	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5211	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5212	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29CR5221	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A29DS5201	150-1014-00			LT EMITTING DIO:RED,695NM,100MA MAX	58361	Q6444/MV5054-1

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29F4990	159-0224-01			FUSE,CARTRIDGE:5AG,3A,600V,FAST	71400	BBS-3
A29F5220	159-0159-00			FUSE,WIRE LEAD:1.5A,125V,5 SEC	75915	25501.5
A29J5210	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR,0.025 Q (QUANTITY OF 2)	22526	48283-036
A29J5220	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR,0.025 Q (QUANTITY OF 3)	22526	48283-036
A29J5290	131-3323-00			CONN,HDR::PCB,;MALE,STR,2 X 20,0.1 CTR,0.36	22526	66506-025
A29J5291	131-3323-00			CONN,HDR::PCB,;MALE,STR,2 X 20,0.1 CTR,0.36	22526	66506-025
A29K4980	148-0146-00			RELAY,REED:1 FORM A,500VDC,COIL 5VDC	12617	ORDER BY DESC
A29K4981	148-0149-00			RELAY,ARMATURE:1 FORM A,1 FORM B,8A,250VAC,	61529	ST1E-DC12V
A29K4990	148-0149-00			RELAY,ARMATURE:1 FORM A,1 FORM B,8A,250VAC,	61529	ST1E-DC12V
A29K5080	148-0149-00			RELAY,ARMATURE:1 FORM A,1 FORM B,8A,250VAC,	61529	ST1E-DC12V
A29K5090	148-0149-00			RELAY,ARMATURE:1 FORM A,1 FORM B,8A,250VAC,	61529	ST1E-DC12V
A29K5091	148-0149-00			RELAY,ARMATURE:1 FORM A,1 FORM B,8A,250VAC,	61529	ST1E-DC12V
A29K5190	148-0141-00			RELAY,REED:1 FORM A,COIL 15 VDC 2200 OHM, C	12617	R7620-2
A29K5191	148-0141-00			RELAY,REED:1 FORM A,COIL 15 VDC 2200 OHM, C	12617	R7620-2
A29P5290	174-1376-00			CA ASSY,SP,ELEC:40,28 AWG,18.875 LFLAT CABL	53387	ORDER BY DESC
A29Q4920	151-0354-00			TRANSISTOR:PNP,SI,DUAL,TO-78	04713	2N3810A
A29Q4922	151-1054-00			TRANSISTOR:FET,N-CHAN,SI	TK1864	SNJ1609
A29Q4930	151-0188-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	2N3906
A29Q4932	151-0221-00			TRANSISTOR,SIG:BIPOLAR,PNP;12V,80MA	04713	SPS246(EL8251)
A29Q4934	151-1103-00			TRANSISTOR:FET,N CHANNEL,SI	TK0987	1S017
A29Q4936	151-0188-00			TRANSISTOR,SIG:BIPOLAR,PNP	04713	2N3906
A29Q4950	151-0190-00			TRANSISTOR,SIG:BIPOLAR,NPN	2D532	2N3904
A29Q4952	151-1078-00			TRANSISTOR:FET,N-CHAN,SI,TO-92	04713	SPF3040
A29Q4960	151-0254-00			TRANSISTOR,SIG:BIPOLAR,NPN	04713	MPSA14
A29Q4970	151-1103-00			TRANSISTOR:FET,N CHANNEL,SI,TO-72SD210DE	TK0987	1S017
A29Q4971	151-1103-00			TRANSISTOR:FET,N CHANNEL,SI,TO-72SD210DE	TK0987	1S017
A29Q4972	151-1063-00			TRANSISTOR,PWR:MOS,N-CH;60V,0.8A,0.8 OHM	04713	IRFD113
A29Q4973	151-1063-00			TRANSISTOR,PWR:MOS,N-CH;60V,0.8A,0.8 OHM	04713	IRFD113
A29Q4980	151-1136-00			TRANSISTOR,PWR:MOS,N-CH;100V,14A,0.16 OHM	04713	IRF530
A29Q5020	151-0342-02			TRANSISTOR,SIG:BIPOLAR,PNP;60V,50MA	04713	MPS4249RLRP
A29Q5070	151-1077-01			TRANSISTOR:FET,N-CHAN,SI	80009	151-1077-01
A29Q5124	151-1059-00			TRANSISTOR:FET,N-CHAN,30MW,TO-92 CASE	04713	MPF4391
A29Q5130	151-0221-00			TRANSISTOR,SIG:BIPOLAR,PNP;12V,80MA	04713	SPS246(EL8251)
A29Q5210	151-0254-03			TRANSISTOR,SIG:BIPOLAR,NPN;30V,500MA	04713	MPSA14RLRP
A29Q5230	151-0221-00			TRANSISTOR,SIG:BIPOLAR,PNP;12V,80MA	04713	SPS246(EL8251)
A29R4910	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4910	315-0823-00			RES,FXD,FILM:82K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4911	315-0681-00			RES,FXD,FILM:680 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4913	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4914	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4915	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4916	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4917	315-0221-00			RES,FXD,FILM:220 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4920	315-0221-00			RES,FXD,FILM:220 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4921	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4922	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4923	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4924	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4925	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4926	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29R4927	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4930	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4932	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4934	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4950	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4951	325-0252-00			RES,FXD,FILM:6.95K OHM,0.1%,0.1W	91637	PTF56,6.95K, T1
A29R4952	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4953	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4954	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4955	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4957	307-0765-00			RES NTWK,FXD,FI:1K OHM & 9K OHM,5% EA,0.1W	11502	4168
A29R4958	307-0765-00			RES NTWK,FXD,FI:1K OHM & 9K OHM,5% EA,0.1W	11502	4168
A29R4960	307-0934-00			RES NTWK,FXD,FI:SINGLE INLINE,0.9,9.900,99.	19647	1787-31
A29R4971	315-0334-00			RES,FXD,FILM:330K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4972	315-0164-00			RES,FXD,FILM:160K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R4973	321-0924-02			RES,FXD,FILM:40K OHM,0.5%,0.125W,TC=T2	19701	5033RC40K00D
A29R4974	321-0318-00			RES,FXD,FILM:20.0K OHM,1%,0.125W,TC=T0	91637	CMF55116G20001F
A29R4975	307-0346-02			RES,FXD,FILM:1 OHM,0.1%	75498	ORDER BY DESC
A29R4976	321-0289-09			RES,FXD,FILM:10.0K OHM,1%,0.125W,TC=T9	19701	5033RE10K00F
A29R4977	322-0481-07			RES,FXD,FILM:1M OHM,0.1%,0.25W,TC=T9	19701	5043RE1M000B
A29R4978	323-0385-00			RES,FXD,FILM:100K OHM,1%,0.5W,TC=T0	91637	CMF65116G10002F
A29R4979	317-0101-00			RES,FXD,CMPSN:100 OHM,5%,0.125W	TK1727	SFR16 2322-180-
A29R4980	307-0662-00			RES,THERMAL:1K OHM,40%SAFETY	50157	180Q10216
A29R4980	315-0102-00			CONTROLLED	TK1727	SFR25 2322-181-
A29R5010	315-0103-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
				RES,FXD,FILM:10K OHM,5%,0.25W		
A29R5011	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5012	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5013	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5014	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5015	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5016	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5017	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5020	321-0225-00			RES,FXD,FILM:2.15K	91637	CMF55116G21500F
A29R5021	315-0152-00			OHM,1%,0.125W,TC=T0SAFET	TK1727	SFR25 2322-181-
A29R5030	315-0681-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	TK1727	.SFR25 2322-181-
				RES,FXD,FILM:680 OHM,5%,0.25W		
A29R5032	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5033	321-0325-00			RES,FXD,FILM:23.7K OHM,1%,0.125W,TC=T0	91637	CMF55116G23701F
A29R5034	321-0318-00			RES,FXD,FILM:20.0K OHM,1%,0.125W,TC=T0	91637	CMF55116G20001F
A29R5035	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5036	321-0239-00			RES,FXD,FILM:3.01K OHM,1%,0.125W,TC=T0	91637	CMF55116G30100F
A29R5039	321-0296-00			RES,FXD,FILM:11.8K OHM,1%,0.125W,TC=T0	91637	CMF55116G11801F
A29R5041	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5042	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5043	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5044	321-0753-06			RES,FXD,FILM:9K OHM,0.25%,0.125W,TC=T9	19701	5033RE9K000C
A29R5045	321-0193-07			RES,FXD,FILM:1K OHM,0.1%,0.125W,TC=T9	19701	5033RE1K000B
A29R5047	321-0277-00			RES,FXD,FILM:7.50K OHM,1%,0.125W,TC=T0	91637	CMF55116G75000F
A29R5048	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5049	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5054	325-0394-00			RES,FXD,FILM:4.95K OHM,1%,0.1W,T-13	17745	CC55 T-13 4.95

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29R5055	325-0079-00			RES,FXD,FILM:1.8K OHM,1%,0.1W,TC-13	17745	CC55 T-13 1.8 K
A29R5056	325-0393-00			RES,FXD,FILM:200 OHM,1%,0.1W,T-13	17745	CC55 T-13 200 O
A29R5057	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5058	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5060	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5063	321-0753-06			RES,FXD,FILM:9K OHM,0.25%,0.125W,TC=T9	19701	5033RE9K000C
A29R5064	321-0193-00			RES,FXD,FILM:1K OHM,1%,0.125W,TC=T0	91637	CMF55116G10000F
A29R5066	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5070	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5071	315-0155-00			RES,FXD,FILM:1.5M OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5072	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5073	315-0563-00			RES,FXD,FILM:56K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5075	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5080	325-0034-00			RES SET,MATCHED:1 EA,9M,900K,99K OHM	03888	ADVISE
A29R5081				(PART OF A29R5080)		
A29R5082				(PART OF A29R5080)		
A29R5083	322-0673-03			RES,FXD,FILM:500K OHM,0.25%,0.25W,TC=T2	91637	CMF55 116D5003C
A29R5090	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5122	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5124	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5130	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5131	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5132	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5133	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5134	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5150	321-0753-06			RES,FXD,FILM:9K OHM,0.25%,0.125W,TC=T9	19701	5033RE9K000C
A29R5151	321-0193-07			RES,FXD,FILM:1K OHM,0.1%,0.125W,TC=T9	19701	5033RE1K000B
A29R5167	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5168	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5170	315-0182-00			RES,FXD,FILM:1.8K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5171	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5172	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5173	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5174	315-0106-00			RES,FXD,FILM:10M OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5176	315-0682-00			RES,FXD,FILM:6.8K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5177	321-0289-09			RES,FXD,FILM:10.0K OHM,1%,0.125W,TC=T9	19701	5033RE10K00F
A29R5180	307-0662-00			RES,THERMAL:1K OHM,40%	50157	180Q10216
A29R5181	324-0620-09			RES,FXD,FILM:990K OHM,1%,1W,TC=T9	03888	PME75 990 K +-
A29R5182	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5190	322-0673-03			RES,FXD,FILM:500K OHM,0.25%,0.25W,TC=T2	91637	CMF55 116D5003C
A29R5191	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5210	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5211	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5212	307-0103-00			RES,FXD,CMPSN:2.7 OHM,5%,0.25W	01121	CB27G5
A29R5220	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5222	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5223	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5224	315-0151-00			RES,FXD,FILM:150 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5230	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5231	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5232	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5233	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5251	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5252	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29R5270	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	TK1727	SFR25 2322-181-

Component Number	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29R5271	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A29T5210	120-1494-00			TRANSFORMER,PWR:ISOLATION HF,POT CORE	TK2425	ORDER BY DESC
A29T5230	120-1533-00			XFMR,ISOLATION:2KV,1:1 RATIO,DUAL SIGNAL	TK1601	63820
A29TP4910	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR	22526	48283-036
A29TP4960	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR	22526	48283-036
A29TP4980	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR	22526	48283-036
A29TP5140	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR	22526	48283-036
A29TP5210	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR	22526	48283-036
A29TP5270	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR	22526	48283-036
A29TP5271	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR	22526	48283-036
A29TP5290	131-0608-00			TERMINAL,PIN:PCB/PRESSFIT,;MALE,STR	22526	48283-036
A29U4920	156-0383-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NOR	01295	SN74LS02N
A29U4930	156-0422-00			IC,DIGITAL:LSTTL,COUNTER	01295	SN74LS191N
A29U4932	156-1611-00			IC,DIGITAL:FTTL,FLIP FLOP;DUAL D-TYPE	04713	MC74F74N
A29U4940	156-0796-00			IC,DIGITAL:CMOS,SHIFT REGISTER;8-STAGE SHIF	04713	MC14094BCP
A29U4942	156-0515-00			IC,MISC:CMOS,ANALOG MUX;TRIPLE SPDT	04713	MC14053BCP
A29U4944	156-0048-00			MICROCKT,LINEAR:5 XSTR ARRAY	04713	MC3346P
A29U4950	156-1850-00			IC,MISC:CMOS,ANALOG SWITCH;QUAD	17856	SDG21107/DG211C
A29U4960	156-1978-01			MICROCKT,LINEAR:OP AMP,LOW BIAS CURRENT	80009	156-1978-01
A29U4970	156-1838-01			MICROCKT,LINEAR:OPERATIONAL AMPLIFIER	80009	156-1838-01
A29U5010	156-1225-00			IC,LINEAR:BIPOLAR,COMPARATOR;DUAL	01295	LM393P
A29U5020	156-0513-00			IC,MISC:CMOS,ANALOG MUX;8 CHANNEL	04713	MC14051B (CP OR
A29U5030	156-1191-01			MICROCKT,LINEAR:BIFET,DUAL OPNL AMP	80009	156119101
A29U5040	156-0854-00			IC,LINEAR:BIPOLAR,OP-AMP	27014	LM308AN
A29U5050	156-0783-00			IC,LINEAR:BIPOLAR,VOLTAGE REF	64155	LM399H
A29U5060	156-1191-01			MICROCKT,LINEAR:BIFET,DUAL OPNL AMPL	80009	156119101
A29U5110	156-1207-00			IC,LINEAR:BIPOLAR,VOLTAGE REG	27014	LM320H-12
A29U5112	156-1160-00			IC,LINEAR:BIPOLAR,VOLTAGE REG	27014	LM78L12ACH
A29U5120	156-0796-00			IC,DIGITAL:CMOS,SHIFT REGISTER;8-STAGE SHIF	04713	MC14094BCP
A29U5122	156-0796-00			IC,DIGITAL:CMOS,SHIFT REGISTER;8-STAGE SHIF	04713	MC14094BCP
A29U5124	156-0934-00			IC,DIGITAL:BIPOLAR,DUAL RS-232 LINE RECEIVE	01295	SN75152
A29U5130	156-0745-00			IC,DIGITAL:CMOS,GATES;HEX INV	04713	MC14069UBCP
A29U5132	156-1245-00			IC,LINEAR:BIPOLAR,TRANSISTOR ARRAY	0CVK3	ULN2003A
A29U5140	156-1457-01			IC,MISC:BIPOLAR,MISC	24355	AD41134
A29U5150	156-1850-00			IC,MISC:CMOS,ANALOG SWITCH;QUAD	17856	SDG21107/DG211C
A29U5151	156-1191-01			MICROCKT,LINEAR:BIFET,DUAL OPNL AMPL	80009	156119101
A29U5170	156-0130-00			MICROCKT,LINEAR:MODULATOR/DEMODULATOR	04713	MC1496G
A29U5222	156-0388-00			IC,DIGITAL:LSTTL,FLIP FLOP;DUAL D W/SET & C	01295	SN74LS74AN
A29U5224	156-0844-00			IC,DIGITAL:LSTTL,COUNTER;SYNCH 4-BIT BINARY	01295	SN74LS161AN
A29U5230	156-0302-00			IC,DIGITAL:TTL,DRIVER;DUAL 2-INPUT NAND PER	01295	SN75452N
A29U5231	156-0895-00			IC,DIGITAL:CMOS,COUNTER;14-BIT BINARY	04713	MC14020BCP
A29U5232	156-0386-00			IC,DIGITAL:LSTTL,GATES;TRIPLE 3-INPUT NAND	01295	SN74LS10N
A29U5240	156-0789-00			IC,DIGITAL:LSTTL,SHIFT REGISTER;8-BIT PISO	01295	SN74LS165N
A29U5241	156-0469-00			IC,DIGITAL:LSTTL,DEMUX/DECODER	01295	SN74LS138 (N OR
A29U5242	156-0480-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT AND	01295	SN74LS08N
A29U5250	156-0465-00			IC,DIGITAL:LSTTL,GATES;8-INPUT NAND	01295	SN74LS30N
A29U5251	156-0388-00			IC,DIGITAL:LSTTL,FLIP FLOP;DUAL D W/SET & C	01295	SN74LS74AN
A29U5252	156-0385-00			IC,DIGITAL:LSTTL,GATES;HEX INV	01295	SN74LS04N
A29U5260	156-0852-00			IC,DIGITAL:LSTTL,GATES;NONINV, HEX BUS DRIV	01295	SN74LS367N
A29U5270	156-0385-00			IC,DIGITAL:LSTTL,GATES;HEX INV	01295	SN74LS04N
A29U5271	156-0479-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT OR	01295	SN74LS32N
A29U5272	156-1426-00			MICROCKT,DGTL:NMOS,PRGM TIMER MDL	04713	MC68B40 (L OR P
A29U5273	156-0388-00			IC,DIGITAL:LSTTL,FLIP FLOP;DUAL D W/SET & C	01295	SN74LS74AN
A29U5274	156-1172-00			IC,DIGITAL:LSTTL,COUNTER;DUAL 4-BIT BINARY	01295	SN74LS393N
A29U5281	160-5935-00			MICROCKT,DGTL:32K X 8 EPROM,PRGM (NOT PART OF A29, ORDER SEPARATELY)	80009	160593500

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29U5282	156-1111-00			IC,DIGITAL:LSTTL,TRANSCEIVER	01295	SN74LS245N
A29VR5010	152-0175-00			DIODE,ZENER:,;5.6V,5%,0.4W	04713	SZG35008 (1N752
A29VR5020	152-0760-00			DIODE,ZENER:,;6.2V,2%,0.4W	04713	SZG30205
A29VR5031	152-0662-00			DIODE,ZENER:,;5V,1%,0.4W	04713	SZG195RL
A29VR5160	152-0217-00			DIODE,ZENER:,;8.2V,5%,0.4W	04713	SZG20
A29VR5162	152-0217-00			DIODE,ZENER:,;8.2V,5%,0.4W	04713	SZG20
A29VR5210	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA	27014	FDH5227.03
A29W4980	195-0964-00			LEAD,ELECTRICAL:26 AWG,2.0 L,9-1	80009	195096400
A29W5070	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225L	24546	OMA 07
A29W5075	195-1259-00			LEAD,ELECTRICAL:26 AWG,1.5 L,9-4	80009	195125900
A29W5260	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225L	24546	OMA 07
A29Y4910	158-0261-00			XTAL UNIT,QTZ:3.579MHZ,01%	33096	CCAT101773(HC18
A30	670-7894-02			CIRCUIT BD ASSY:FRONT PANEL (OPTION 01 ONLY)	80009	670789402
A30C4310	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A30LS4330	119-1427-01			XDCR,AUDIO:1-4.2KHZ,30MA,6V	63791	QMB-06
A30P4300	131-0589-00			TERMINAL,PIN:PRESSFIT/PCB,;MALE,STR (QUANTITY OF 2)	22526	48283-029
A30R4320	307-0542-00			RES NTWK,FXD,FI:(5)10K OHM,5%,0.125W	91637	CSC06AO1-103J (
A30S4302	260-2171-00			SWITCH,PUSH:3 BUTTON,1 POLE,RANGE	71590	2LL9CCB1000123
A30S4303	260-2170-00			SWITCH,PUSH:5 BUTTON,I POLE,INPUT SEL	71590	2LL9EEB1000122
A30S4304	260-2088-00			SWITCH,PUSH:1 BTN,1 POLE,TRIGGER	71590	2LL199NB021068
A30S4305	260-2088-00			SWITCH,PUSH:1 BTN,1 POLE,TRIGGER	71590	2LL199NB021068
A30S4306	260-2171-00			SWITCH,PUSH:3 BUTTON,1 POLE,RANGE	71590	2LL9CCB1000123
A30U4300	156-1080-00			IC,DIGITAL:TTL,BUFFER/DRIVER;HEX, OC, HIGH	01295	SN7407N
A30U4310	156-0541-00			IC,DIGITAL:LSTTL,DEMUX/DECODER	01295	SN74LS139AN
A30U4320	156-1220-00			IC,DIGITAL:LSTTL,BUFFER/DRIVER	01295	SN74LS365A(N OR
A30W4330	174-1392-00			CA ASSY,SP,ELEC:16,28 AWG,10.75 L	53387	ORDER BY DESCRI
A32	670-7999-00			CIRCUIT BD ASSY:WORD RECOGNIZER PROB (OPTION 09 ONLY)	80009	670799900
A32C6303	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50VDIP STYLE	04222	MD015E224ZAA
A32C6334	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50VDIP STYLE	04222	MD015E224ZAA
A32C6338	281-0767-00			CAP,FXD,CER DI:330PF,20%,100V	04222	SA102C331MAA
A32CR6330	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A32CR6335	152-0664-00			SEMICOND DVC,DI:SCHOTTKY,SW,SI,70V	50434	5082-2800-T01
A32CR6340	152-0664-00			SEMICOND DVC,DI:SCHOTTKY,SW,SI,70V	50434	5082-2800-T01
A32J6300	131-3046-00			CONN,HDR::PCB,;MALE,RTANG,1 X 10,0.15 CTR	22526	ORDER BY DESC
A32J6370	131-1425-00			CONN,HDR::PCB,;MALE,RTANG,1 X 36,0.1 CTR, (LOCATION A)	22526	65521-136
A32J6370	131-1426-00			CONN,HDR::PCB,;MALE,RTANG,1 X 36,0.1 CTR (LOCATION B)	22526	65524-136
A32J6380	131-3045-00			CONN,BOX::PCB,;FEMALE,RTANG,1 X 5	00779	1-380949-5
A32J6385	136-0547-00			CONN,RCPT,ELEC:CKT BOARD,6 CONTACT	00779	1-380949-6
A32L6354	108-0245-00			CHOKE,RF:FIXED,3.9UH, +/- 10 %, Q 35, DCR 0	0JR03	108-0245-00
A32Q6334	151-0190-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	2D532	2N3904
A32R6301	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6302	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6303	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6304	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6305	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6306	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A32R6307	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6308	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6325	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6330	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6336	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6340	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6350	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32U6310	156-1707-00			IC,DIGITAL:FTTL,GATE;QUAD 2-INPUT NAND	04713	MC74F00 (N OR J
A32U6315	156-1707-00			IC,DIGITAL:FTTL,GATE;QUAD 2-INPUT NAND	04713	MC74F00 (N OR J
A32U6320	156-0441-00			IC,DIGITAL:FTTL,COMPARATOR;8-BIT IDENTITY,	04713	MC74F521N
A32U6325	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER;8-BIT SIPO	27014	MM74C164(NA+)
A32U6330	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER;8-BIT SIPO	27014	MM74C164(NA+)
A32U6335	156-1724-00			IC,DIGITAL:FTTL,GATES;QUAD 2-INPUT OR	04713	MC74F32N
A32U6350	156-1611-00			IC,DIGITAL:FTTL,FLIP FLOP;DUAL D-TYPE	04713	MC74F74N
A32U6356	156-1743-00			IC,DIGITAL:FTTL,GATES;QUAD 2-INPUT NOR	04713	MC74F02N
A33	670-7998-01			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE (OPTION 09 ONLY)	80009	670799801
A33C6410	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50VDIP STYLE	04222	MD015E224ZAA
A33C6440	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50VDIP STYLE	04222	MD015E224ZAA
A33J6400	131-3046-00			CONN,HDR::PCB,;MALE,RTANG,1 X 10,0.15 CTR,0	22526	ORDER BY DESC
A33P6380	131-3153-00			CONN,HDR::PCB,;MALE,RTANG,1 X 36,0.1 CTR,0.	58050	082-3643-RS20
A33P6385	131-3153-00			CONN,HDR::PCB,;MALE,RTANG,1 X 36,0.1 CTR,0.	58050	082-3643-RS20
A33R6400	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6401	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6402	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6403	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6404	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6405	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6406	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6407	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6408	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6432	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6443	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33U6405	156-1707-00			IC,DIGITAL:FTTL,GATE;QUAD 2-INPUT NAND	04713	MC74F00 (N OR J
A33U6409	156-1707-00			IC,DIGITAL:FTTL,GATE;QUAD 2-INPUT NAND	04713	MC74F00 (N OR J
A33U6415	156-0441-00			IC,DIGITAL:FTTL,COMPARATOR;8-BIT IDENTITY,	04713	MC74F521N
A33U6420	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER;8-BIT SIPO	27014	MM74C164(NA+)
A33U6425	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER;8-BIT SIPO	27014	MM74C164(NA+)
A33U6430	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER;8-BIT SIPO	27014	MM74C164(NA+)
A33U6435	156-1800-00			IC,DIGITAL:FTTL,GATES;QUAD 2-INPUT XOR	04713	MC74F86N
F4991	159-0016-00			FUSE,CARTRIDGE:3AG,1.5,250V,FAST BLOW (OPTION 01)	75915	31201.5
P4241	174-1375-00			CA ASSY,SP,ELEC:40,28 AWG,14.375 LFLAT CABL	53387	ORDER BY DESC

REPLACEABLE ELECTRICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

When ordering parts, 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 Mfg. Code Number to Manufacturer Cross 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 parts list)

Example a. **component number**

A23R1234 **A23** **R1234**

Assembly number **Circuit number**

Read: Resistor 1234 of Assembly 23

Example b. **component number**

A23A2R1234 **A23** **A2** **R1234** **Circuit number**

Assembly number **Subassembly number**

Read: Resistor 1234 of Subassembly 2 of Assembly 23

The circuit component's number appears 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 parts list)

Indicates part number to be used when ordering replacement part from Tektronix.

SERIAL NO. (columns three and four of the 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 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 Catalog handbook H6-1 can be utilized where possible.

MFR. CODE (column six of the 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 NO. (column seven of the parts list)

Indicates actual manufacturer's part number.

REPLACEABLE ELECTRICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

When ordering parts, 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 Mfg. Code Number to Manufacturer Cross 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 parts list)

Example a. component number

A23R1234 — A23 (Assembly number) R1234 (Circuit number)

Read: Resistor 1234 of Assembly 23

Example b. component number

A23A2R1234 — A23 (Assembly number) A2 (Subassembly number) R1234 (Circuit number)

Read: Resistor 1234 of Subassembly 2 of Assembly 23

The circuit component's number appears 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 parts list)

Indicates part number to be used when ordering replacement part from Tektronix.

SERIAL NO. (columns three and four of the 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 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 Catalog handbook H6-1 can be utilized where possible.

MFR. CODE (column six of the 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 NO. (column seven of the parts list)

Indicates actual manufacturer's part number.

CROSS INDEX – MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
TK0161	WYLE LABORATORIES ELECTRONICS MARKETING GROUP LOS ANGELES DIV	124 MARYLAND ST	EL SEGUNDO CA 90245-4115
TK1727	PHILIPS NEDERLAND BV AFD ELONCO	POSTBUS 90050	5600 PB EINDHOVEN THE NETHERLANDS
0JR03	ZMAN AND ASSOCIATES	7633 S 180th	KENT WA 98032
0JR04	TOSHIBA AMERICA INC ELECTRONICS COMPONENTS DIV BUSINESS SECTOR	2692 DOW AVE	TUSTIN CA 92680
0J7N9	MCX INC	30608 SAN ANTONIO ST	HAYWARD CA 94544
0J9R5	MARCON AMERICA CORP	3 PEARL COURT	ALLENDALE NJ 07401
00779	AMP INC	2800 FULLING MILL PO BOX 3608	HARRISBURG PA 17105
01295	TEXAS INSTRUMENTS INC SEMICONDUCTOR GROUP	13500 N CENTRAL EXPY PO BOX 655012	DALLAS TX 75265
04222	AVX CERAMICS DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
04713	MOTOROLA INC SEMICONDUCTOR PRODUCTS SECTOR	5005 E MCDOWELL RD	PHOENIX AZ 85008-4229
06665	PRECISION MONOLITHICS INC SUB OF BOURNS INC	1500 SPACE PARK DR	SANTA CLARA CA 95050
09922	BURNDY CORP	RICHARDS AVE	NORWALK CT 06852
09969	DALE ELECTRONICS INC	EAST HIGHWAY 50 P O BOX 180	YANKTON SD 57078
14301	ANDERSON ELECTRONICS INC	310 PENN ST PO BOX 89	HOLLIDAYSBURG PA 16648-2009
18324	SIGNETICS CORP MILITARY PRODUCTS DIV	4130 S MARKET COURT	SACRAMENTO CA 95834-1222
2D532	SPRAGUE ELECTRIC CO SEMICONDUCTOR DIVISION	70 PEMBROKE ROAD	CONCORD NH 03301
22526	DU PONT E I DE NEMOURS AND CO INC DU PONT ELECTRONICS DEPT	515 FISHING CREEK RD	NEW CUMBERLAND PA 17070-3007
24546	CORNING GLASS WORKS	550 HIGH ST	BRADFORD PA 16701-3737
25088	SIEMENS CORP	186 WOOD AVE S	ISELIN NJ 08830-2704
27014	NATIONAL SEMICONDUCTOR CORP	2900 SEMICONDUCTOR DR	SANTA CLARA CA 95051-0606
32997	BOURNS INC TRIMPOT DIV	1200 COLUMBIA AVE	RIVERSIDE CA 92507-2114
34335	ADVANCED MICRO DEVICES	901 THOMPSON PL	SUNNYVALE CA 94086-4518
34371	HARRIS CORP HARRIS SEMICONDUCTOR PRODUCTS GROUP	200 PALM BAY BLVD PO BOX 883	MELBOURNE FL 32919
50434	HEWLETT-PACKARD CO OPTOELECTRONICS DIV	370 W TRIMBLE RD	SAN JOSE CA 95131
53387	MINNESOTA MINING MFG CO	PO BOX 2963	AUSTIN TX 78769-2963
53469	PLESSEY SEMICONDUCTOR	SEQUOIA RESEARCH PARK 1500 GREEN HILLS ROAD	SCOTTS VALLEY CA 95066
54583	TDK ELECTRONICS CORP	12 HARBOR PARK DR	PORT WASHINGTON NY 11550

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
56289	SPRAGUE ELECTRIC CO WORLD HEADQUARTERS	92 HAYDEN AVE	LEXINGTON MA 02173-7929
57668	ROHM CORP	8 WHATNEY PO BOX 19515	IRVINE CA 92713
58050	TEKA PRODUCTS INC	45 SALEM ST	PROVIDENCE RI 02907
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077-0001
91637	DALE ELECTRONICS INC	2064 12TH AVE PO BOX 609	COLUMBUS NE 68601-3632

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A22	670-8159-00			CIRCUIT BD ASSY:LED	80009	670815900
				(OPTION 10 ONLY)		
A23	671-0981-00			CIRCUIT BD ASSY:GPIB OPTION 10	80009	671098100
				(OPTION 10 ONLY)		
A25	671-1340-00	B050000	B050176	CIRCUIT BD ASSY:TV	80009	671134000
A25	671-1340-01	B050177		CIRCUIT BD ASSY:TV	80009	671134001
				(OPTION 05 ONLY)		
				(FOR SUBPARTS SEE A26)		
A26	671-0982-00	B050000	B050190	CIRCUIT BD ASSY:TV/CTT	80009	671098200
A26	671-0982-01	B050191		CIRCUIT BD ASSY:CTT/TV	80009	671098201
				(OPTION 05/06/09)		
A27	671-1341-00	B050000	B050190	CIRCUIT BD ASSY:CTT	80009	671134100
A27	671-1341-01	B050191		CIRCUIT BD ASSY:CTT	80009	671134101
				(OPTION 06/09 ONLY)		
				(FOR SUBPARTS SEE A26)		
A32	670-7999-00			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE	80009	670799900
				(OPTION 09 ONLY)		
A33	670-7998-01			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE	80009	670799801
				(OPTION 09 ONLY)		

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A22	670-8159-00			CIRCUIT BD ASSY:LED (OPTION 10 ONLY)	80009	670815900
A22DS4540	150-1061-00			LT EMITTING DIO:RED,660NM,50MA MAX	50434	HLMP-1301
A22DS4542	150-1061-00			LT EMITTING DIO:RED,660NM,50MA MAX	50434	HLMP-1301
A22DS4545	150-1061-00			LT EMITTING DIO:RED,660NM,50MA MAX	50434	HLMP-1301
A23	671-0981-00			CIRCUIT BD ASSY:GPIB OPTION 10 (OPTION 10 ONLY)	80009	671098100
A23C4625	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4626	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4705	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4706	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4708	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4730	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4735	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4738	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4745	283-0203-02			CAP,FXD,CER DI:0.47UF,20%,50V	04222	SR305E474MAATRS
A23C4747	290-0847-00			CAP,FXD,ELCTLT:47UF,+50-20%,10WVDC	0J9R5	CE02W1A470MD
A23C4801	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4805	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4808	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4831	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23C4838	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	04222	SA105C223MAA
A23J4243	131-3323-00			CONN,HDR::PCB,;MALE,STR,2 X 20,0.1 CTR,0.36	22526	66506-025
A23J4540	131-2919-01			CONN,HDR::PCB,;MALE,STR,1 X 4,0.1 CTR,0.235	53387	2404-6112 UB
A23J4800	131-4114-00			CONN,HDR::PCB,;MALE,STR,2 X 12,0.1 CTR,0.36	53387	3589-6002
A23P4243	174-1375-00			CA ASSY,SP,ELEC:40,28 AWG,14.375 L	53387	ORDER BY DESC
A23P4800	174-1450-00			CA ASSY,SP,ELEC:24,28 AWG,8.25 L,RIBBON	53387	ORDER BY DESC
A23Q4743	151-0622-01			TRANSISTOR,SIG:BIPOLAR,PNP	27014	2N6727/D75Z
A23Q4745	151-0736-01			TRANSISTOR:NPN,SI,TO-92	27014	2N4401 (D75Z)
A23R4513	313-1101-00			RES,FXD,FILM:100 OHM,5%,0.2W	91637	CCF50-2-100R0J
A23R4543	313-1201-00			RES,FXD,FILM:200 OHM,5%,0.2W	91637	CCF50-2-200R0J
A23R4544	313-1201-00			RES,FXD,FILM:200 OHM,5%,0.2W	91637	CCF50-2-200R0J
A23R4545	313-1201-00			RES,FXD,FILM:200 OHM,5%,0.2W	91637	CCF50-2-200R0J
A23R4732	313-1103-00			RES,FXD,FILM:10K OHM,5%,0.2W	91637	CCF50-2-10001J
A23R4734	313-1131-00			RES,FXD,FILM:130 OHM,5%,0.26	91637	CCF501G130R0J
A23R4735	313-1271-00			RES,FXD,FILM:270 OHM,5%,0.2W	91637	CCF50-2-270R0J
A23R4740	313-1152-00			RES,FXD,FILM:1.5K OHM,5%,0.2W	91637	CCF50-2-15000J
A23R4743	313-1152-00			RES,FXD,FILM:1.5K OHM,5%,0.2W	91637	CCF50-2-15000J
A23R4750	313-1103-00			RES,FXD,FILM:10K OHM,5%,0.2W	91637	CCF50-2-10001J
A23U4501	156-1065-00			IC,DIGITAL:LSTTL,LATCH	01295	SN74LS373N
A23U4505	156-1065-00			IC,DIGITAL:LSTTL,LATCH	01295	SN74LS373N
A23U4601	156-0866-00			IC,DIGITAL:LSTTL,GATES;13-INPUT NAND	04713	SN74LS133N
A23U4605	156-0386-00			IC,DIGITAL:LSTTL,GATES;TRIPLE 3-INPUT NAND	01295	SN74LS10N
A23U4606	156-0385-00			IC,DIGITAL:LSTTL,GATES;HEX INV	01295	SN74LS04N
A23U4608	156-1111-00			IC,DIGITAL:LSTTL,TRANSCEIVER	01295	SN74LS245N
A23U4625	156-1221-00			IC,DIGITAL:LSTTL,FLIP FLOP;HEX D, POS EDGE	01295	SN74LS378N
A23U4626	156-1221-00			IC,DIGITAL:LSTTL,FLIP FLOP;HEX D, POS EDGE	01295	SN74LS378N
A23U4701	156-1277-00			MICROCKT,DGTL:LSTTL,3-STATE OCTAL BFR,SCRN	27014	DM81LS95AN
A23U4705	156-0480-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT AND	01295	SN74LS08N
A23U4706	156-0382-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NAND	01295	SN74LS00N
A23U4708	156-0469-00			IC,DIGITAL:LSTTL,DEMUX/DECODER	01295	SN74LS138 (N OR

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A23U4710	160-5881-01	B050000	B050135	MICROCKT,DGTL:8K X 8 EPROM,PRGM	80009	160588101
A23U4710	160-5881-02	B050136		MICROCKT,DGTL:8K X 8 EPROM,PRGM (NOT PARTS OF BOARD, ORDER SEPERATELY)	80009	160588102
A23U4715	160-5882-01	B050000	B050135	MICROCKT,DGTL:32K X 8 EPROM,PRGM	80009	160588201
A23U4715	160-5882-02	B050136		MICROCKT,DGTL:32K X 8 EPROM,PRGM (NOT PARTS OF BOARD, ORDER SEPERATELY)	80009	160588202
A23U4730	156-0467-00			IC,DIGITAL:LSTTL,GATES	01295	SN74LS38N
A23U4735	156-0382-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NAND	01295	SN74LS00N
A23U4738	156-0386-00			IC,DIGITAL:LSTTL,GATES;TRIPLE 3-INPUT NAND	01295	SN74LS10N
A23U4801	156-0865-00			IC,DIGITAL:LSTTL,FLIP FLOP	01295	SN74LS273N
A23U4805	156-1415-00			IC,DIGITAL:LSTTL,TRANSCEIVER	01295	SN75161BN
A23U4808	156-1414-00			IC,DIGITAL:LSTTL,TRANSCEIVER	01295	SN75160B (N OR
A23U4811	156-2473-00			IC,MEMORY:CMOS,SRAM;8K X 8,200NS	0JR04	TC5564PL-20
A23U4818	156-1444-01			IC,PROCESSOR:NMOS,CONTROLLER	01295	TMS9914A (NL OR
A23U4831	156-0479-00			IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT OR	01295	SN74LS32N
A23U4838	156-0388-00			IC,DIGITAL:LSTTL,FLIP FLOP;DUAL D	01295	SN74LS74AN
A23W4244	174-1697-00			CA ASSY,SP,ELEC:3,26 AWG,5.25 L	80009	174169700
A23W4540	174-0128-00			CA ASSY,SP,ELEC:4,26 AWG,9.0 L,9-N	0J7N9	ORDER BY DESC
A23W4750	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225L	24546	OMA 07
A23XU4710	136-0755-00			SOCKET,DIP::PCB,;28 POS,2 X 14,0.1 X 0.6 CT	09922	DILB28P-108
A23XU4715	136-0755-00			SOCKET,DIP::PCB,;28 POS,2 X 14,0.1 X 0.6 CT	09922	DILB28P-108
A25	671-1340-00	B050000	B050176	CIRCUIT BD ASSY:TV	80009	671134000
A25	671-1340-01	B050177		CIRCUIT BD ASSY:TV (OPTION 05 ONLY) (FOR SUBPARTS SEE A26)	80009	671134001
A26	671-0982-00	B050000	B050190	CIRCUIT BD ASSY:TV/CTT	80009	671098200
A26	671-0982-01	B050191		CIRCUIT BD ASSY:CTT/TV (OPTION 05/06/09)	80009	671098201
A26C5332	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5371	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5372	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5373	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5374	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5419	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5433	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5438	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5458	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5460	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5462	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5465	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5468	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5490	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5543	283-5188-00			CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C5545	283-5068-00			CAP,FXD,CER DI:2200PF,10%,50V	04222	W1206X222K2B04
A26C5612	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5613	283-5187-00			CAP,FXD,CER DI:15PF,5%,100V	04222	W1206C150J3B04
A26C5614	283-5108-00			CAP,FXD,CER DI:68PF,5%,100V	04222	W1206C680J3B04
A26C5625	283-5106-00			CAP,FXD,CER DI:470PF,5%,100V	04222	W1206C470J3B04
A26C5626	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5627	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5628	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5630	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26C5631	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5633	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5638	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5640	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C5651	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5690	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5720	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5724	283-5188-00			CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C5726	283-5108-00			CAP,FXD,CER DI:68PF,5%,100V	04222	W1206C680J3B04
A26C5728	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5731	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5734	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5735	283-5107-00			CAP,FXD,CER DI:22PF,5%,100V	04222	W1206C220J3B04
A26C5740	283-5105-00			CAP,FXD,CER DI:1UF,+80/-20%,50V	04222	W1825Z105Z2B04
A26C5755	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5757	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5758	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5770	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5771	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5772	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5773	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5774	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5775	283-5113-00			CAP,FXD,CER DI:0.047UF,10%,50V,X7R,1206 PKT	04222	W1206X473K2B04
A26C5776	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5777	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5778	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5779	283-5188-00			CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C5804	283-5098-00	B050177		CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5806	283-5098-00	B050177		CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5808	283-5105-00			CAP,FXD,CER DI:1UF,+80/-20%,50V	04222	W1825Z105Z2B04
A26C5810	283-5105-00			CAP,FXD,CER DI:1UF,+80/-20%,50V	04222	W1825Z105Z2B04
A26C5812	283-5098-00	B050177		CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5814	283-5098-00	B050177		CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5830	283-5109-00			CAP,FXD,CER DI:680PF,5%,100V	04222	W1206C681J3B04
A26C5848	283-5189-00			CAP,FXD,CER DI:220PF,5%,100V	04222	W1206C221J3B04
A26C5849	283-5196-00			CAP,FXD,CER DI:47PF,5%,100V	04222	W1206C470J3B04
A26C5850	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C5853	283-5105-00			CAP,FXD,CER DI:1UF,+80/-20%,50V	04222	W1825Z105Z2B04
A26C5865	283-5203-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	W1206X102K2B04
A26C5872	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C5875	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5910	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5920	283-5195-00			CAP,FXD,CER DI:10PF,5%,100V	04222	W1206C100J3B04
A26C5922	283-5107-00			CAP,FXD,CER DI:22PF,5%,100V	04222	W1206C220J3B04
A26C5923	283-5197-00			CAP,FXD,CER DI:330PF,5%,100V	04222	W1206C331J3B04
A26C5924	283-5197-00			CAP,FXD,CER DI:330PF,5%,100V	04222	W1206C331J3B04
A26C5930	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5940	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5942	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5950	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5952	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5958	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5960	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C5961	283-5188-00			CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C5980	283-5196-00			CAP,FXD,CER DI:47PF,5%,100V	04222	W1206C470J3B04

Component Number	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26C5981	283-5196-00			CAP,FXD,CER DI:47PF,5%,100V	04222	W1206C470J3B04
A26C5990	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5991	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C5992	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C6010	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6021	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6030	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26C6070	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6111	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6113	283-5203-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	W1206X102K2B04
A26C6114	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6115	283-5188-00	B050000	B050190	CAP,FXD,CER DI:100PF,5%,100V	04222	W1206C101J3B04
A26C6121	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6122	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6130	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6131	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6140	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6180	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6190	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6223	283-5202-00			CAP,FXD,CER DI:0.022UF,10%,50VDC	04222	W1206X223K2B04
A26C6230	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6231	283-5003-00			CAP,FXD,CER DI:0.01UF,10%,50V	04222	W1206X103K2B04
A26C6233	283-5203-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	W1206X102K2B04
A26C6250	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6252	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6291	283-5098-00			CAP,FXD,CER DI:0.1UF,50WVDC	04222	W1206Z104Z2B01
A26C6300	290-5009-00			CAP,FXD,ELCTLT:15UF,25V	56289	293D156X0025D2T
A26CR5522	152-5005-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR5522	152-5062-00	B050368		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF	27014	FDSO1205.LA
A26CR5526	152-5004-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5526	152-5018-00	B050368		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5590	152-5004-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5590	152-5018-00	B050368		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5623	152-5004-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5623	152-5018-00	B050368		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5653	152-5005-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR5653	152-5062-00	B050368		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF	27014	FDSO1205.LA
A26CR5721	152-5004-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5721	152-5018-00	B050368		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5735	152-5004-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5735	152-5018-00	B050368		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5751	152-5000-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV70T3
A26CR5772	152-5000-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV70T3
A26CR5825	152-5005-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR5825	152-5062-00	B050368		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF	27014	FDSO1205.LA
A26CR5867	152-5004-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5867	152-5018-00	B050368		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5870	152-5004-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5870	152-5018-00	B050368		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5872	152-5004-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5872	152-5018-00	B050368		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5874	152-5004-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5874	152-5018-00	B050368		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5876	152-5004-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5876	152-5018-00	B050368		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA

Component Number	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26CR5878	152-5004-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR5878	152-5018-00	B050368		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR5930	152-5005-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR5930	152-5062-00	B050368		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF	27014	FDSO1205.LA
A26CR5960	152-5000-00			DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV70T3
A26CR5970	152-5005-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR5970	152-5062-00	B050368		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF	27014	FDSO1205.LA
A26CR5990	152-5005-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR5990	152-5062-00	B050368		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF	27014	FDSO1205.LA
A26CR5995	152-5005-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR5995	152-5062-00	B050368		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF	27014	FDSO1205.LA
A26CR6010	152-5005-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR6010	152-5062-00	B050368		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF	27014	FDSO1205.LA
A26CR6020	152-5005-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR6020	152-5062-00	B050368		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF	27014	FDSO1205.LA
A26CR6162	152-5005-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR6162	152-5062-00	B050368		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF	27014	FDSO1205.LA
A26CR6181	152-5004-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	25088	BAV99-E6327
A26CR6181	152-5018-00	B050368		DIODE,SIG:,ULTRA FAST;100V,0.74VF,4NS,2.0PF	27014	FDSO1203.SA
A26CR6190	152-5005-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR6190	152-5062-00	B050368		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF	27014	FDSO1205.LA
A26CR6210	152-0269-00			SEMICOND DVC,DI:VVC,SI,35V,33PF AT 4V,DO-7	04713	SMV1263RL
A26CR6211	152-5005-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR6211	152-5062-00	B050368		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF	27014	FDSO1205.LA
A26CR6273	152-5005-00	B050000	B050367	DIODE,SIG:,ULTRA FAST;70V,0.15A,6NS	04713	MBAW56LT1
A26CR6273	152-5062-00	B050368		DIODE,SIG:,ULTRA FAST;100V,4NS,2.0PF	27014	FDSO1205.LA
A26J4232	131-3360-00			CONN,HDR::PCB,;MALE,STR,2 X 10,0.1 CTR,0.36	53387	3592-6002
A26J4234	131-2920-00			CONN,HDR::PCB,;MALE,RTANG,2 X 5,0.1 CTR,0.3	00779	86479-3
A26J4242	131-3181-00			CONN,HDR::PCB,;MALE,RTANG,2 X 20,0.1 CTR,0.	22526	69155-040
A26J5800	131-3766-00			CONN,HDR::PCB,;MALE,RTANG,1 X 2,0.1 CTR,0.2	00779	87232-2
A26J5990	131-2920-00			CONN,HDR::PCB,;MALE,RTANG,2 X 5,0.1 CTR,0.3	00779	86479-3
A26J6000	131-1857-00			CONN,HDR::PCB,;MALE,STR,1 X 36,0.1 CTR,0.23	58050	082-3644-SS10
A26L6210	108-1382-00			COIL,RF:FIXED,42NH,10%,AXIAL	0JR03	108-1382-00
A26L6220	108-5018-00			COIL,RF:FXD,4.7UH,20%, Q=50, SRF 45 MHZ, DC	54583	NL453232T-4R7M
A26L6230	108-5018-00			COIL,RF:FXD,4.7UH,20%, Q=50, SRF 45 MHZ, DC	54583	NL453232T-4R7M
A26P5990	131-3957-00			BUS,CONDUCTOR:SHUNT,1 X 2,0.1 CTR	22526	68786-202
A26P6000	131-3957-00			BUS,CONDUCTOR:SHUNT,1 X 2,0.1 CTR (QUANTITY OF 2)	22526	68786-202
A26Q5370	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q5400	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5442	151-5656-00			TRANSISTOR,SIG:JFET,N-CHANNEL;	04713	MMBF4391LT1,T2
A26Q5512	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5515	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5518	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5528	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5530	151-5656-00			TRANSISTOR,SIG:JFET,N-CHANNEL	04713	MMBF4391LT1,T2
A26Q5532	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q5720	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5736	151-5656-00			TRANSISTOR,SIG:JFET,N-CHANNEL	04713	MMBF4391LT1,T2
A26Q5740	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5870	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q5875	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q5880	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q5885	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q5920	151-5029-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,500MA	04713	MMBT2369LT1
A26Q5921	151-5022-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,50MA	04713	MMBT918LT1

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26Q5980	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q5981	151-5029-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,500MA	04713	MMBT2369LT1
A26Q5982	151-5022-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,50MA	04713	MMBT918LT1
A26Q5983	151-5029-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,500MA	04713	MMBT2369LT1
A26Q5984	151-5029-00	B050000	B050190	TRANSISTOR,SIG:BIPOLAR,NPN;15V,500MA	04713	MMBT2369LT1
A26Q6090	151-5022-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,50MA	04713	MMBT918LT1
A26Q6091	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6092	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6093	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6180	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q6181	151-5001-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	04713	MMBT3904T1/T2
A26Q6190	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6191	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6270	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6271	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6272	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6273	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6274	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6290	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6291	151-5000-00			TRANSISTOR,SIG:BIPOLAR,PNP;40V,200MA	04713	MMBT3906LT1
A26Q6292	151-5029-00			TRANSISTOR,SIG:BIPOLAR,NPN;15V,500MA	04713	MMBT2369LT1
A26R5319	321-5031-00			RES,FXD,FILM:12.1K,1%,0.125W	91637	CRCW12061212FT
A26R5329	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R5330	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5332	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5334	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5335	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5370	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5371	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5419	321-5049-00			RES,FXD,FILM:1 MEG,1%,0.125W	57668	MCR18FXEA1M
A26R5420	321-5049-00			RES,FXD,FILM:1 MEG,1%,0.125W	57668	MCR18FXEA1M
A26R5421	321-5049-00			RES,FXD,FILM:1 MEG,1%,0.125W	57668	MCR18FXEA1M
A26R5422	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5423	321-5167-00			RES,FXD,FILM:221K OHM,1%,0.125W	91637	CRCW1206-22102F
A26R5424	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5425	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5426	321-5027-00			RES,FXD,FILM:5.62K,1%,0.125W	91637	CRCW12065621FT
A26R5427	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5429	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R5432	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R5433	321-5048-00			RES,FXD,FILM:332K,1%,0.125W	91637	CRCW1206-3323FT
A26R5434	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5436	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R5437	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5438	321-5016-00			RES,FXD,FILM:681 OHM,1%,0.125W	91637	CRCW12066810FT
A26R5439	321-5016-00			RES,FXD,FILM:681 OHM,1%,0.125W	91637	CRCW12066810FT
A26R5440	321-5016-00			RES,FXD,FILM:681 OHM,1%,0.125W	91637	CRCW12066810FT
A26R5442	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5443	321-5167-00			RES,FXD,FILM:221K OHM,1%,0.125W	91637	CRCW1206-22102F
A26R5444	321-5048-00			RES,FXD,FILM:332K,1%,0.125W	91637	CRCW1206-3323FT
A26R5445	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5458	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5460	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5462	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5464	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26R5466	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5468	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5519	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5523	321-5019-00			RES,FXD,FILM:1.21K,1%,0.125W	91637	CRCW12061211FT
A26R5524	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5525	321-5010-00			RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R5530	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5540	321-5035-00			RES,FXD,FILM:27.4K,1%,0.125W	91637	CRCW12062742FT
A26R5541	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5542	321-5007-00			RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R5544	321-5007-00			RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R5557	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5575	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5608	311-5039-00			RES,VAR,NONWW:TRMR,1K OHM,25%,0.1W	32997	3314J-1-102E
A26R5610	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5611	321-5032-00			RES,FXD,FILM:15.0K,1%,0.125W	91637	CRCW12061502FT
A26R5612	321-5021-00			RES,FXD,FILM:1.82K,1%,0.125W	91637	CRCW12061821FT
A26R5614	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5616	321-5038-00			RES,FXD,FILM:47.5K,1%,0.125W	91637	CRCW12064752FT
A26R5618	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5620	321-5017-00			RES,FXD,FILM:825 OHM,1%,0.125W	91637	CRCW12068250FT
A26R5622	321-5029-00			RES,FXD,FILM:8.25K,1%,0.125W	91637	CRCW12068251FT
A26R5623	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5624	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R5626	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R5627	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5628	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5629	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5632	321-5051-00			RES,FXD,FILM:0 OHM,1%,0.125W	09969	CRCW1206 JUMPER
A26R5652	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5657	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5720	321-5036-00			RES,FXD,FILM:33.2K,1%,0.125W	91637	CRCW12063322FT
A26R5722	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5723	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R5725	321-5035-00			RES,FXD,FILM:27.4K,1%,0.125W	91637	CRCW12062742FT
A26R5729	321-5169-00			RES,FXD,FILM:475K OHM,1%,0.125W	91637	CRCW1206-47502F
A26R5730	321-5051-00			RES,FXD,FILM:0 OHM,1%,0.125W	09969	CRCW1206 JUMPER
A26R5732	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5733	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5735	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5736	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5737	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5738	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5739	321-5037-00			RES,FXD,FILM:39.2K,1%,0.125W	91637	CRCW12063922FT
A26R5750	321-5166-00			RES,FXD,FILM:150K OHM,1%,0.125W	91637	CRCW1206-15002F
A26R5751	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5752	321-5028-00			RES,FXD,FILM:6.81K,1%,0.125W	91637	CRCW12066811FT
A26R5753	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5754	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R5755	321-5039-00			RES,FXD,FILM:56.2K,1%,0.125W	91637	CRCW12065622FT
A26R5756	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5758	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R5771	321-5036-00			RES,FXD,FILM:33.2K,1%,0.125W	91637	CRCW12063322FT
A26R5810	321-5024-00			RES,FXD,FILM:3.32K,1%,0.125W	91637	CRCW12063321FT
A26R5811	321-5000-00			RES,FXD,FILM:10 OHM,1%,0.125W	91637	CRCW120610R0FT

Component Number	Tektronix Part No.	Serial No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26R5812	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5813	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5814	321-5000-00			RES,FXD,FILM:10 OHM,1%,0.125W	91637	CRCW120610R0FT
A26R5815	321-5000-00			RES,FXD,FILM:10 OHM,1%,0.125W	91637	CRCW120610R0FT
A26R5820	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5822	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5823	321-5040-00			RES,FXD,FILM:68.1K,1%,0.125W	91637	CRCW12066812FT
A26R5824	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5825	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5826	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5827	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5828	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R5829	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5830	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5831	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5832	321-5031-00			RES,FXD,FILM:12.1K,1%,0.125W	91637	CRCW12061212FT
A26R5833	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5834	321-5016-00			RES,FXD,FILM:681 OHM,1%,0.125W	91637	CRCW12066810FT
A26R5847	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5849	321-5169-00			RES,FXD,FILM:475K OHM,1%,0.125W	91637	CRCW1206-47502F
A26R5850	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5851	321-5036-00			RES,FXD,FILM:33.2K,1%,0.125W	91637	CRCW12063322FT
A26R5852	321-5031-00			RES,FXD,FILM:12.1K,1%,0.125W	91637	CRCW12061212FT
A26R5853	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5854	321-5170-00			RES,FXD,FILM:825K OHM,1%,0.125W	91637	CRCW1206-82502F
A26R5864	321-5023-00			RES,FXD,FILM:2.74K,1%,0.125W	91637	CRCW12062741FT
A26R5868	321-5040-00			RES,FXD,FILM:68.1K,1%,0.125W	91637	CRCW12066812FT
A26R5870	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5871	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5872	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5873	321-5047-00			RES,FXD,FILM:100K,1%,0.125W	91637	CRCW12061003FT
A26R5874	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5875	321-5026-00			RES,FXD,FILM:4.75K,1%,0.125W	91637	CRCW12064751FT
A26R5876	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5877	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5878	321-5064-00			RES,FXD,FILM:200K,1%,0.125W,1206,8MM	91637	CRCW1206-2003FT
A26R5880	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5882	321-5017-00			RES,FXD,FILM:825 OHM,1%,0.125W	91637	CRCW12068250FT
A26R5883	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5884	321-5024-00			RES,FXD,FILM:3.32K,1%,0.125W	91637	CRCW12063321FT
A26R5885	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R5886	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R5887	321-5024-00			RES,FXD,FILM:3.32K,1%,0.125W	91637	CRCW12063321FT
A26R5888	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5889	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5890	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5892	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5893	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5920	321-5031-00			RES,FXD,FILM:12.1K,1%,0.125W	91637	CRCW12061212FT
A26R5921	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5925	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5926	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5930	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5931	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5932	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT

Component Number	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26R5933	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5934	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5935	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5936	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5937	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5938	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5939	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5951	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5952	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5953	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5954	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5955	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5956	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5957	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5958	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5959	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5960	321-5009-00	B050000	B050238	RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R5960	321-5007-00	B050239		RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R5961	321-5007-00			RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R5962	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5963	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5964	321-5169-00			RES,FXD,FILM:475K OHM,1%,0.125W	91637	CRCW1206-47502F
A26R5970	321-5045-00			RES,FXD,FILM:68.1 OHM,1%,0.125W	91637	CRCW120668R1FT
A26R5971	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5972	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R5973	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R5980	321-5034-00			RES,FXD,FILM:22.1K,1%,0.125W	91637	CRCW12062212FT
A26R5981	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R5982	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R5983	321-5045-00			RES,FXD,FILM:68.1 OHM,1%,0.125W	91637	CRCW120668R1FT
A26R5984	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R5985	321-5169-00			RES,FXD,FILM:475K OHM,1%,0.125W	91637	CRCW1206-47502F
A26R5991	321-5050-00			RES,FXD,FILM:33.2 OHM,1%,0.125W	91637	CRCW120633R2FT
A26R5992	321-5008-00	B050000	B050238	RES,FXD,FILM:150 OHM,1%,0.125W	91637	CRCW12061500FT
A26R5992	321-5014-00	B050239		RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R5993	321-5194-00			RES,FXD,FILM:49.9 OHM,1%,0.125W,1206,8MM	91637	CRCW-1206-49R-9
A26R6020	321-5038-00			RES,FXD,FILM:47.5K,1%,0.125W	91637	CRCW12064752FT
A26R6021	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6022	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6042	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6050	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6051	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6052	321-5019-00			RES,FXD,FILM:1.21K,1%,0.125W	91637	CRCW12061211FT
A26R6060	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6062	321-5007-00			RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6063	321-5009-00	B050000	B050238	RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R6063	321-5007-00	B050239		RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6082	321-5010-00			RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6083	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R6090	321-5046-00			RES,FXD,FILM:82.5 OHM,1%,0.125W	91637	CRCW120682R5FT
A26R6091	321-5009-00			RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R6092	321-5022-00			RES,FXD,FILM:2.21K,1%,0.125W	91637	CRCW12062211FT
A26R6093	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6094	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R6102	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT

Component Number	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A26R6104	321-5025-00			RES,FXD,FILM:3.92K,1%,0.125W	91637	CRCW12063921FT
A26R6105	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6106	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6107	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6108	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6109	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6113	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6114	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6115	321-5018-00	B050000	B050190	RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6116	321-5018-00	B050000	B050190	RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6122	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6123	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6127	321-5008-00	B050000	B050238	RES,FXD,FILM:150 OHM,1%,0.125W	91637	CRCW12061500FT
A26R6130	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6132	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6133	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6134	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6137	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6140	321-5194-00			RES,FXD,FILM:49.9 OHM,1%,0.125W,1206,8MM	91637	CRCW-1206-49R-9
A26R6164	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6165	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6166	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6170	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6172	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6180	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6181	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R6182	321-5044-00			RES,FXD,FILM:56.2 OHM,1%,0.125W	91637	CRCW120656R2FT
A26R6183	321-5044-00			RES,FXD,FILM:56.2 OHM,1%,0.125W	91637	CRCW120656R2FT
A26R6184	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6191	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6192	321-5010-00			RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6193	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6194	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6195	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6197	321-5027-00			RES,FXD,FILM:5.62K,1%,0.125W	91637	CRCW12065621FT
A26R6198	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6199	321-5027-00			RES,FXD,FILM:5.62K,1%,0.125W	91637	CRCW12065621FT
A26R6221	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6222	321-5064-00			RES,FXD,FILM:200K,1%,0.125W,1206,8MM	91637	CRCW1206-2003FT
A26R6230	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6231	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R6232	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6233	321-5018-00			RES,FXD,FILM:1.00K,1%,0.125W	91637	CRCW12061001FT
A26R6245	321-5006-00			RES,FXD,FILM:100 OHM,1%,0.125W	91637	CRCW12061000FT
A26R6250	321-5030-00			RES,FXD,FILM:10.0K,1%,0.125W	91637	CRCW12061002FT
A26R6251	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6264	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6266	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6267	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6271	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R6273	321-5194-00			RES,FXD,FILM:49.9 OHM,1%,0.125W,1206,8MM	91637	CRCW-1206-49R-9
A26R6274	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R6275	321-5015-00			RES,FXD,FILM:562 OHM,1%,0.125W	91637	CRCW12065620FT
A26R6277	321-5028-00			RES,FXD,FILM:6.81K,1%,0.125W	91637	CRCW12066811FT
A26R6290	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT

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A26R6291	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6293	321-5043-00			RES,FXD,FILM:47.5 OHM,1%,0.125W	91637	CRCW1206-47R5FT
A26R6294	321-5014-00			RES,FXD,FILM:475 OHM,1%,0.125W	91637	CRCW12064750FT
A26R6295	321-5010-00	B050000	B050176	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6296	321-5010-00	B050000	B050176	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6296	321-5007-00	B050177		RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6297	321-5010-00	B050000	B050176	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6297	321-5009-00	B050177	B050238	RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R6297	321-5007-00	B050239		RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6298	321-5010-00	B050000	B050176	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6298	321-5007-00	B050177		RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6299	321-5010-00	B050000	B050176	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6300	321-5010-00	B050000	B050176	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT
A26R6300	321-5009-00	B050177	B050238	RES,FXD,FILM:182 OHM,1%,0.125W	91637	CRCW12061820FT
A26R6300	321-5007-00	B050239		RES,FXD,FILM:121 OHM,1%,0.125W	91637	CRCW12061210FT
A26R6301	321-5012-00			RES,FXD,FILM:332 OHM,1%,0.125W	91637	CRCW12063320FT
A26R6302	321-5021-00			RES,FXD,FILM:1.82K,1%,0.125W	91637	CRCW12061821FT
A26R6303	321-5017-00			RES,FXD,FILM:825 OHM,1%,0.125W	91637	CRCW12068250FT
A26R6304	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6305	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6306	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6307	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26R6308	321-5020-00			RES,FXD,FILM:1.50K,1%,0.125W	91637	CRCW12061501FT
A26U5300	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U5302	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U5310	156-5487-01			MICROCKT,LINEAR:BIPOLAR,XCONDUCTANCE	34371	CA3080AM96
A26U5315	156-5714-00			IC,LINEAR:BIPOLAR,VOLTAGE REG	27014	LM317LM
A26U5410	156-5487-01			MICROCKT,LINEAR:BIPOLAR,XCONDUCTANCE	34371	CA3080AM96
A26U5427	156-5692-01			IC,LINEAR:BIPOLAR,TRANSISTOR ARRAY	34371	CA3083M96
A26U5436	156-5837-01			IC,LINEAR:BIPOLAR,AMPLIFIER	80009	156583701
A26U5445	156-5485-01			MICROCKT,LINEAR:3 NPN & 2 PNP TRANS ARRAY	34371	CA3096M96
A26U5456	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP	18324	74HCT74DT
A26U5459	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U5460	156-5088-01			IC,DIGITAL:HCTCMOS,DEMUX/DECODER	18324	74HCT138DT
A26U5464	156-5147-01			IC,DIGITAL:FLIP FLOP;OCTAL D-TYPE	18324	74HCT273DT
A26U5468	156-5043-01			IC,CONVERTER:BIPOLAR,D/A	06665	DAC08-360SR(STD
A26U5565	160-5879-00			IC,MEMORY:CMOS,EPROM;8K X 8	TK0161	160-5879-00
A26U5575	156-1426-00			MICROCKT,DGTL:NMOS,PRGM TIMER MDL	04713	MC68B40 (L OR P
A26U5580	156-5081-01			IC,DIGITAL:HCTMOS,GATE;HEX INVERTER	18324	74HCT04DT
A26U5590	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP;DUAL D-TYPE	18324	74HCT74DT
A26U5634	156-2051-01			MICROCKT,LINEAR:OPERATIONAL AMPL	04713	MC34004DR2
A26U5636	156-5138-01			IC,LINEAR:BIFET,OP-AMP;DUAL	04713	MC34002DR2
A26U5645	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP;DUAL D-TYPE	18324	74HCT74DT
A26U5712	156-5485-01			MICROCKT,LINEAR:3 NPN & 2 PNP TRANS ARRAY	34371	CA3096M96
A26U5728	156-5485-01			MICROCKT,LINEAR:3 NPN & 2 PNP TRANS ARRAY	34371	CA3096M96
A26U5755	156-5487-01			MICROCKT,LINEAR:BIPOLAR,XCONDUCTANCE	34371	CA3080AM96
A26U5756	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP;DUAL D-TYPE	18324	74HCT74DT
A26U5764	156-5147-01			IC,DIGITAL:FLIP FLOP;OCTAL D-TYPE	18324	74HCT273DT
A26U5775	156-5098-01			IC,DIGITAL:HCTCMOS,GATE;QUAD 2-INPUT NAND	18324	74HCT00DT
A26U5790	156-5783-00			IC,DIGITAL:HCTCMOS,GATE;QUAD 2-INPUT NAND	18324	74HCT132D
A26U5838	156-5290-01			IC,DIGITAL:HCTCMOS,GATE;TRIPLE 3-INPUT NOR	18324	74HCT27DT
A26U5845	156-5517-01			MICROCKT,LINEAR:CMOS,PHASE LOCK LOOP	04713	MC14046BDWR (X1
A26U5855	156-5487-01			MICROCKT,LINEAR:BIPOLAR,XCONDUCTANCE	34371	CA3080AM96
A26U5870	156-2051-01			MICROCKT,LINEAR:OPERATIONAL AMPL	04713	MC34004DR2
A26U5875	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP;DUAL D-TYPE	18324	74HCT74DT

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A26U5880	160-5878-00			MICROCKT,DGTL:LOGIC DEVICE,PRGM	TK0161	160-5878-00
A26U5890	156-5198-01			IC,DIGITAL:HCTCMOS,GATE;QUAD 2-INPUT XOR	34371	CD74HCT86M96
A26U5910	156-5566-01			IC,DIGITAL:HCTCMOS,COUNTER	18324	74HCT390DT
A26U5930	160-5880-00			MICROCKT,DGTL:16K X 8 X 4 EPROM,PRGM	80009	160588000
A26U5940	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U5942	160-5878-00			MICROCKT,DGTL:LOGIC DEVICE,PRGM	TK0161	160-5878-00
A26U5950	156-5088-01			IC,DIGITAL:HCTCMOS,DEMUX/DECODER	18324	74HCT138DT
A26U5952	156-5147-01			IC,DIGITAL:FLIP FLOP;OCTAL D-TYPE	18324	74HCT273DT
A26U5990	156-5085-01			IC,DIGITAL:HCTCMOS,GATE;QUAD 2-INPUT OR	18324	74HCT32DT
A26U6010	156-5518-01			IC,DIGITAL:TTL,MISC;PHASE-FREQ DET	04713	MC4044DR (X1 OR
A26U6070	156-5471-01			IC,DIGITAL:ECL,MUX/ENCODER	04713	MC10H174FNR1, 2
A26U6120	156-5486-01			IC,DIGITAL:ECL,MISC;VOLTAGE CONT	80009	156548601
A26U6130	156-1248-00			IC,DIGITAL:ECL,MISC;PRESCALER/DIVIDE BY 100 (U6130 USED ONLY WHEN U6131 & W6131 ARE	53469	SP8629
A26U6131	156-1248-00			IC,DIGITAL:ECL,MISC;PRESCALER/DIVIDE BY 100	53469	SP8629
A26U6140	156-5493-00			MICROCKT,DGTL:NMOS,PERIPHERIAL,TIMER	34335	AM9513AJC
A26U6190	160-1748-00			MICROCKT,DGTL:MACROCELL GATE ARRAY	04713	SC32205-001
A26U6230	156-5138-01			IC,LINEAR:BIFET,OP-AMP;DUAL	04713	MC34002DR2
A26U6250	156-5071-01			IC,DIGITAL:HCTCMOS,TRANSCEIVER	18324	74HCT245DT
A26U6252	156-5145-01			IC,DIGITAL:HCTCMOS,FLIP FLOP;DUAL D-TYPE	18324	74HCT74DT
A26U6290	156-5262-01			MICROCKT,LINEAR:BIPOLAR,QUAD CONPARATOR	04713	LM339DR1,2
A26W5500	174-1555-00			CA ASSY,SP,ELEC:2,26 AWG,4.0 L	80009	174155500
A26W5970	321-5051-00			RES,FXD,FILM:0 OHM,1%,0.125W	09969	CRCW1206 JUMPER
A26W5980	321-5051-00			RES,FXD,FILM:0 OHM,1%,0.125W	09969	CRCW1206 JUMPER
A26W6127	321-5051-00	B050239		RES,FXD,FILM:0 OHM,1%,0.125W	09969	CRCW1206 JUMPER
A26XU5930	136-0755-00			SOCKET,DIP::PCB,;28 POS,2 X 14,0.1 X 0.6 CT	09922	DILB28P-108
A26Y5910	158-0269-00			XTAL UNIT,QTZ:13.10669MHZ, +/- 0.001 %	14301	011-668-03371
A27	671-1341-00	B050000	B050190	CIRCUIT BD ASSY:CTT	80009	671134100
A27	671-1341-01	B050191		CIRCUIT BD ASSY:CTT (OPTION 06/09 ONLY) (FOR SUBPARTS SEE A26)	80009	671134101
A32	670-7999-00			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE (OPTION 09 ONLY)	80009	670799900
A32C6303	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50VDIP STYLE	04222	MD015E224ZAA
A32C6334	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50VDIP STYLE	04222	MD015E224ZAA
A32C6338	281-0767-00			CAP,FXD,CER DI:330PF,20%,100V	04222	SA102C331MAA
A32CR6330	152-0141-02			DIODE,SIG:,ULTRA FAST;40V,150MA,4NS,2PF	27014	FDH9427
A32CR6335	152-0664-00			SEMICOND DVC,DI:SCHOTTKY,SW,SI,70V	50434	5082-2800-T01
A32CR6340	152-0664-00			SEMICOND DVC,DI:SCHOTTKY,SW,SI,70V	50434	5082-2800-T01
A32J6300	131-3046-00			CONN,HDR::PCB,;MALE,RTANG,1 X 10,0.15 CTR	22526	ORDER BY DESCRI
A32J6370	131-1425-00			CONN,HDR::PCB,;MALE,RTANG,1 X 36,0.1 CTR (LOCATION A)	22526	65521-136
A32J6370	131-1426-00			CONN,HDR::PCB,;MALE,RTANG,1 X 36,0.1 CTR (LOCATION B)	22526	65524-136
A32J6380	131-3045-00			CONN,BOX::PCB,;FEMALE,RTANG,1 X 5,0.1 CTR	00779	1-380949-5
A32J6385	136-0547-00			CONN,RCPT,ELEC:CKT BOARD,6 CONTACT	00779	1-380949-6
A32L6354	108-0245-00			CHOKE,RF:FIXED,3.9UH, +/- 10 %, Q 35	0JR03	108-0245-00
A32Q6334	151-0190-00			TRANSISTOR,SIG:BIPOLAR,NPN;40V,200MA	2D532	2N3904
A32R6301	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6302	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6303	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6304	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6305	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6306	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-

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A32R6307	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6308	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6325	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6330	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6336	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6340	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32R6350	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A32U6310	156-1707-00			IC,DIGITAL:FTTL,GATE;QUAD 2-INPUT NAND	04713	MC74F00 (N OR J
A32U6315	156-1707-00			IC,DIGITAL:FTTL,GATE;QUAD 2-INPUT NAND	04713	MC74F00 (N OR J
A32U6320	156-0441-00			IC,DIGITAL:FTTL,COMPARATOR	04713	MC74F521N
A32U6325	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER	27014	MM74C164(NA+)
A32U6330	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER	27014	MM74C164(NA+)
A32U6335	156-1724-00			IC,DIGITAL:FTTL,GATES;QUAD 2-INPUT OR	04713	MC74F32N
A32U6350	156-1611-00			IC,DIGITAL:FTTL,FLIP FLOP;DUAL D-TYPE	04713	MC74F74N
A32U6356	156-1743-00			IC,DIGITAL:FTTL,GATES;QUAD 2-INPUT NOR	04713	MC74F02N
A33	670-7998-01			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE (OPTION 09 ONLY)	80009	670799801
A33C6410	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50VDIP STYLE	04222	MD015E224ZAA
A33C6440	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50VDIP STYLE	04222	MD015E224ZAA
A33J6400	131-3046-00			CONN,HDR::PCB,;MALE,RTANG,1 X 10,0.15 CTR	22526	ORDER BY DESC
A33P6380	131-3153-00			CONN,HDR::PCB,;MALE,RTANG,1 X 36,0.1 CTR	58050	082-3643-RS20
A33P6385	131-3153-00			CONN,HDR::PCB,;MALE,RTANG,1 X 36,0.1 CTR	58050	082-3643-RS20
A33R6400	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6401	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6402	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6403	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6404	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6405	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6406	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6407	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6408	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6432	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33R6443	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	TK1727	SFR25 2322-181-
A33U6405	156-1707-00			IC,DIGITAL:FTTL,GATE;QUAD 2-INPUT NAND	04713	MC74F00 (N OR J
A33U6409	156-1707-00			IC,DIGITAL:FTTL,GATE;QUAD 2-INPUT NAND	04713	MC74F00 (N OR J
A33U6415	156-0441-00			IC,DIGITAL:FTTL,COMPARATOR	04713	MC74F521N
A33U6420	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER;8-BIT SIPO	27014	MM74C164(NA+)
A33U6425	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER;8-BIT SIPO	27014	MM74C164(NA+)
A33U6430	156-0572-02			IC,DIGITAL:CMOS,SHIFT REGISTER;8-BIT SIPO	27014	MM74C164(NA+)
A33U6435	156-1800-00			IC,DIGITAL:FTTL,GATES;QUAD 2-INPUT XOR	04713	MC74F86N
P4241	174-1375-00			CA ASSY,SP,ELEC:40,28 AWG,14.375 L	53387	ORDER BY DESCRI
R6298	321-5010-00	B050000	B050176	RES,FXD,FILM:221 OHM,1%,0.125W	91637	CRCW12062210FT

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:

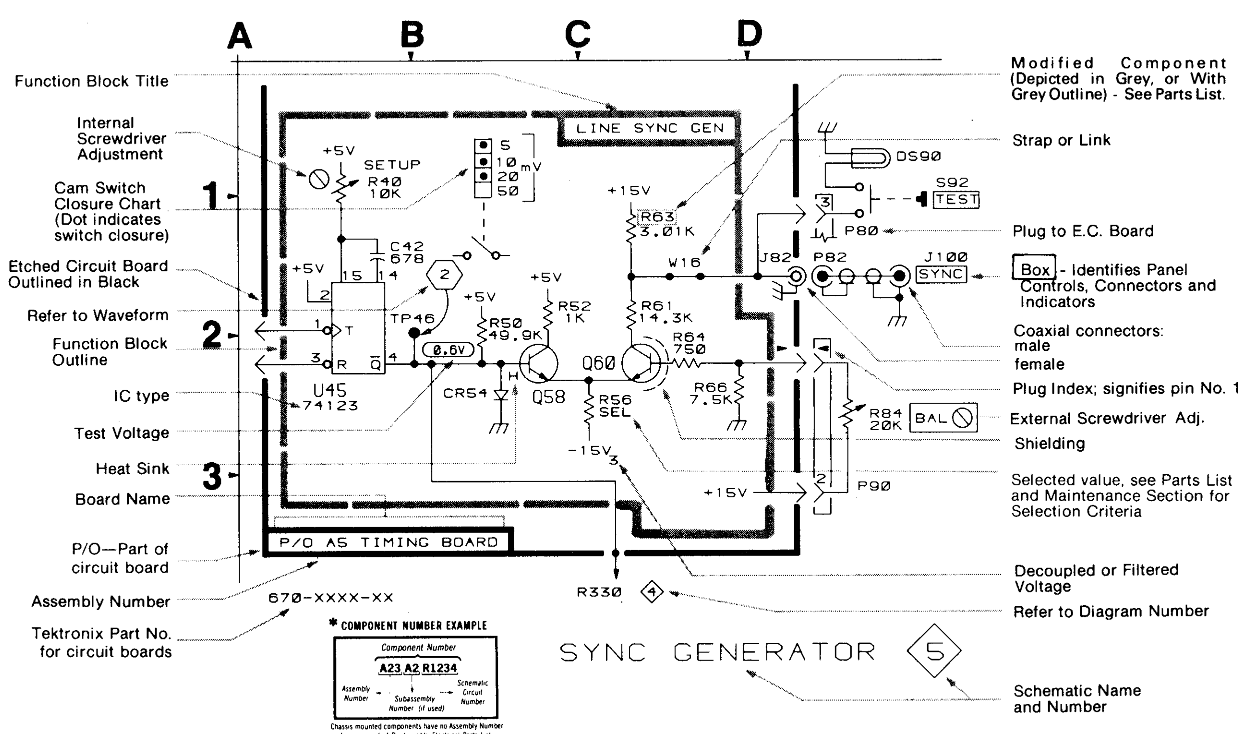
Capacitors = Values one or greater are in picofarads (pF). Values less than one are in microfarads (μF).
Resistors = Ohms (Ω).

The information and special symbols below may appear in this manual.

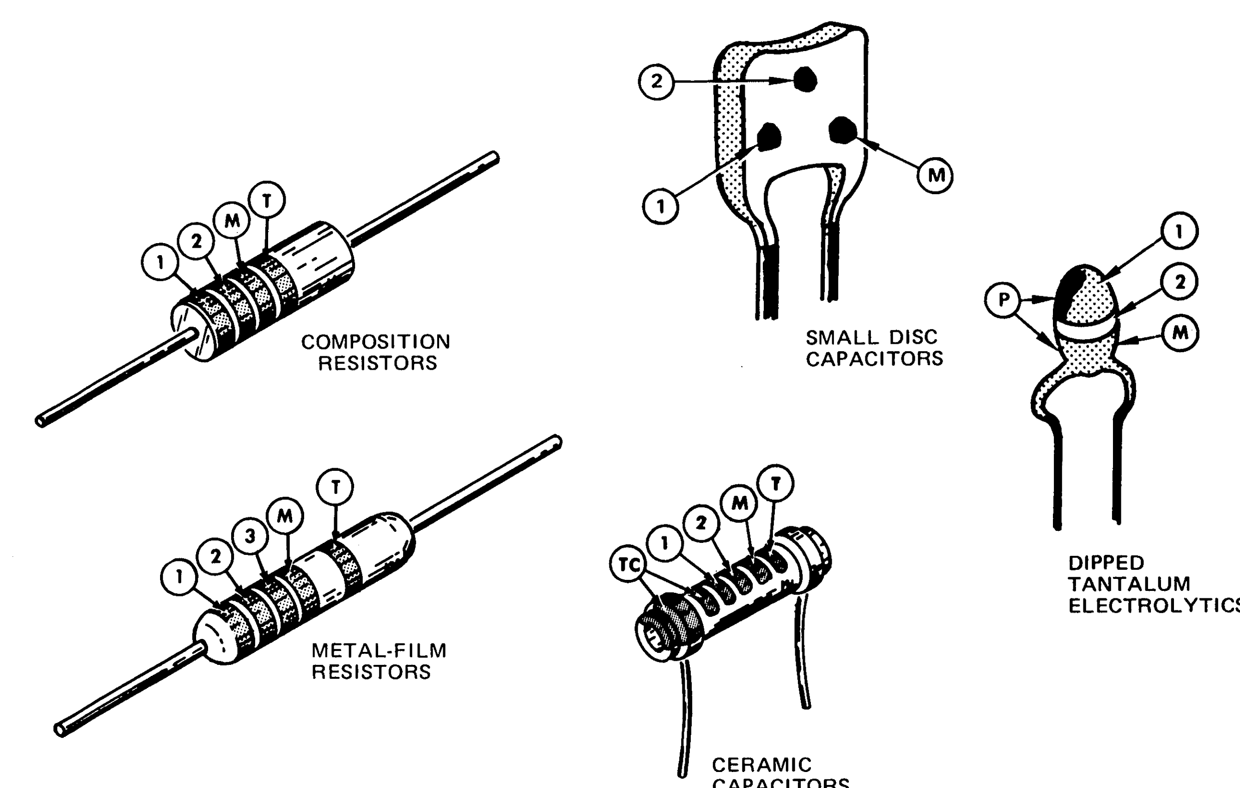
Assembly Numbers and Grid Coordinates

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.



COLOR CODE



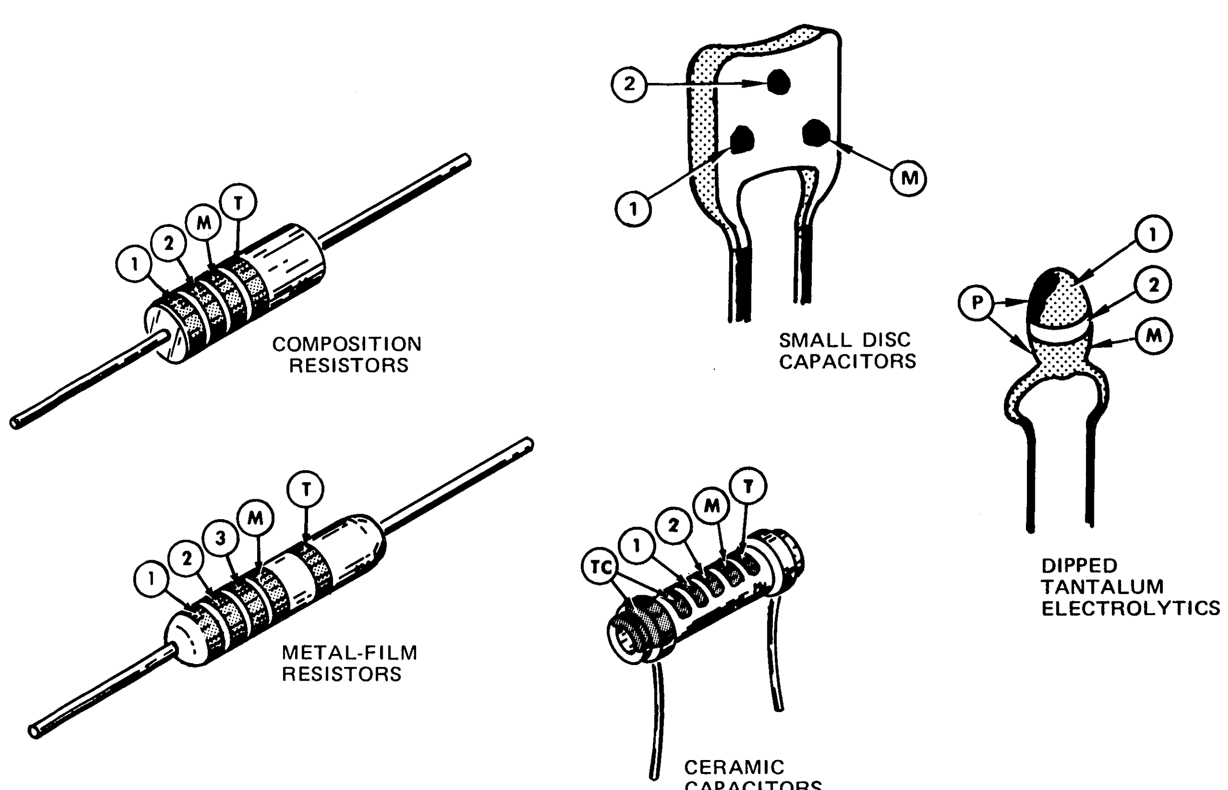
(1)(2) and (3) – 1st, 2nd, and 3rd significant figures
(M) –multiplier (T) –tolerance
(TC) –temperature coefficient
(P) –polarity and voltage rating
(T) and/or (TC) color code may not be present on some capacitors

COLOR	SIGNIFICANT FIGURES	RESISTORS		CAPACITORS			DIPPED TANTALUM VOLTAGE RATING
		MULTIPLIER	TOLERANCE	MULTIPLIER	TOLERANCE		
					over 10 pF	under 10 pF	
BLACK	0	1	---	1	±20%	±2 pF	4 VDC
BROWN	1	10	±1%	10	±1%	±0.1 pF	6 VDC
RED	2	10^2 or 100	±2%	10^2 or 100	±2%	---	10 VDC
ORANGE	3	10^3 or 1 K	±3%	10^3 or 1000	±3%	---	15 VDC
YELLOW	4	10^4 or 10 K	±4%	10^4 or 10,000	+100% –9%	---	20 VDC
GREEN	5	10^5 or 100 K	±½%	10^5 or 100,000	±5%	±0.5 pF	25 VDC
BLUE	6	10^6 or 1 M	±¼%	10^6 or 1,000,000	---	---	35 VDC
VIOLET	7	---	±1/10%	---	---	---	50 VDC
GRAY	8	---	---	10^{-2} or 0.01	+80% –20%	±0.25 pF	---
WHITE	9	---	---	10^{-1} or 0.1	±10%	±1 pF	3 VDC
GOLD	–	10^{-1} or 0.1	±5%	---	---	---	---
SILVER	–	10^{-2} or 0.01	±10%	---	---	---	---
NONE	–	---	±20%	---	±10%	±1 pF	---

(1861-20A) 5857-52

Figure 10-1. Color code for resistors and capacitors.

COLOR CODE



(1)(2) and (3) — 1st, 2nd, and 3rd significant figures

(M) —multiplier (T) —tolerance

(TC) —temperature coefficient

(P) —polarity and voltage rating

(T) and/or (TC) color code may not be present on some capacitors

COLOR	SIGNIFICANT FIGURES	RESISTORS		CAPACITORS			DIPPED TANTALUM VOLTAGE RATING
		MULTIPLIER	TOLERANCE	MULTIPLIER	TOLERANCE		
					over 10 pF	under 10 pF	
BLACK	0	1	———	1	±20%	±2 pF	4 VDC
BROWN	1	10	±1%	10	±1%	±0.1 pF	6 VDC
RED	2	10^2 or 100	±2%	10^2 or 100	±2%	———	10 VDC
ORANGE	3	10^3 or 1 K	±3%	10^3 or 1000	±3%	———	15 VDC
YELLOW	4	10^4 or 10 K	±4%	10^4 or 10,000	+100% −9%	———	20 VDC
GREEN	5	10^5 or 100 K	±½%	10^5 or 100,000	±5%	±0.5 pF	25 VDC
BLUE	6	10^6 or 1 M	±¼%	10^6 or 1,000,000	———	———	35 VDC
VIOLET	7	———	±1/10%	———	———	———	50 VDC
GRAY	8	———	———	10^{-2} or 0.01	+80% −20%	±0.25 pF	———
WHITE	9	———	———	10^{-1} or 0.1	±10%	±1 pF	3 VDC
GOLD	–	10^{-1} or 0.1	±5%	———	———	———	———
SILVER	–	10^{-2} or 0.01	±10%	———	———	———	———
NONE	–	———	±20%	———	±10%	±1 pF	———

(1861-20A) 5857-52

Figure 10-1. Color code for resistors and capacitors.

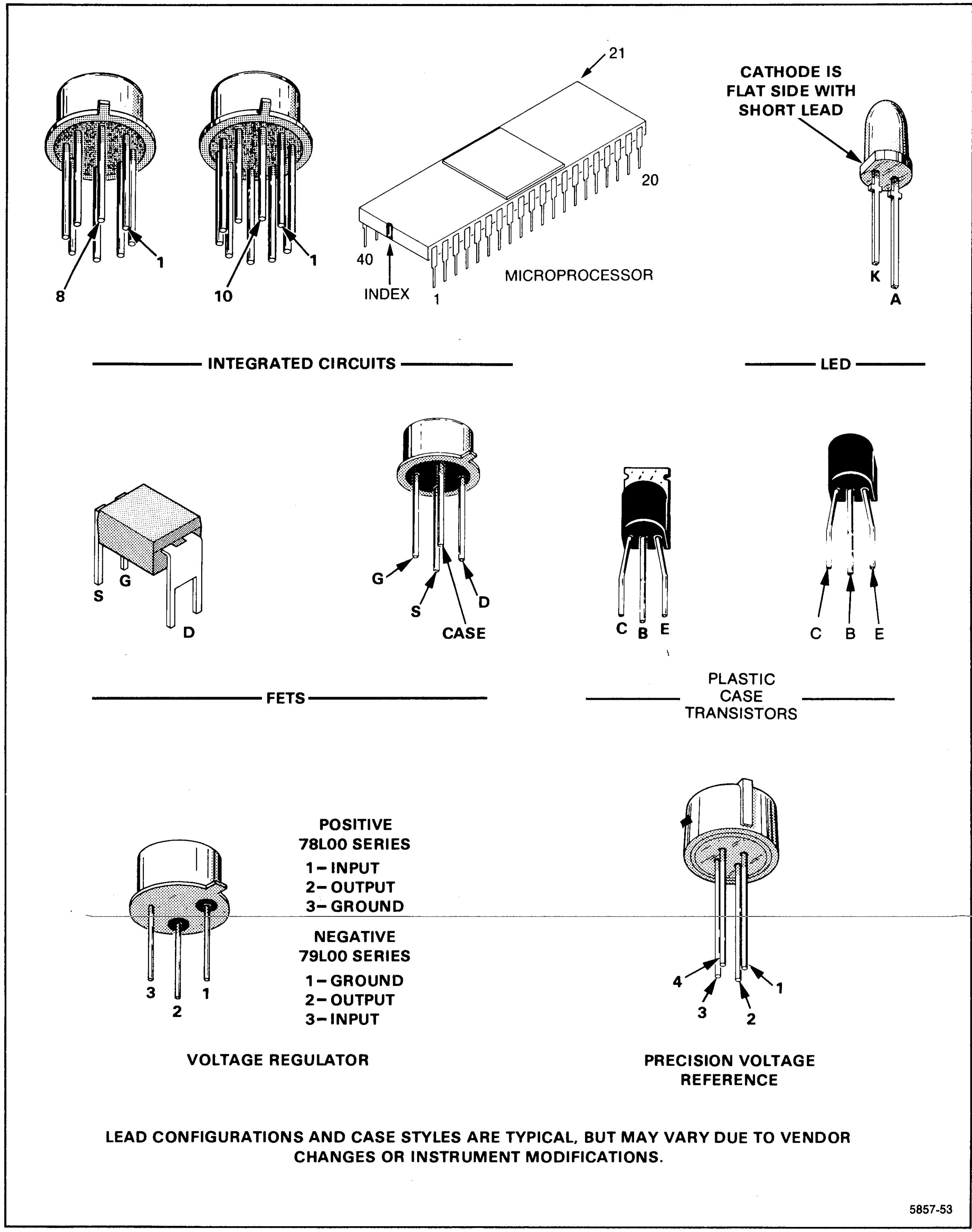


Figure 10-2. Semiconductor lead configurations.

To identify any component mounted on a circuit board and to locate that component in the appropriate schematic diagram

1. Locate the Circuit Board Illustration

a. Identify the particular circuit board that the component is located on by using the Circuit Board Location illustration (Figure 9-5) to determine the Assembly Number.

b. In the manual locate and pull out tabbed page whose title corresponds with the Assembly Number of the circuit board. Circuit board assembly numbers and board nomenclature are printed on the back side of the tabs (facing the rear of the manual).

2. Determine the Circuit Number

a. Compare the circuit board with its illustration and locate the desired component by area and shape on the illustration.

b. Scan the table adjacent to the Circuit Board Illustration and find the Circuit Number of the desired component.

c. Determine the Schematic Diagram Number in which the component is located.

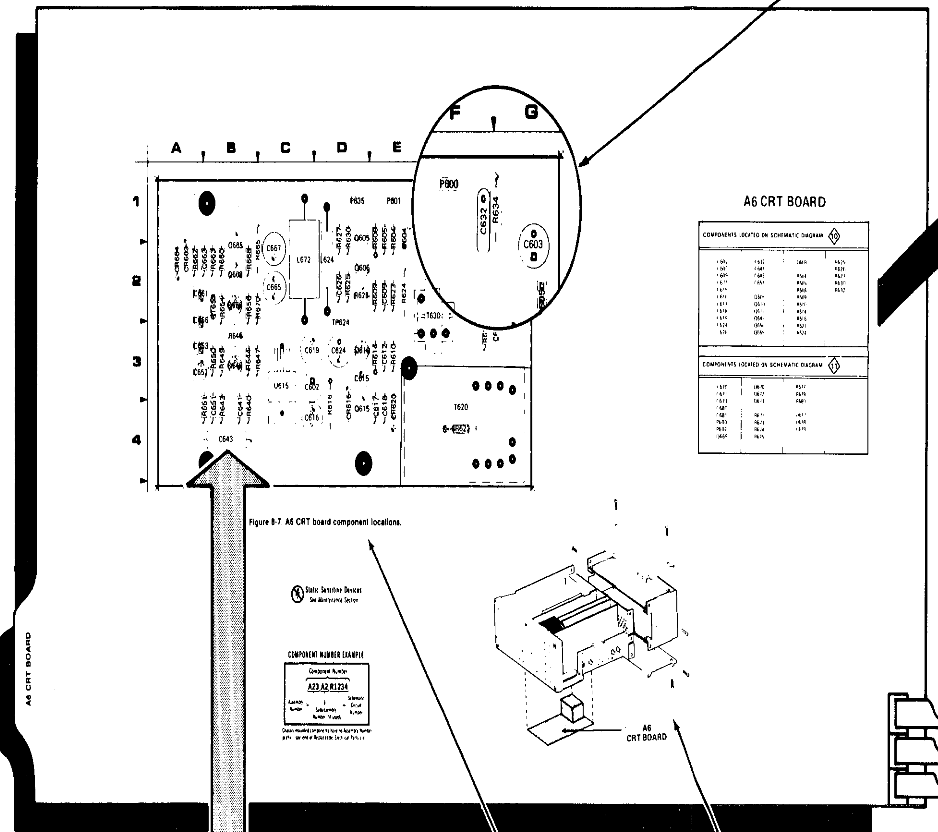
3. Locate the Component on the Schematic Diagram

a. Locate and pull out tabbed page whose number and title correspond with the Schematic Diagram Number just determined in the table. Schematic diagram nomenclature and numbers are printed on the front side of the tabs (facing the front of the manual).

b. Scan the Component Location Table adjacent to the schematic diagram and find the Circuit Number of the desired component.

c. Under the SCHEM LOCATION column, read the grid coordinates for the desired component.

d. Using the Circuit Number and grid coordinates, locate the component on the schematic diagram.



A6 CRT BOARD

COMPONENTS LOCATED ON SCHEMATIC DIAGRAM 10			
C602	C632	Q668	R625
C603	C641		R626
C609	C643	R604	R627
C671	C651	R605	R630
C615		R608	R632
C616	Q606	R609	
C617	Q610	R610	
C618	Q615	R614	
C619	Q645	R616	
C624	Q656	R623	
C626	Q665	R624	

COMPONENTS LOCATED ON SCHEMATIC DIAGRAM 11			
C670	Q670	R677	
C671	Q672	R679	
C673	Q673	R680	
C680			
C681	R671	U617	
P603	R673	U618	
P607	R674	U619	
Q669	R675		

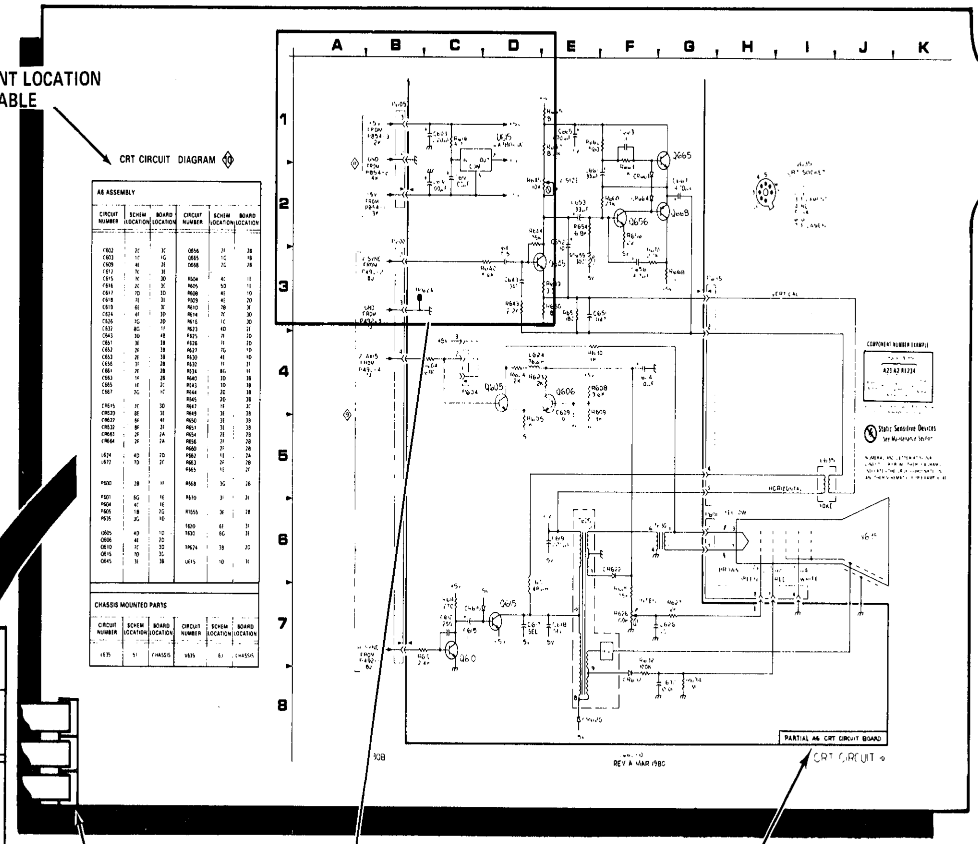
CRT CIRCUIT DIAGRAM 10

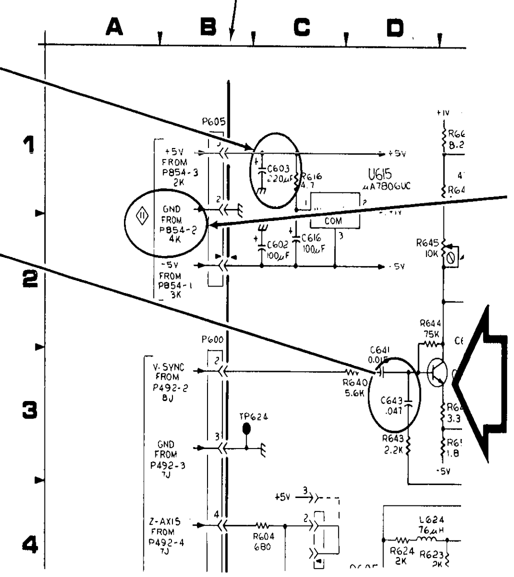
A6 ASSEMBLY

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C602	2C	3C	Q656	2F	2B
C603	1C	1G	Q665	1G	1B
C609	4E	2E	Q668	2G	2B
C612	7C	3E			
C615	7C	3D	R604	4C	1E
C616	2C	3C	R605	5D	1E
C617	7D	3D	R608	4E	1D
C618	7E	3E	R609	4E	2D
C619	6E	3C	R610	7B	3E
C624	4F	3D	R614	7C	3D
C626	7G	2D	R616	1C	3D
C632	8G	1F	R623	4D	2E
C643	3D	4B	R625	7F	2D
C651	3E	3B	R626	7F	2D
		3B	R627	7G	1D
			R630	4F	1D
Q605					
Q606	4E	2D			
Q610	7C	3D	TP624	3B	2D
Q615	7D	3D			
Q645	3E	3B	U615	1D	3C

CHASSIS MOUNTED PARTS

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
L635	51	CHASSIS	V635	6J	CHASSIS





Numeral and letter at signal lines to or from other diagrams indicates the grid coordinates on another schematic (for example: 4K)

To identify any component in a schematic diagram and to locate that component on its respective circuit board.

SCHEMATIC DIAGRAM NAME AND NUMBER

4. Determine the Circuit Board Illustration and Component Location

a. From the schematic diagram, determine the Assembly Number of the circuit board on which the component is mounted. This information is boxed and located in a corner of the heavy line that distinguishes the board outline.

b. Scan the Component Location Table for the Assembly Number just determined and find the Circuit Number of the desired component.

c. Under the BOARD LOCATION column, read the grid coordinates for the desired component.

5. Locate the Component on the Circuit Board

a. In the manual, locate and pull out the tabbed page whose title and Assembly Number correspond with the desired circuit board. This information is on the back side of the tabs.

b. Using the Circuit Number and grid coordinates, locate the component on the Circuit Board Illustration.

c. In the circuit board location illustration, determine the location of the circuit board in the instrument.

d. Find the circuit board in the instrument and compare it with its illustration in the manual to locate the desired component on the board.

Figure 10-3. Locating components on schematic diagrams and circuit board illustrations.

4204-58 A

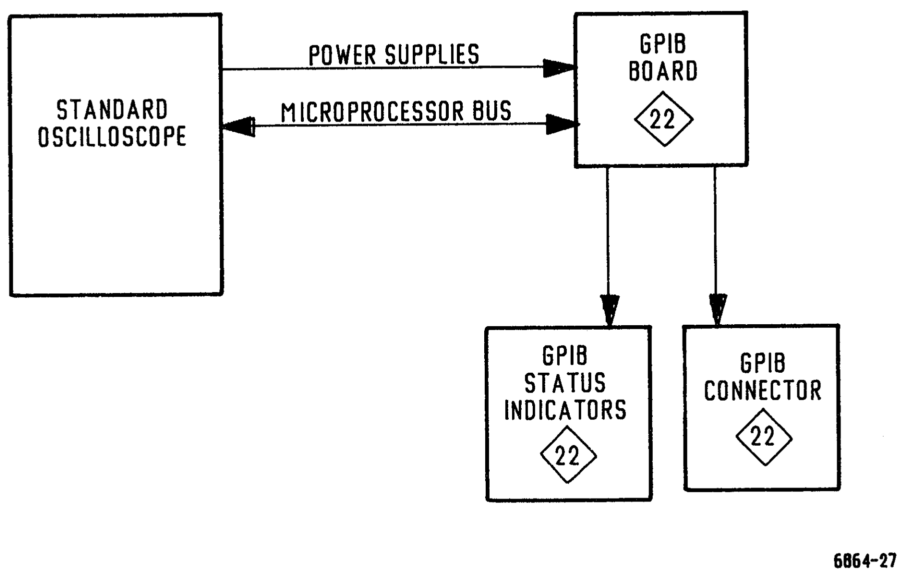


Figure 10-4. GPIB (Option 10) simplified block diagram.

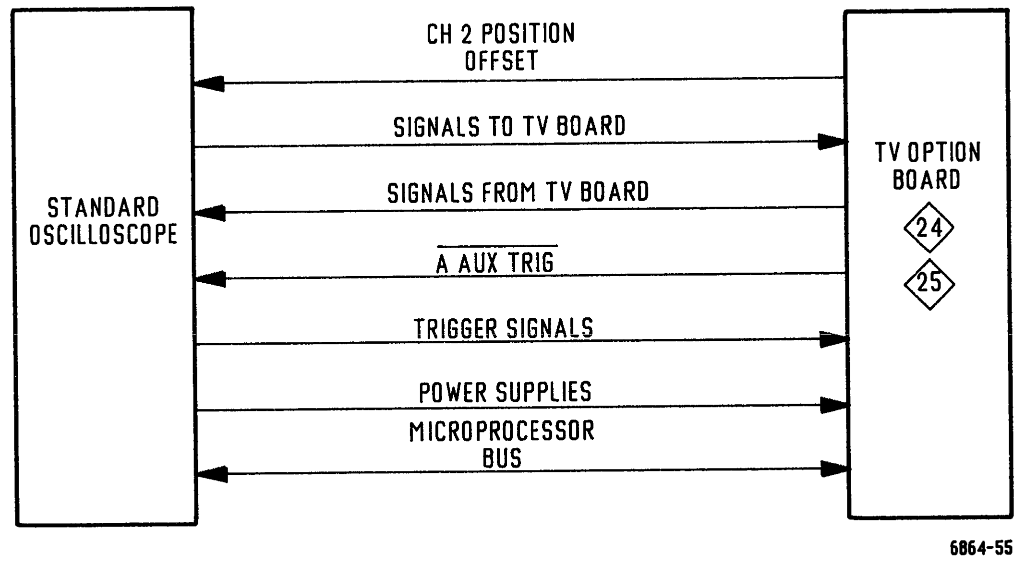


Figure 10-5. TV (option 05) simplified block diagram.

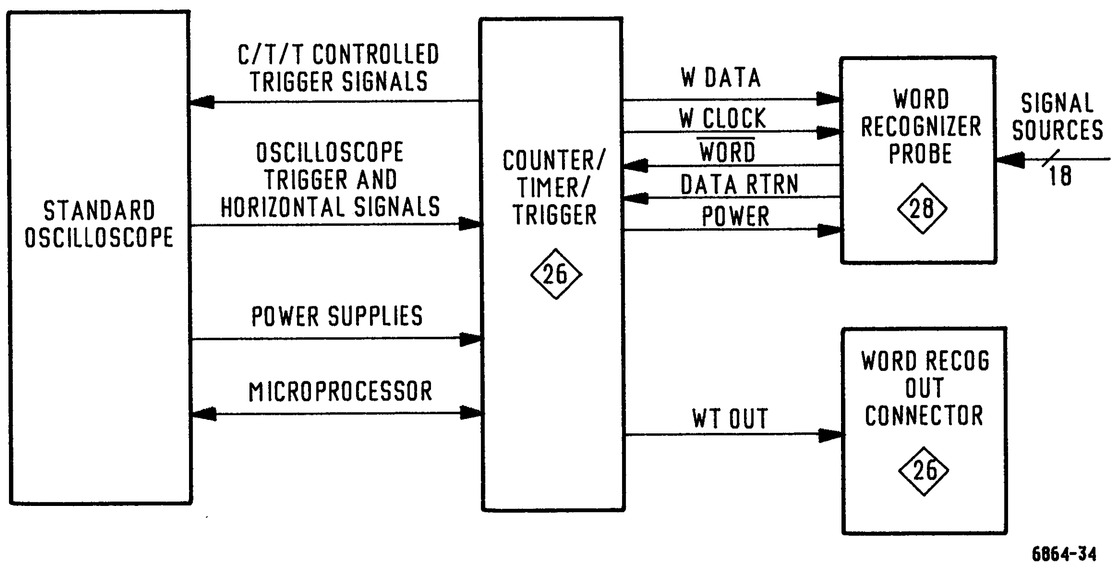


Figure 10-6. CTT and WR (Option 06/09) simplified block diagram.

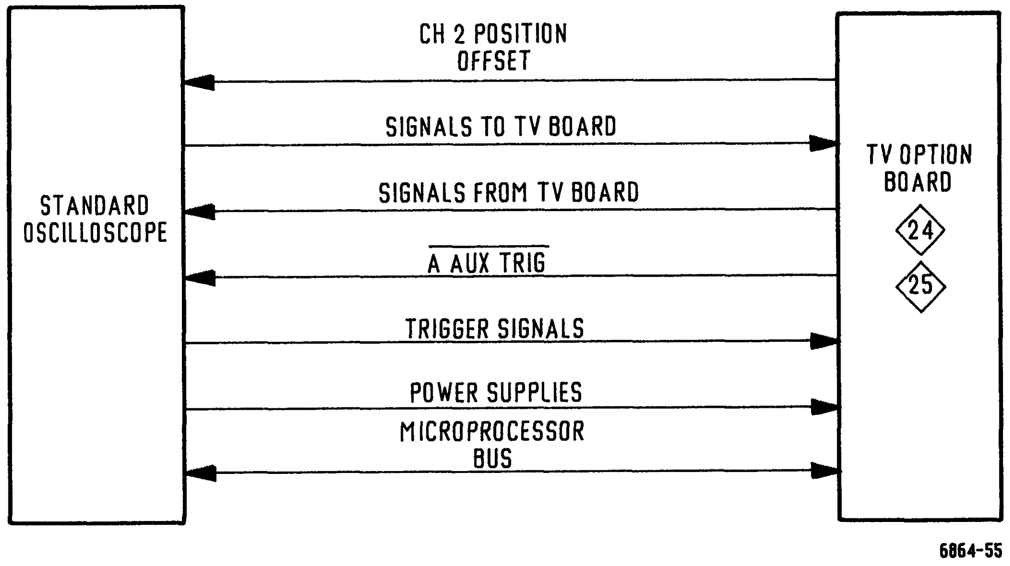


Figure 10-5. TV (option 05) simplified block diagram.

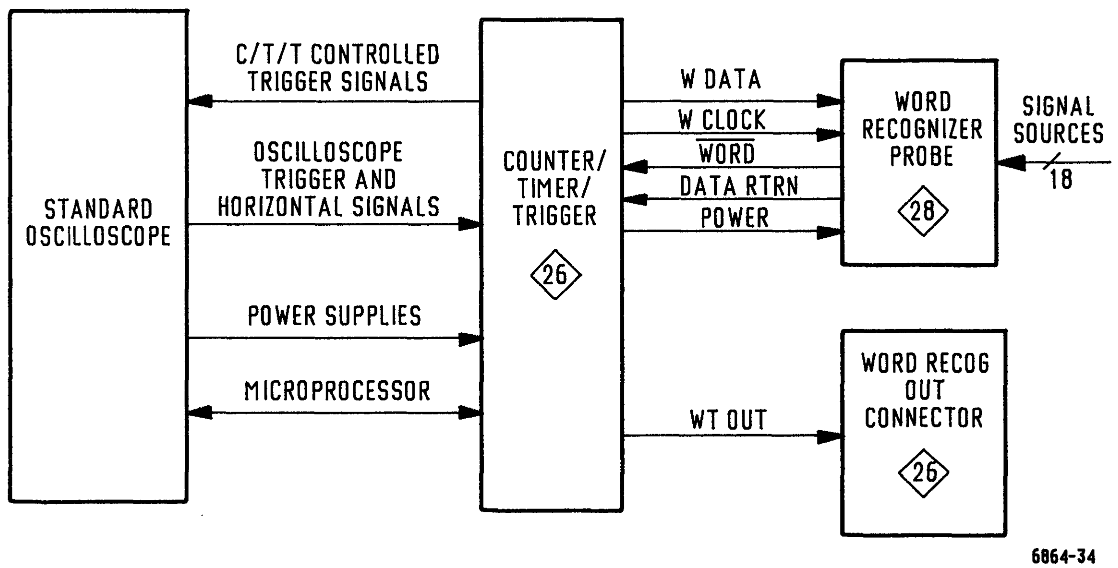


Figure 10-6. CTT and WR (Option 06/09) simplified block diagram.

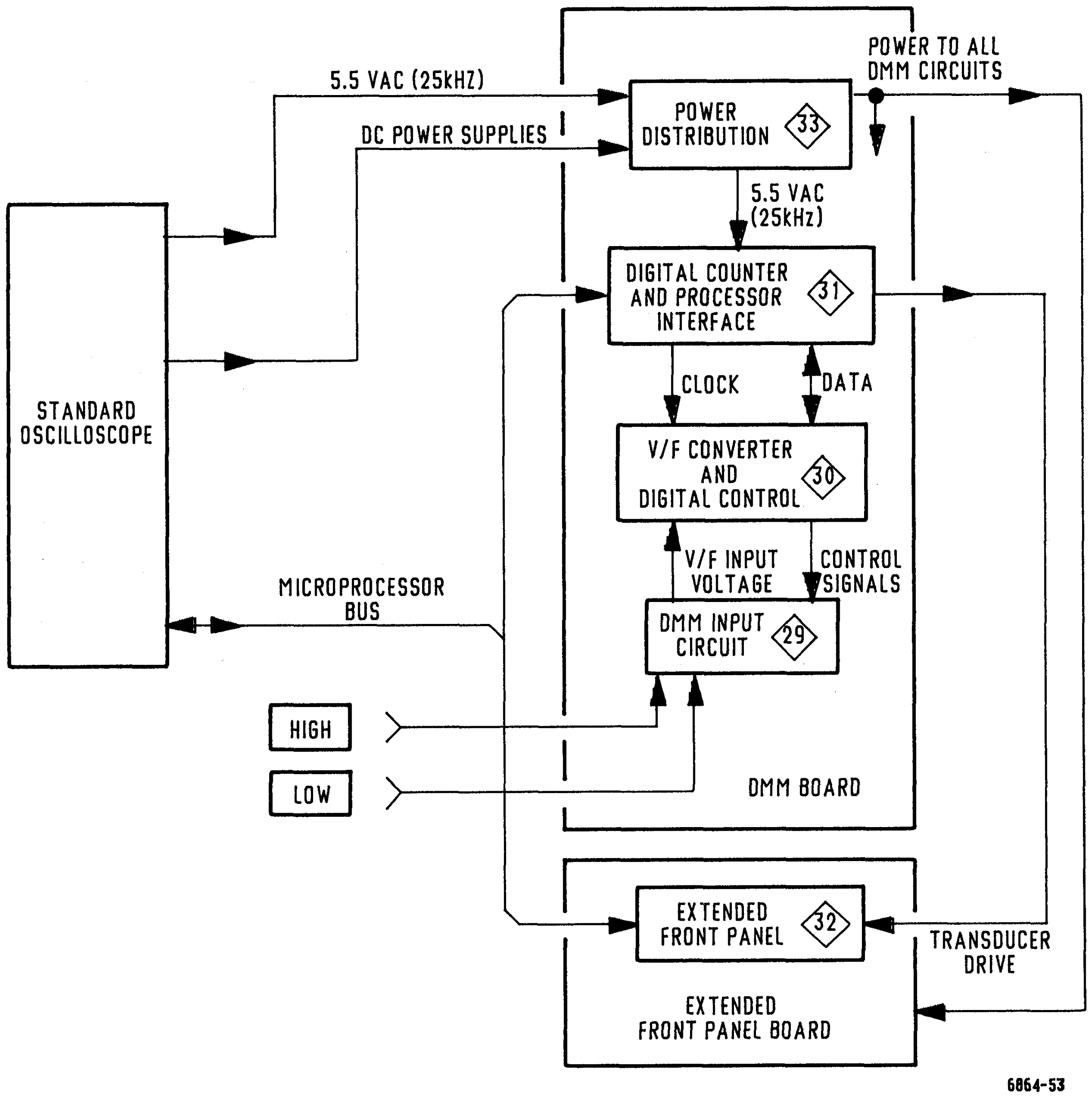
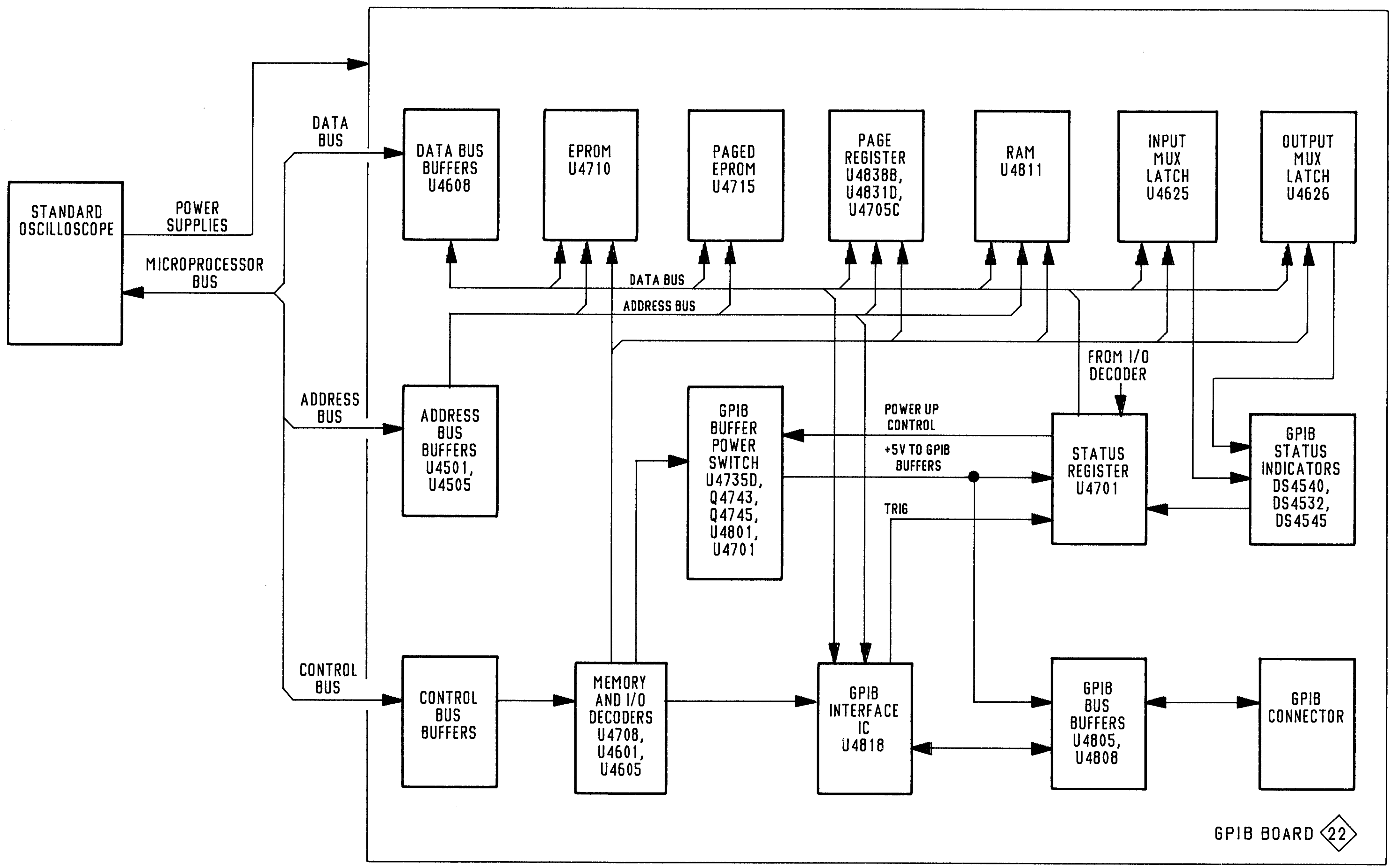


Figure 10-7. DMM (Option 01) simplified block diagram.

OTHER PARTS

CIRCUIT NUMBER	SCHEM NUMBER	SCHEM LOCATION	CIRCUIT NUMBER	SCHEM NUMBER	SCHEM LOCATION	CIRCUIT NUMBER	SCHEM NUMBER	SCHEM LOCATION	CIRCUIT NUMBER	SCHEM NUMBER	SCHEM LOCATION
F4991	28	5A	P4242	23	1A	P6370	27	1C	W4230	21	2A
			P4242	24	2A	P6400	27	6C	W4232	21	3A
J59	25	1R	P4300	30	7P	P6401	27	7C	W4232	24	1A
J2732	27	2B	P4330	20	8B	P6402	27	7C	W4232	24	5N
J4243	22	1A	P4800	22	3P	P6403	27	7C	W4234	21	4A
J4243	22	2P	P4991	28	6A	P6404	27	7C	W4234	23	7A
			P5090	28	4A	P6405	27	7C	W4234	23	7S
P100	21	2A	P5210	30	7P	P6406	27	6C	W4236	21	5A
P101	21	4A	P5220	32	2A	P6407	27	6C	W4242	23	1A
P102	21	3A	P5290	30	1A	P6408	27	6C	W4242	24	7A
P103	21	1A	P5290	32	6A	P6409	27	6C	W4243	22	3P
P104	21	4A	P5800	24	6N	P6410	27	8C	W4243	22	8A
P109	21	1A	P5990A	25	1R				W4800	22	6P
P302	32	2A	P5990B	25	4R	U4225	21	7D	W4990	28	8A
P500	20	1A	P5990	27	1A	U4235	21	7D	W4991	28	6A
P2732	27	2C	P6300	27	3C	U4240	21	7E	W5090	28	4A
P4210	20	1B	P6301	27	3C	U4245	21	7D	W5210	30	7P
P4228	21	1B	P6302	27	3C	U4250	21	7E	W5220	32	3A
P4230	21	2B	P6303	27	3C	U4255	21	7D	W5290	30	10A
P4232	21	3B	P6304	27	4C	U4260	21	7C	W5290	32	6A
P4232	24	1A	P6305	27	4C	U4265	21	7E	W5990	27	2B
P4232	24	3N	P6306	27	4C	U4275	21	7D	W6300	27	5C
P4234	21	4B	P6307	27	4C	U4280	21	7D	W6370	27	2C
P4234	23	3A	P6308	27	4C						
P4234	23	7S	P6309	27	5C	W4210	20	5A			
P4236	21	4B	P6310	27	5C	W4228	21	2A			



6864-29

Figure 10-8. GPIB (Option 10) detailed block diagram.

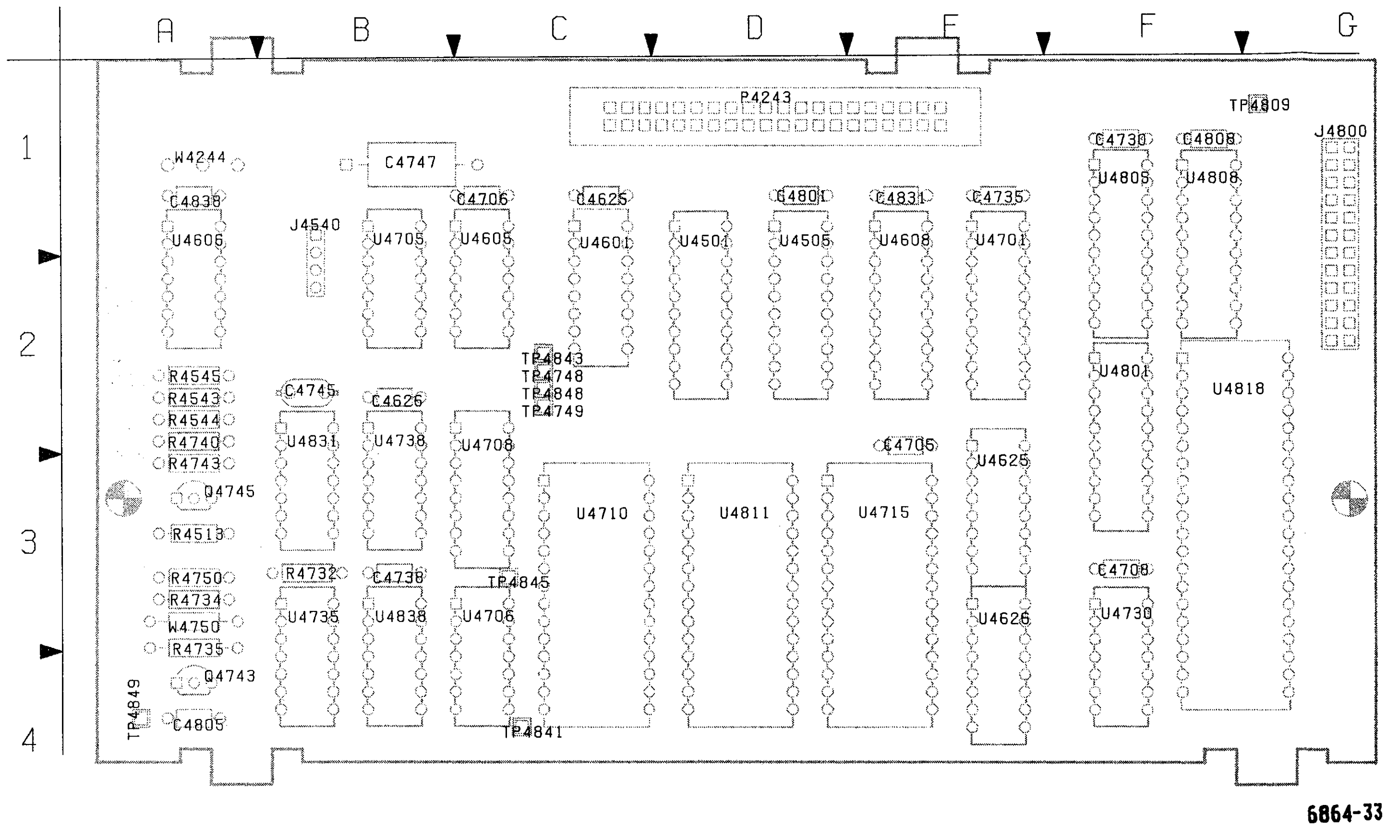
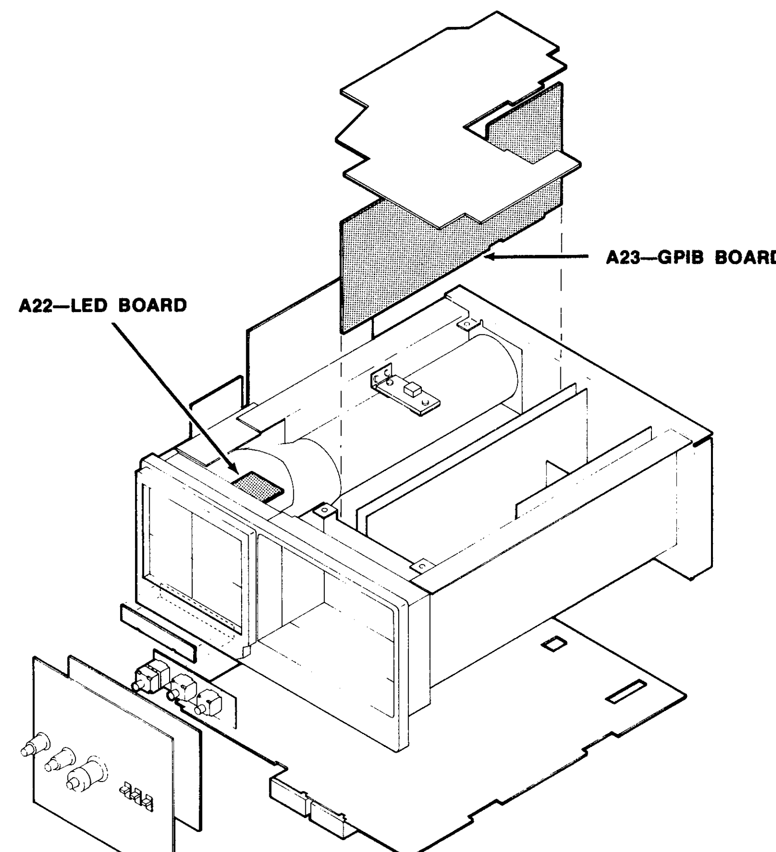


Figure 10-9. A23—GPIB board.

A23—GPIB BOARD							
CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C4625	22	J4800	22	TP4809	22	U4708	22
C4626	22			TP4841	22	U4710	22
C4705	22	Q4743	22	TP4843	22	U4715	22
C4706	22	Q4745	22	TP4845	22	U4730	22
C4708	22			TP4848	22	U4735	22
C4730	22	R4513	22	TP4849	22	U4738	22
C4735	22	R4543	22			U4801	22
C4738	22	R4544	22	U4501	22	U4805	22
C4745	22	R4545	22	U4505	22	U4808	22
C4747	22	R4732	22	U4601	22	U4811	22
C4801	22	R4734	22	U4605	22	U4818	22
C4805	22	R4735	22	U4606	22	U4831	22
C4808	22	R4740	22	U4608	22	U4838	22
C4831	22	R4743	22	U4625	22		
C4838	22	R4750	22	U4626	22	W4244	22
				U4701	22	W4750	22
J4243	22	TP4748	22	U4705	22		
J4540	22	TP4749	22	U4706	22		



Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE

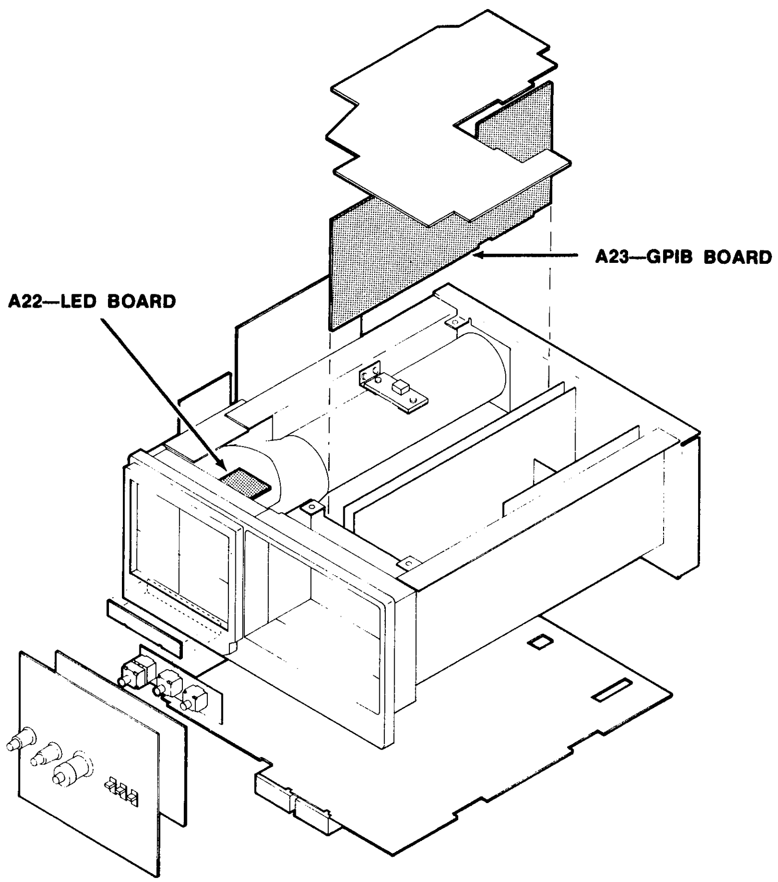
$\overbrace{\text{A23 A2 R1234}}^{\text{Component Number}}$

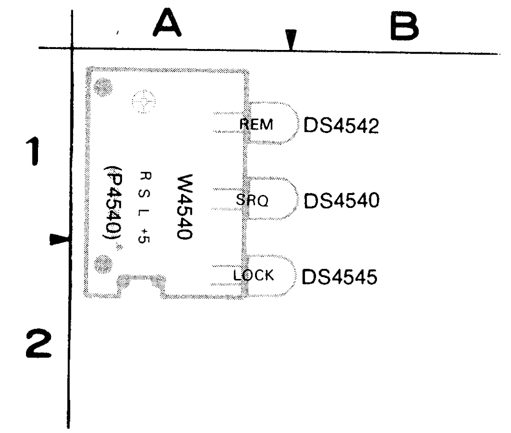
Assembly Number — Subassembly Number (if used) — Schematic Circuit Number

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

A23—GPIB BOARD

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C4625	22	J4800	22	TP4809	22	U4708	22
C4626	22			TP4841	22	U4710	22
C4705	22	Q4743	22	TP4843	22	U4715	22
C4706	22	Q4745	22	TP4845	22	U4730	22
C4708	22			TP4848	22	U4735	22
C4730	22	R4513	22	TP4849	22	U4738	22
C4735	22	R4543	22			U4801	22
C4738	22	R4544	22	U4501	22	U4805	22
C4745	22	R4545	22	U4505	22	U4808	22
C4747	22	R4732	22	U4601	22	U4811	22
C4801	22	R4734	22	U4605	22	U4818	22
C4805	22	R4735	22	U4606	22	U4831	22
C4808	22	R4740	22	U4608	22	U4838	22
C4831	22	R4743	22	U4625	22		
C4838	22	R4750	22	U4626	22	W4244	22
				U4701	22	W4750	22
J4243	22	TP4748	22	U4705	22		
J4540	22	TP4749	22	U4706	22		





6864-18

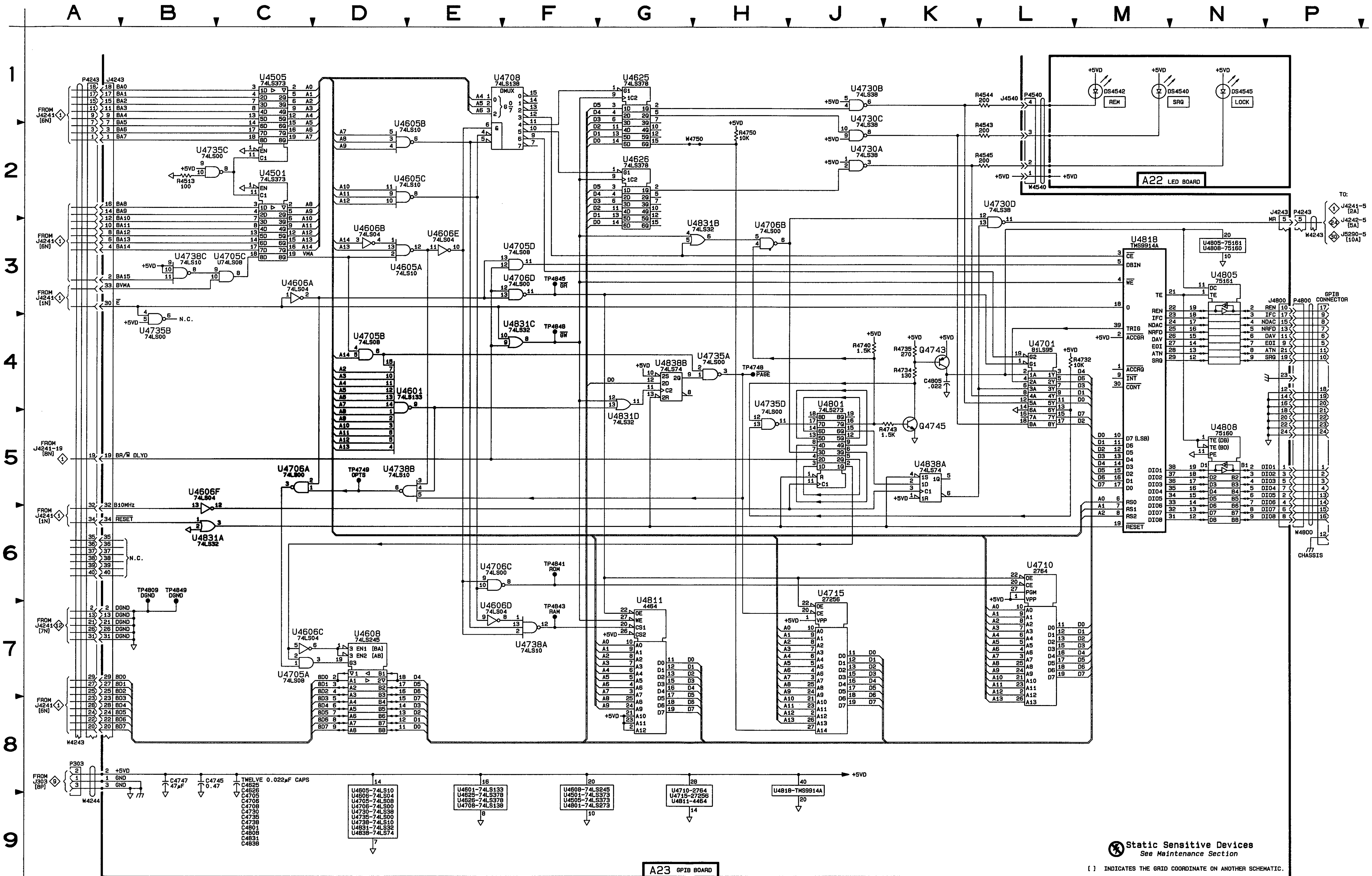
Figure 10-10. A22—LED board.

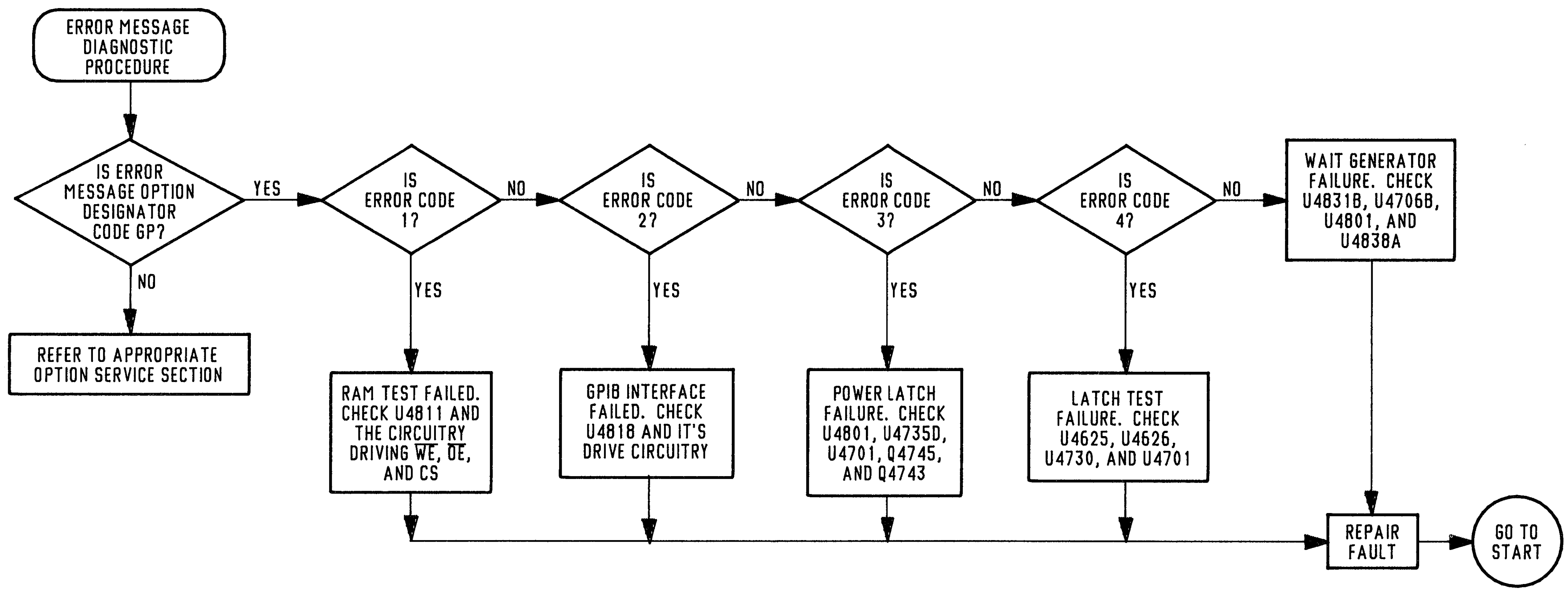
A22—LED BOARD

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
DS4540	22	P4540	22
DS4542	22		
DS4545	22	W4540	22

GPIB BOARD AND POWER DISTRIBUTIONS ⟨22⟩

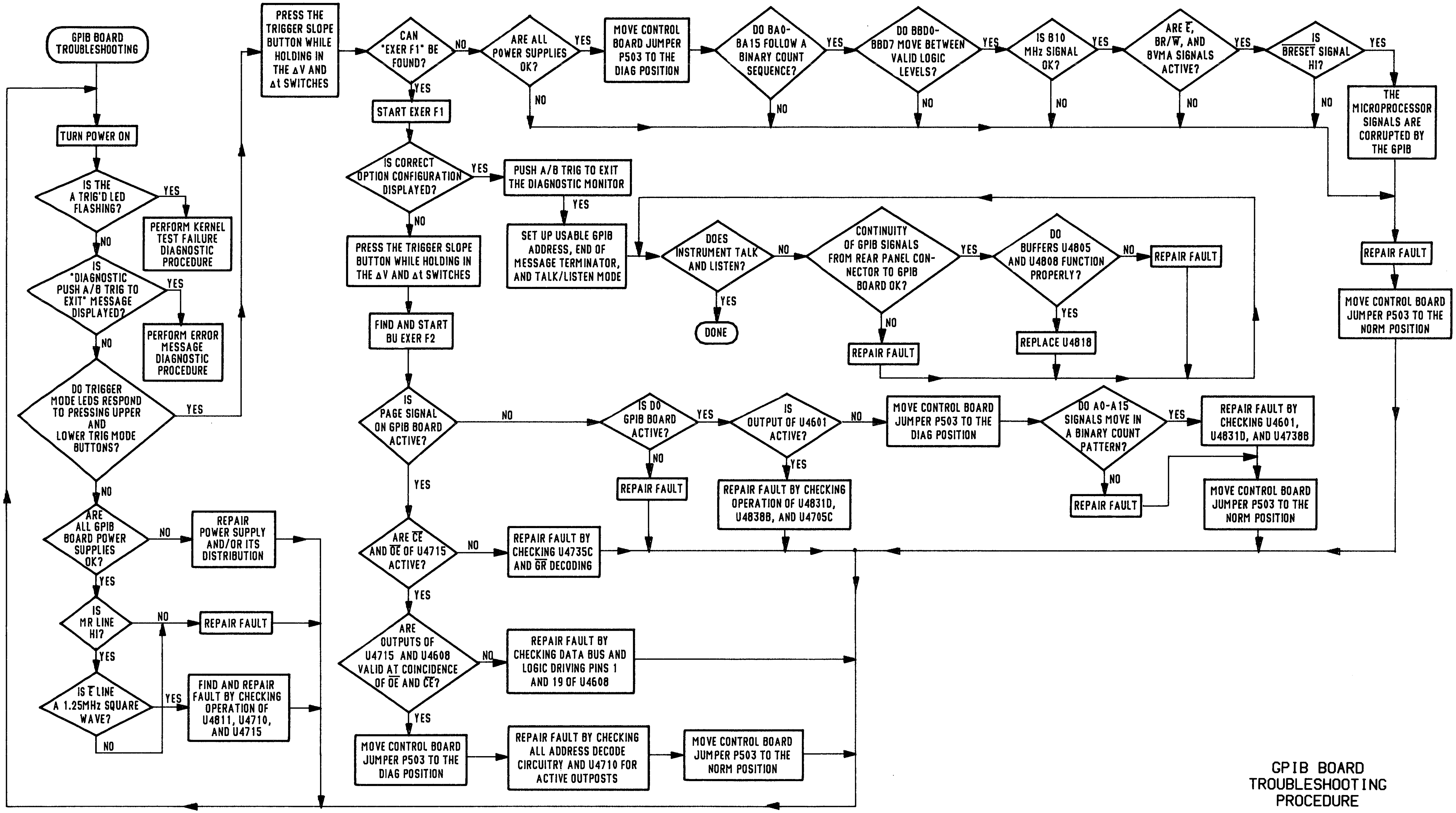
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
ASSEMBLY A22											
DS4540	1M	1A	DS4545	1N	2A	P4540	1L	1A	W4540	2L	1A
DS4542	1M	1A									
ASSEMBLY A23											
C4625	8C	1C	R4735	4K	4A	U4606	9D	1A	U4735B	4B	3B
C4626	8C	2B	R4740	4J	2A	U4608	7D	1E	U4735C	2B	3B
C4705	9C	3E	R4743	5K	3A	U4608	8F	1E	U4735D	5H	3B
C4706	9C	1C	R4750	2H	3A	U4625	1G	3E	U4735	9D	3B
C4708	9C	3F				U4625	9E	3E	U4738A	7F	2B
C4730	9C	1F	TP4748	4H	2C	U4626	2G	3E	U4738B	5D	2B
C4735	9C	1E	TP4749	5D	2C	U4626	9E	3E	U4738C	3B	2B
C4738	9C	3B	TP4809	6A	1F	U4701	4L	1E	U4738	9D	2B
C4745	8B	2B	TP4841	6F	4C	U4705A	7C	1B	U4801	5J	2F
C4747	8B	1B	TP4843	7F	2C	U4705B	4D	1B	U4801	9F	2F
C4801	9C	1D	TP4845	3F	3C	U4705C	3C	1B	U4805	3N	1F
C4805	4K	4A	TP4848	4F	2C	U4705D	3F	1B	U4808	3N	1F
C4808	9C	1F	TP4849	6B	4A	U4705	9D	1B	U4808	5N	1F
C4831	9C	1E				U4706A	5C	3C	U4811	7G	3D
C4838	9C	1A	U4501	2C	1D	U4706B	3H	3C	U4811	9G	3D
			U4501	9F	1D	U4706C	6E	3C	U4818	3M	2F
J4243	1A	1D	U4505	1C	1D	U4706D	3F	3C	U4818	8H	2F
J4243	2P	1D	U4505	9F	1D	U4706	9D	3C	U4831A	6B	2B
J4540	1L	1B	U4601	4D	1C	U4708	1F	2C	U4831B	3H	2B
J4800	3P	1G	U4601	8E	1C	U4708	9E	2C	U4831C	4F	2B
			U4605A	3D	1C	U4710	6L	3C	U4831D	4G	2B
Q4743	4K	4A	U4605B	2D	1C	U4710	8G	3C	U4831	9D	2B
Q4745	5K	3A	U4605C	2D	1C	U4715	7J	3E	U4838A	5K	3B
			U4605	8D	1C	U4715	9G	3E	U4838B	4G	3B
R4513	2B	3A	U4606A	3C	1A	U4730A	2J	3F	U4838	9D	3B
R4543	2L	2A	U4606B	3D	1A	U4730B	1J	3F			
R4544	1L	2A	U4606C	7C	1A	U4730C	2J	3F	W4244	9A	1A
R4545	2L	2A	U4606D	7E	1A	U4730D	2L	3F	W4750	2H	3A
R4732	4L	3B	U4606E	3E	1A	U4730	9D	3F			
R4734	4K	3A	U4606F	6B	1A	U4735A	4H	3B			
OTHER PARTS											
J4243	1A	CHASSIS							W4243	8A	CHASSIS
J4243	2P	CHASSIS	P4800	3P	CHASSIS	W4243	3P	CHASSIS	W4800	6P	CHASSIS


A23 GPIB BOARD
A22 LED BOARD
U4505 74LS373
U4501 74LS373
U4708 74LS138
U4625 74LS378
U4626 74LS378
U4730B 74LS38
U4730C 74LS38
U4730A 74LS38
U4730D 74LS38
U4818 TMS9914A
U4805 75161
U4808 75160
U4701 81LS95
U4801 74LS273
U4838A 74LS74
U4838B 74LS74
U4601 74LS133
U4608 74LS245
U4811 4464
U4715 27256
U4710 2764
Q4743
Q4745
DS4542 REM
DS4540 SRQ
DS4545 LOCK
GPIB CONNECTOR
CHASSIS
N.C.
TWELVE 0.022μF CAPS
U4605-74LS10
U4606-74LS04
U4705-74LS08
U4706-74LS00
U4730-74LS38
U4735-74LS00
U4738-74LS10
U4831-74LS32
U4838-74LS74
U4601-74LS133
U4625-74LS378
U4626-74LS378
U4708-74LS138
U4608-74LS245
U4501-74LS373
U4505-74LS373
U4801-74LS273
U4710-2764
U4715-27256
U4811-4464
U4818-TMS9914A
Static Sensitive Devices
See Maintenance Section
[ ] INDICATES THE GRID COORDINATE ON ANOTHER SCHEMATIC.
6864-36



ERROR MESSAGE
DIAGNOSTICS PROCEDURE

5857-76



GPIB BOARD TROUBLESHOOTING PROCEDURE

5857-16A

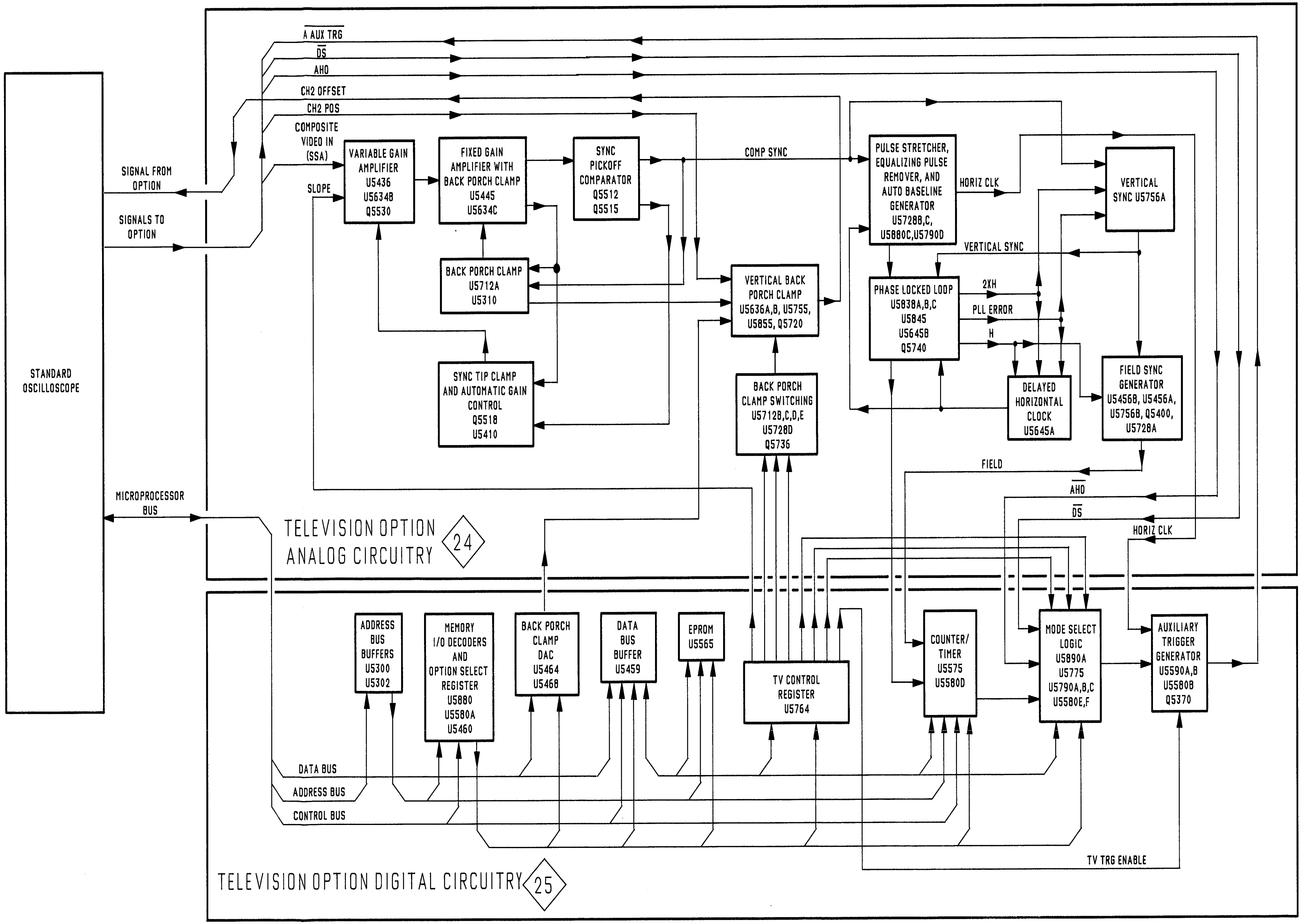


Figure 10-11. TV (Option 05) detailed block diagram.

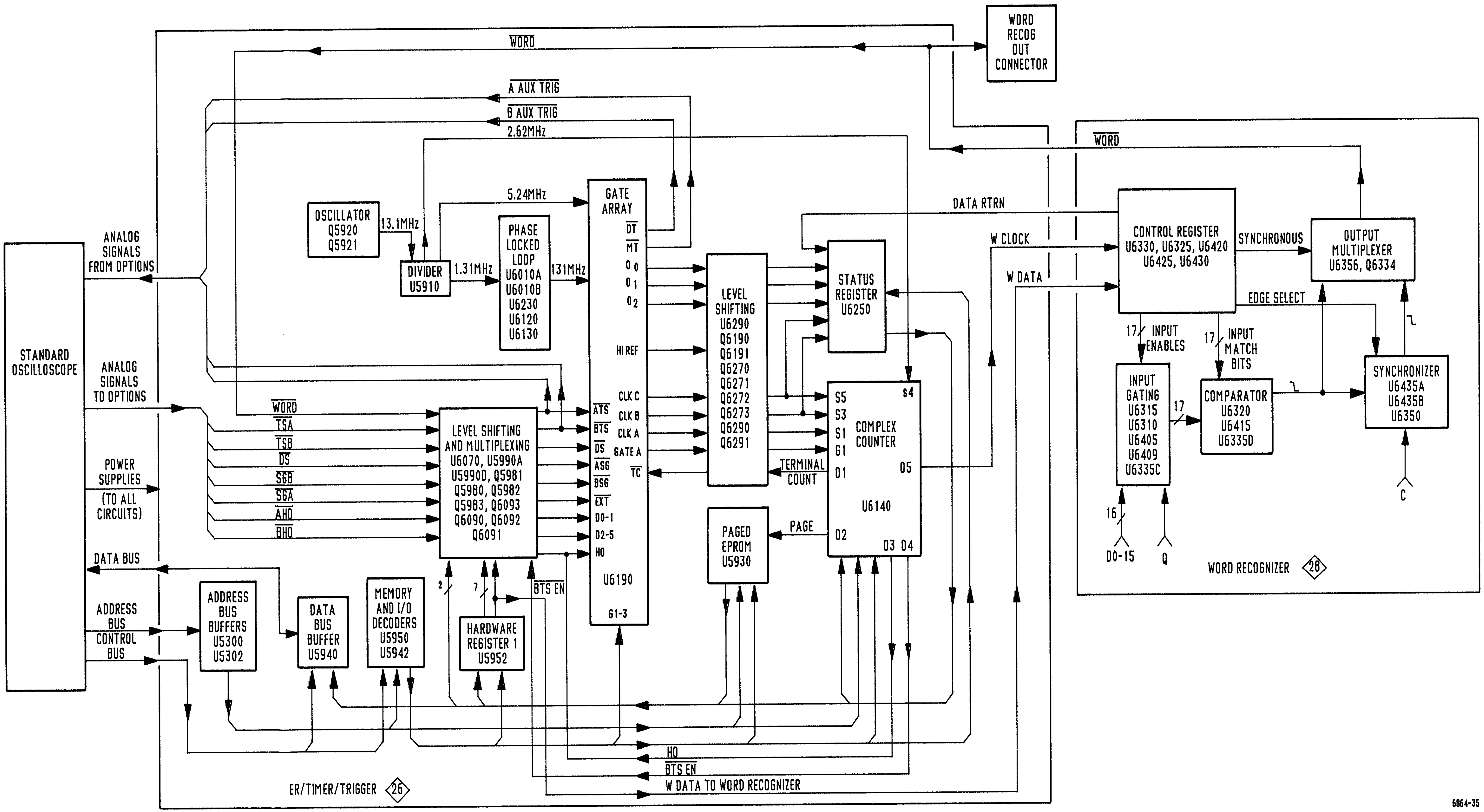


Figure 10-12. CTT and WR (Option 06/09) detailed block diagram.

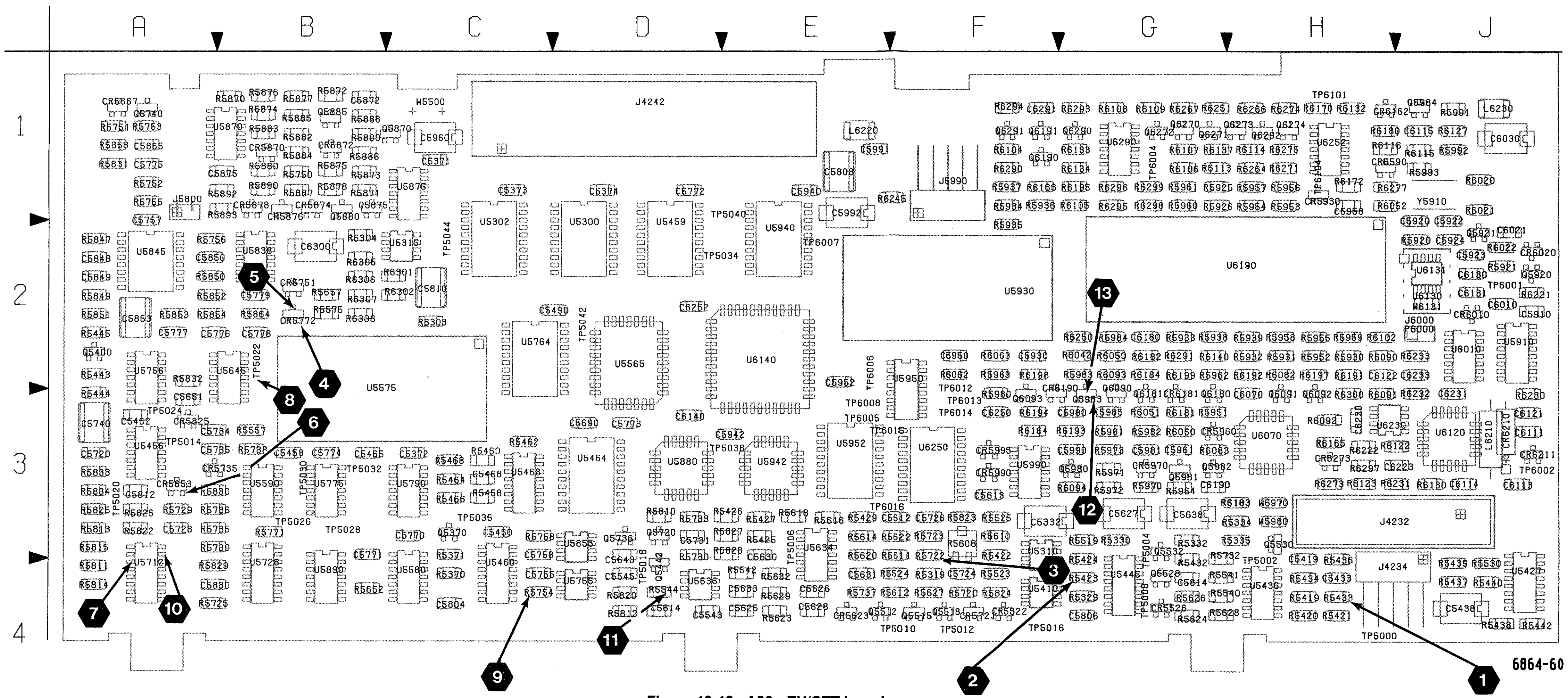
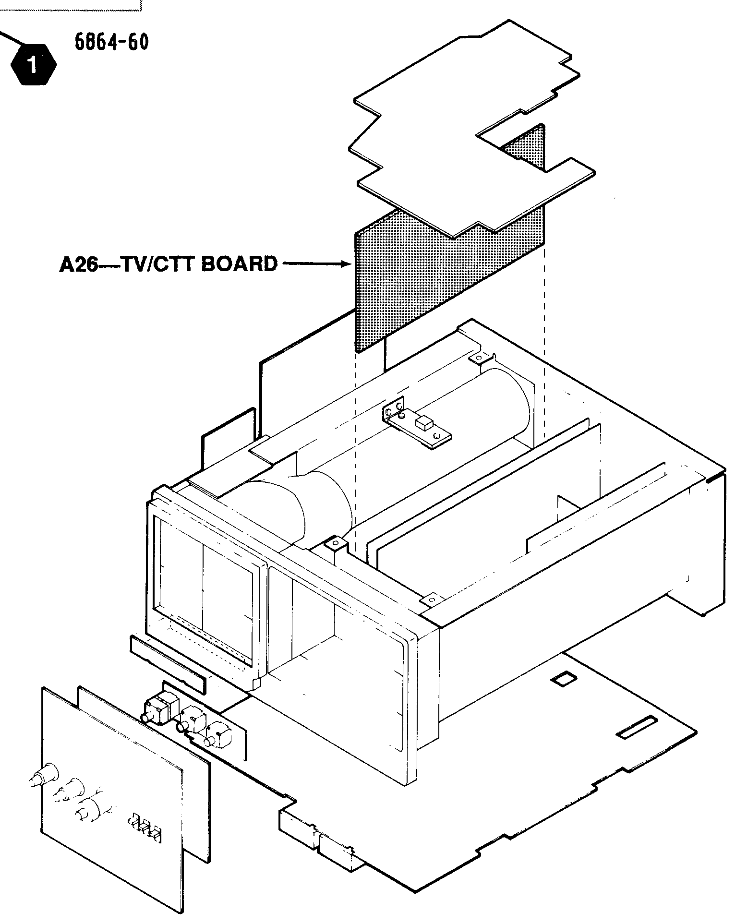


Figure 10-13. A26—TV/CTT board.



Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE

Component Number

A23 A2 R1234

Assembly Number — *Subassembly Number (if used)* — *Schematic Circuit Number*

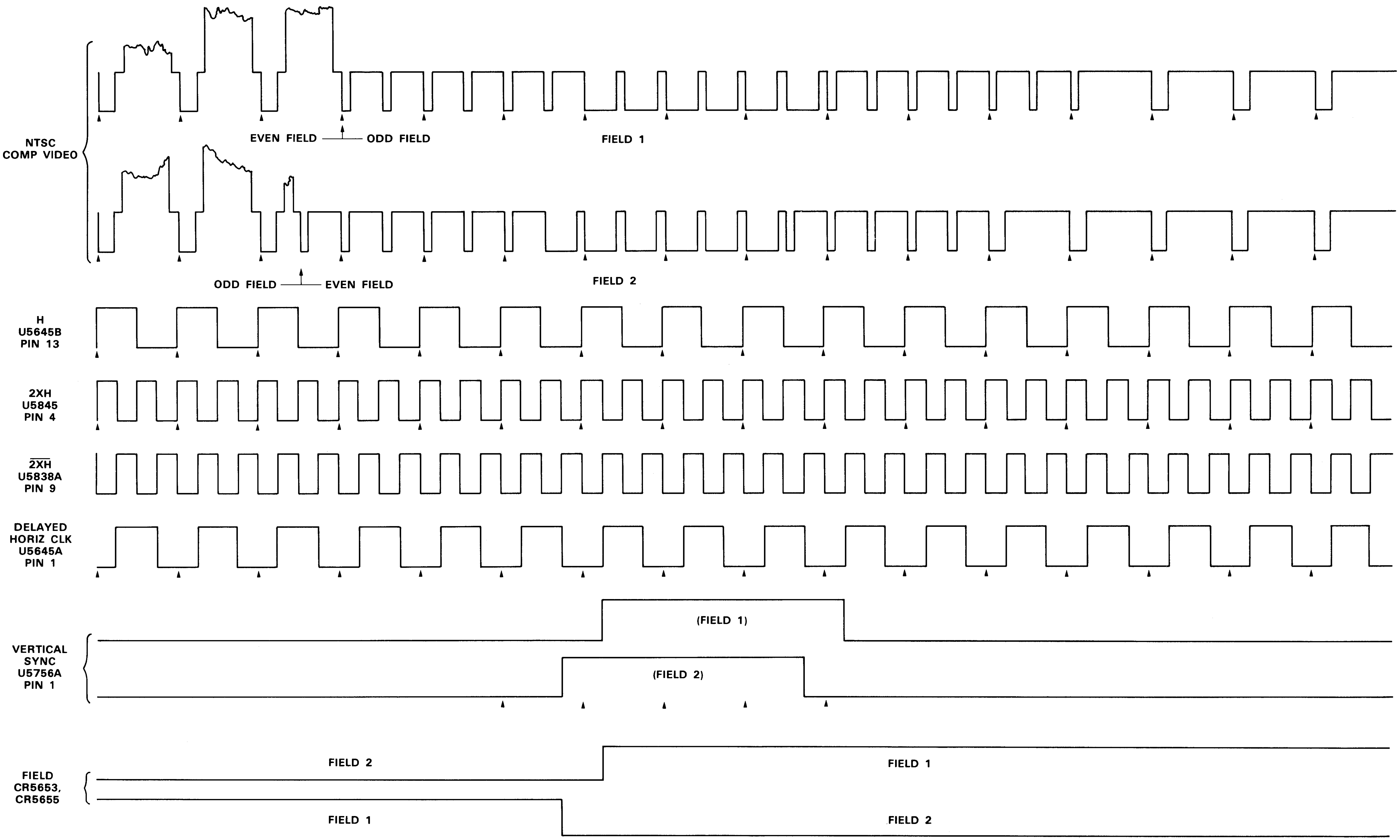
Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

A26—TV/CTT BOARD

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C5332	23	C5990	26	Q5720	23	R5611	23	R5885	24	R6130	26
C5371	24	C5991	26	Q5736	23	R5612	23	R5886	24	R6132	25
C5372	24	C5992	26	Q5740	23	R5614	23	R5887	24	R6133	25
C5373	24	C6010	26	Q5870	24	R5616	23	R5888	24	R6134	25
C5374	24	C6021	26	Q5875	24	R5618	23	R5889	24	R6137	25
C5419	23	C6030	26	Q5880	24	R5620	23	R5890	24	R6140	25
C5433	23	C6070	26	Q5885	24	R5622	23	R5892	24	R6164	25
C5438	23	C6111	26	Q5920	26	R5623	23	R5893	24	R6165	25
C5458	24	C6113	26	Q5921	26	R5624	23	R5920	26	R6166	25
C5460	24	C6114	26	Q5980	25	R5626	23	R5921	26	R6170	25
C5462	24	C6115	25	Q5981	25	R5627	23	R5925	25	R6172	25
C5465	24	C6121	26	Q5982	25	R5628	23	R5926	25	R6180	25
C5468	24	C6122	26	Q5983	25	R5629	23	R5930	25	R6181	25
C5490	24	C6130	26	Q5984	25	R5632	24	R5931	25	R6182	25
C5543	23	C6131	26	Q6090	25	R5652	23	R5932	25	R6183	25
C5545	23	C6140	26	Q6091	25	R5657	23	R5933	25	R6184	25
C5612	23	C6180	25	Q6092	25	R5720	23	R5934	25	R6191	25
C5613	23	C6190	26	Q6093	25	R5722	23	R5935	25	R6192	25
C5614	23	C6223	26	Q6180	25	R5723	23	R5936	25	R6193	25
C5625	23	C6230	26	Q6181	25	R5725	23	R5937	25	R6194	25
C5626	23	C6231	26	Q6190	25	R5729	23	R5938	25	R6195	25
C5627	23	C6233	26	Q6191	25	R5730	24	R5939	25	R6197	25
C5628	23	C6250	26	Q6270	25	R5732	23	R5951	25	R6198	25
C5630	23	C6252	26	Q6271	25	R5733	23	R5952	25	R6199	25
C5631	23	C6291	25	Q6272	25	R5735	23	R5953	25	R6221	26
C5633	24	C6300	24	Q6273	25	R5736	23	R5954	25	R6222	26
C5638	23			Q6274	25	R5737	23	R5955	25	R6230	26
C5640	23	CR5522	23	Q6290	25	R5738	23	R5956	25	R6231	26
C5651	23	CR5526	23	Q6291	25	R5739	23	R5957	25	R6232	26
C5690	24	CR5590	25	Q6292	25	R5750	23	R5958	25	R6233	26
C5720	23	CR5623	23			R5751	23	R5959	25	R6245	25
C5724	23	CR5653	23	R5319	23	R5752	23	R5960	25	R6250	25
C5726	23	CR5721	23	R5329	23	R5753	23	R5961	25	R6251	25
C5728	23	CR5735	23	R5330	23	R5754	23	R5962	25	R6264	25
C5731	24	CR5751	23	R5332	23	R5755	23	R5963	25	R6266	25
C5734	23	CR5772	23	R5334	23	R5756	24	R5964	25	R6267	25
C5735	23	CR5825	23	R5335	23	R5758	23	R5970	25	R6271	25
C5740	23	CR5867	23	R5370	24	R5771	23	R5971	25	R6273	25
C5755	23	CR5870	24	R5371	24	R5810	23	R5972	25	R6274	25
C5757	24	CR5872	24	R5419	23	R5811	23	R5973	25	R6275	25
C5758	23	CR5874	24	R5420	23	R5812	23	R5980	25	R6277	25
C5770	24	CR5876	24	R5421	23	R5813	23	R5981	25	R6290	25
C5771	24	CR5878	24	R5422	23	R5814	23	R5982	25	R6291	25
C5772	24	CR5930	26	R5423	23	R5815	23	R5983	25	R6293	25
C5773	24	CR5960	25	R5424	23	R5820	23	R5984	25	R6294	25
C5774	24	CR5970	25	R5425	23	R5822	23	R5985	25	R6295	25
C5775	23	CR5990	25	R5426	23	R5823	23	R5991	25	R6296	25
C5776	24	CR5995	25	R5427	23	R5824	23	R5992	25	R6297	25
C5777	24	CR6010	26	R5429	23	R5825	23	R5993	25	R6298	25
C5778	24	CR6020	26	R5432	23	R5826	23	R6020	26	R6299	25
C5779	24	CR6162	25	R5433	23	R5827	23	R6021	26	R6300	25
C5804	24	CR6181	25	R5434	23	R5828	23	R6022	26	R6301	24
C5806	24	CR6190	25	R5436	23	R5829	23	R6042	25	R6302	24
C5808	24	CR6210	26	R5437	23	R5830	23	R6050	25	R6303	24
C5810	24	CR6211	26	R5438	23	R5831	23	R6051	25	R6304	24
C5812	24	CR6273	25	R5439	23	R5832	23	R6052	25	R6305	24
C5814	24			R5440	23	R5833	23	R6060	25	R6306	24
C5830	23	J4232	24	R5442	23	R5834	23	R6062	25	R6307	24
C5848	23	J4234	23	R5443	23	R5847	23	R6063	25	R6308	24
C5849	23	J4242	23	R5444	23	R5849	23	R6082	25		
C5850	23	J4242	24	R5445	23	R5850	23	R6083	25	TP5000	23
C5853	23	J5800	24	R5458	24	R5851	23	R6090	26	TP5002	23
C5865	23	J5990	25	R5460	24	R5852	23	R6091	26	TP5004	23
C5872	24	J6000	26	R5462	24	R5853	23	R6092	25	TP5006	23
C5875	24			R5464	24	R5854	23	R6093	25	TP5008	23
C5910	26	L6210	26	R5466	24	R5864	24	R6094	25	TP5010	23
C5920	26	L6220	26	R5468	24	R5868	23	R6102	26	TP5012	23
C5922	26	L6230	26	R5519	23	R5870	24	R6104	25	TP5014	23
C5923	26			R5523	23	R5871	24	R6105	25	TP5016	23
C5924	26	P6000	26	R5524	23	R5872	24	R6106	25	TP5018	23
C5930	26			R5525	23	R5873	24	R6107	25	TP5020	23
C5940	26	Q5370	24	R5530	23	R5874	24	R6108	25	TP5022	23
C5942	26	Q5400	23	R5540	23	R5875	24	R6109	25	TP5024	23
C5950	26	Q5442	23	R5541	23	R5876	24	R6113	25	TP5026	24
C5952	26	Q5512	23	R5542	23	R5877	24	R6114	25	TP5028	24
C5958	26	Q5515	23	R5544	23	R5878	24	R6115	25	TP5030	24
C5960	24	Q5518	23	R5557	23	R5880	24	R6116	25	TP5032	24
C5961	25	Q5528	23	R5575	24	R5882	24	R6122	26	TP5034	24
C5980	25	Q5530	23	R5608	23	R5883	24	R6123	26	TP5036	24
C5981	25	Q5532	23	R5610	23	R5884	24	R6127	25	TP5038	24

A26—TV/CTT BOARD (cont)

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
TP5040	24	U5436	23	U5756	24	U5952	26
TP5042	24	U5436	24	U5764	24	U5990	25
TP5044	24	U5445	23	U5775	24	U5990	26
TP6001	26	U5445	24	U5790	24	U6010	26
TP6002	26	U5456	23	U5838	23	U6070	25
TP6004	25	U5456	24	U5838	24	U6070	26
TP6005	25	U5459	24	U5845	23	U6120	26
TP6006	25	U5460	24	U5845	24	U6130	26
TP6007	25	U5464	24	U5855	23	U6131	26
TP6008	25	U5468	24	U5855	24	U6140	25
TP6012	25	U5565	24	U5870	23	U6140	26
TP6013	25	U5575	24	U5870	24	U6190	25
TP6014	25	U5580	24	U5875	23	U6190	26
TP6015	25	U5590	24	U5875	24	U6230	26
TP6016	25	U5634	23	U5880	24	U6250	25
TP6101	25	U5634	24	U5890	23	U6250	26
TP6104	26	U5636	23	U5890	24	U6252	25
		U5636	24	U5910	26	U6252	26
U5300	24	U5645	23	U5930	25	U6290	25
U5302	24	U5645	24	U5930	26	U6290	26
U5310	23	U5712	23	U5940	25		
U5310	24	U5712	24	U5940	26	W5500	24
U5315	24	U5728	23	U5942	25	W5970	25
U5410	23	U5728	24	U5942	26	W5980	25
U5410	24	U5755	23	U5950	25	W6131	26
U5427	23	U5755	24	U5950	26		
U5427	24	U5756	23	U5952	25	Y5910	26



4630-03

Figure 10-14. TV Option timing diagram.

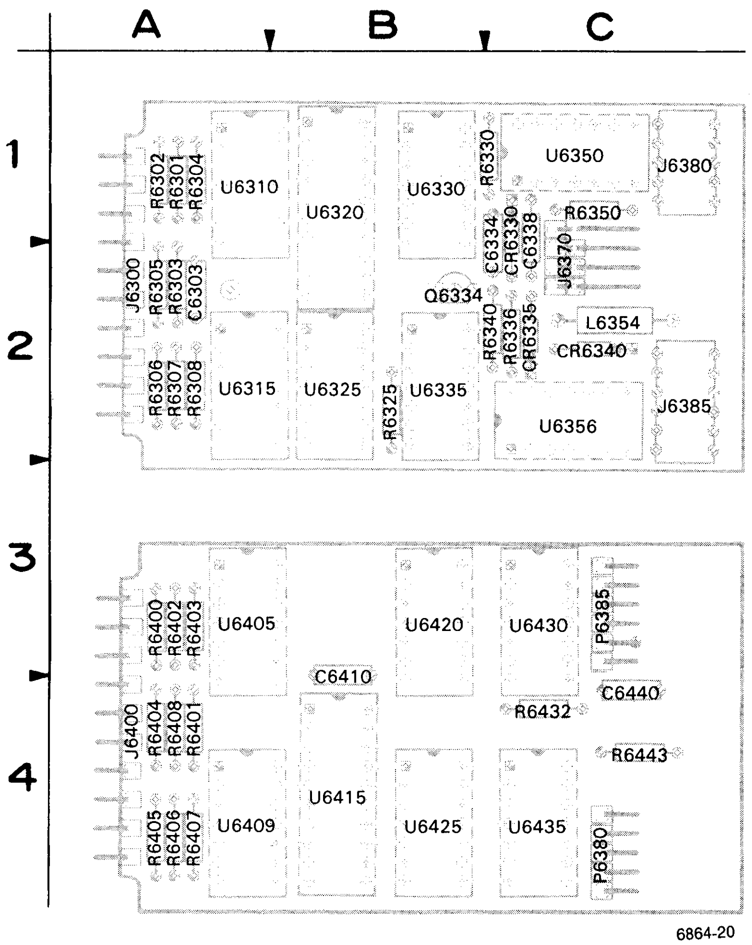
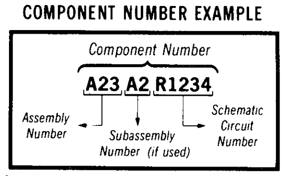


Figure 10-15. A32—Word Recognizer board 1 (top), and A33—Word Recognizer board 2 (bottom).

Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE



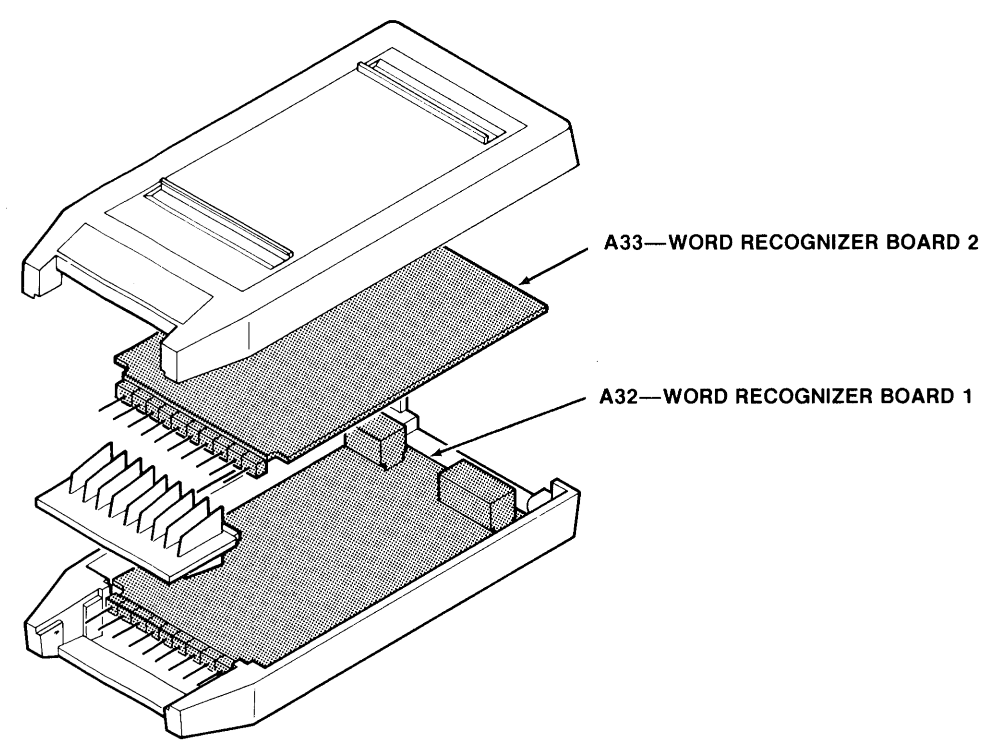
Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

A32—WORD RECOGNIZER BOARD 1

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C6303	27	J6380	27	R6304	27		
C6334	27	J6385	27	R6305	27	U6310	27
C6338	27			R6306	27	U6315	27
		L6354	27	R6307	27	U6320	27
CR6330	27			R6308	27	U6325	27
CR6335	27	Q6334	27	R6325	27	U6330	27
CR6340	27			R6330	27	U6335	27
		R6301	27	R6336	27	U6350	27
J6300	27	R6302	27	R6340	27	U6356	27
J6370	27	R6303	27	R6350	27		

A33—WORD RECOGNIZER BOARD 2

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C6410	27			R6406	27	U6409	27
C6440	27	R6400	27	R6407	27	U6415	27
		R6401	27	R6408	27	U6420	27
J6400	27	R6402	27	R6432	27	U6425	27
		R6403	27	R6443	27	U6430	27
P6380	27	R6404	27			U6435	27
P6385	27	R6405	27	U6405	27		

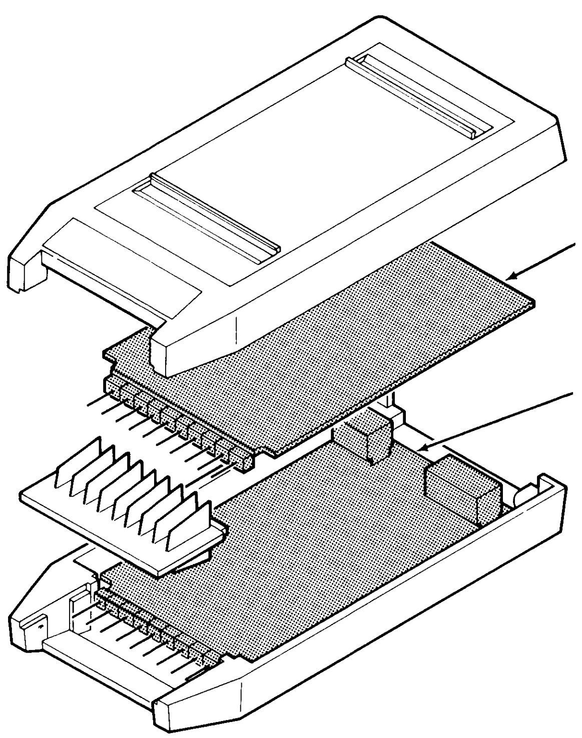


A32—WORD RECOGNIZER BOARD 1

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C6303	27	J6380	27	R6304	27		
C6334	27	J6385	27	R6305	27	U6310	27
C6338	27			R6306	27	U6315	27
		L6354	27	R6307	27	U6320	27
CR6330	27			R6308	27	U6325	27
CR6335	27	Q6334	27	R6325	27	U6330	27
CR6340	27			R6330	27	U6335	27
		R6301	27	R6336	27	U6350	27
J6300	27	R6302	27	R6340	27	U6356	27
J6370	27	R6303	27	R6350	27		

A33—WORD RECOGNIZER BOARD 2

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C6410	27			R6406	27	U6409	27
C6440	27	R6400	27	R6407	27	U6415	27
		R6401	27	R6408	27	U6420	27
J6400	27	R6402	27	R6432	27	U6425	27
		R6403	27	R6443	27	U6430	27
P6380	27	R6404	27			U6435	27
P6385	27	R6405	27	U6405	27		



TEST WAVEFORM SETUP INFORMATION

The numbered waveforms below were obtained at the test points indicated on the schematic diagram. The waveforms are representative of signals that may be expected at the associated points when the following setup conditions are observed. Any changes from the given setup conditions required to produce a given waveform are noted with that waveform illustration.

24X5B/2467B TV OPTION SETUP

Connect a 100 IRE unit composite video signal (NTSC or PAL) to the CH 2 input using a 75-Ω bnc cable and a 75-Ω terminator. Set initial front-panel controls as follows:

CH 2 POSITION	Midrange

VERTICAL MODE

CH 1, CH 3, and CH 4	Off
CH 2	On

VOLTS/DIV

CH 2	200 mV
CH 2 VAR	In detent

Input Coupling

CH 2	1 MΩ DC

Horizontal

POSITION	Midrange
A SEC/DIV	10 μs
SEC/DIV VAR	In detent
X10 MAG	Off
ΔV and Δt	Displays off

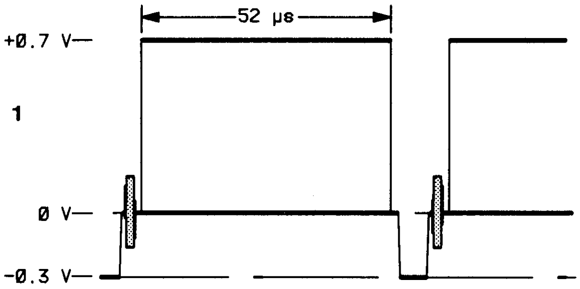
Trigger

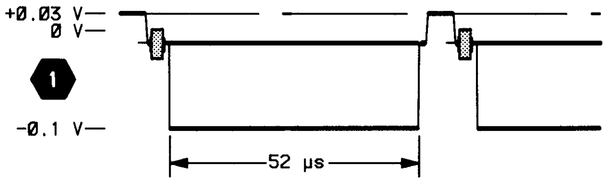
HOLDOFF	MIN (fully CCW)
SLOPE	–
MODE	AUTO
SOURCE	CH 2
COUPLING	LINES

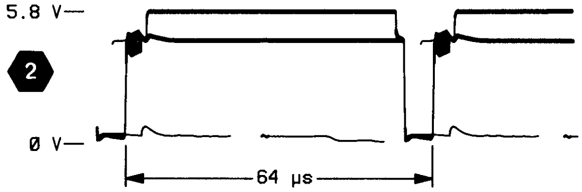
TEST OSCILLOSCOPE SETUP

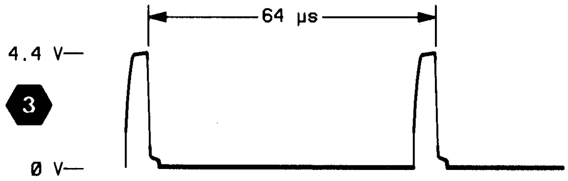
Using a X10 probe with the test oscilloscope, set its Trigger Slope, Trigger Level, Volts/Div, and Time/Div ranges as required to obtain the indicated displays.

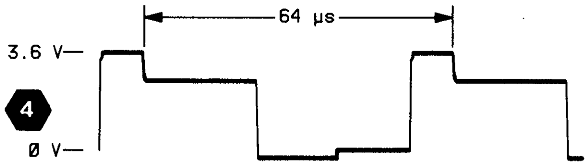
INPUT SIGNAL WHILE OBSERVING WAVEFORMS 1 THROUGH 8.

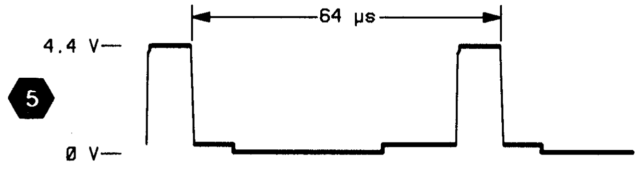


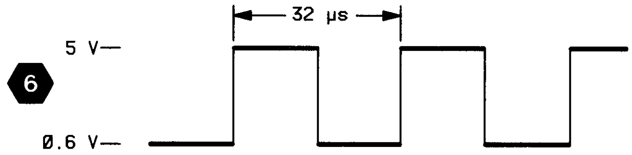


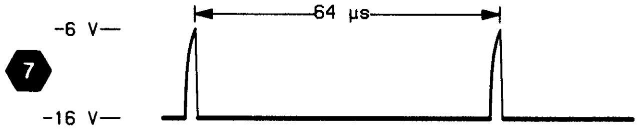


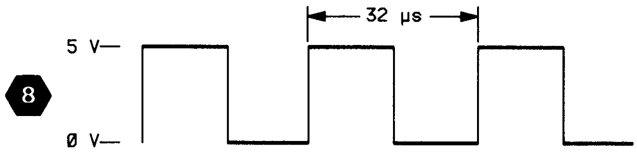




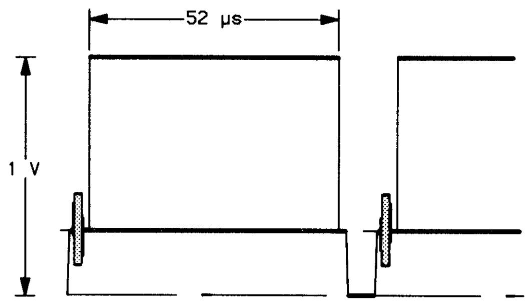


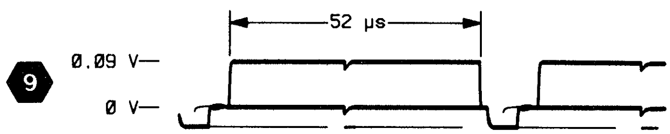


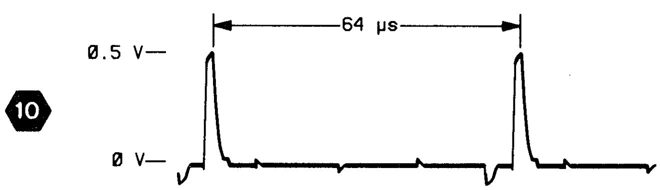


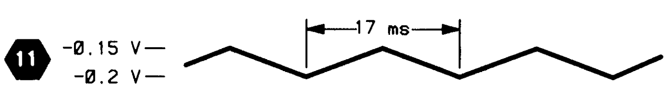


INPUT SIGNAL WHILE OBSERVING WAVEFORMS 9 THROUGH 11. CONNECT A FIELD SQUARE WAVE FROM A TV GENERATOR TO THE CH 2 INPUT. SET CH 2 INPUT COUPLING TO TV CLAMP.







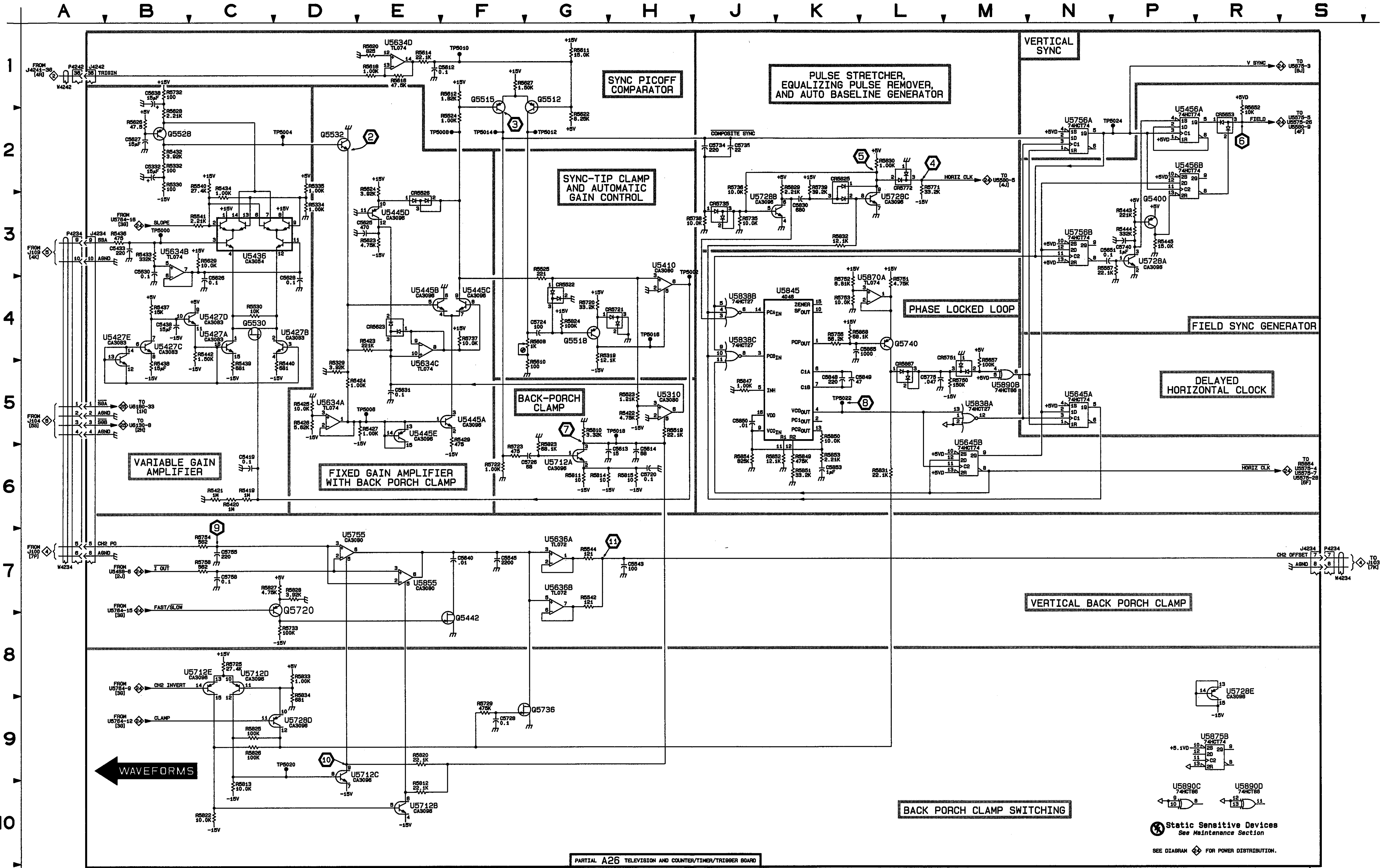


A AND B SEC/DIV 5 ms.

4630-52

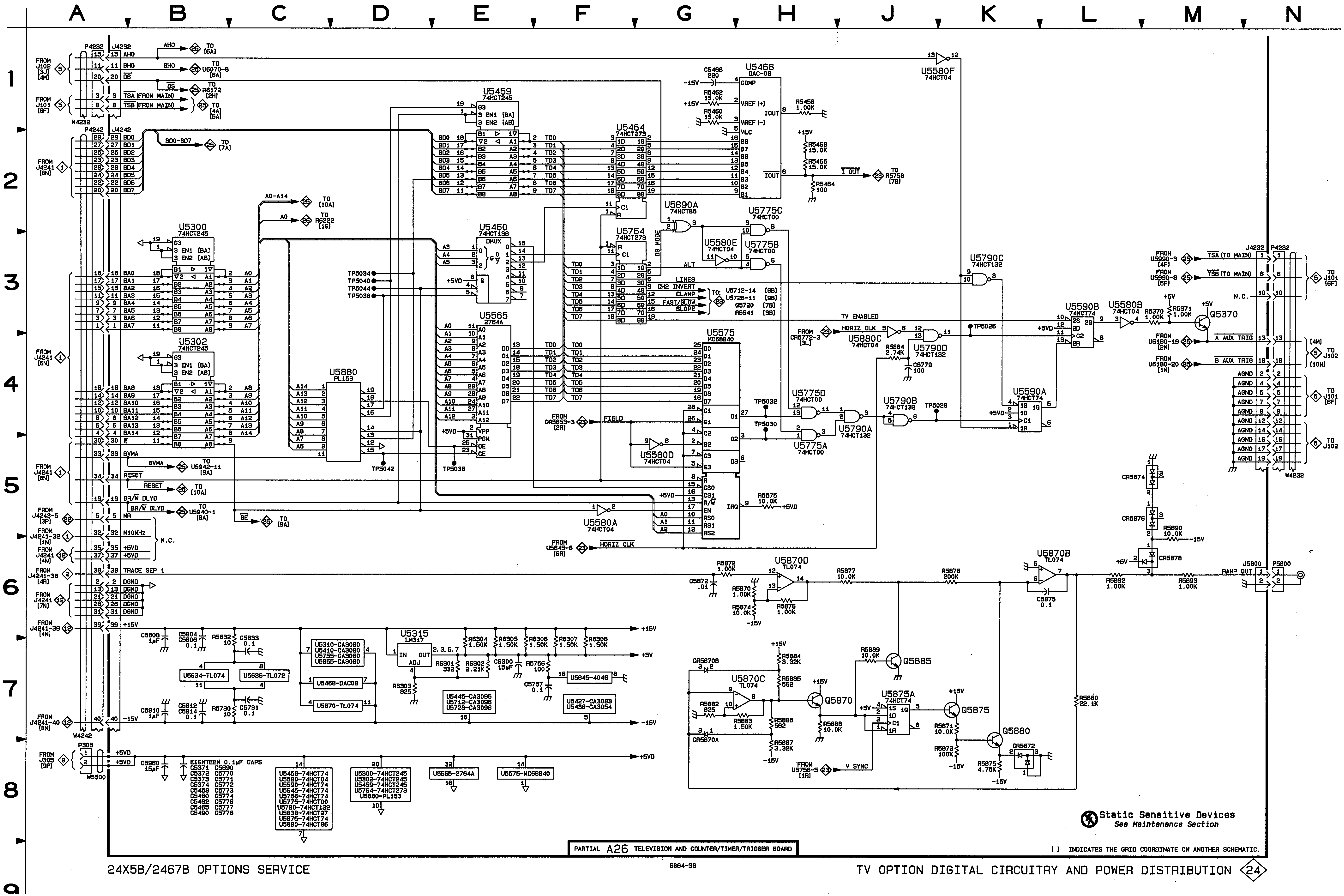
TV OPTION ANALOG CIRCUITRY 23

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
ASSEMBLY A26											
C5332	2B	3F	Q5532	2D	4G	R5629	3C	4E	TP5010	1F	4F
C5419	6C	4H	Q5720	7D	4D	R5652	1R	4B	TP5012	2G	4F
C5433	3B	4H	Q5736	9G	4D	R5657	5M	2B	TP5014	2F	3A
C5438	4B	4J	Q5740	4L	1A	R5720	4G	4F	TP5016	4H	4F
C5543	7H	4D				R5722	6F	4F	TP5018	5H	4D
C5545	7F	4D	R5319	4G	4F	R5723	6F	4F	TP5020	9D	3A
C5612	1E	3F	R5329	5D	4G	R5725	8C	4A	TP5022	5K	3B
C5613	6H	3F	R5330	2B	4G	R5729	9F	3A	TP5024	2P	3A
C5614	6H	4D	R5332	2B	4G	R5732	1B	4G			
C5625	3E	4E	R5334	3D	3H	R5733	8D	3D	U5310	5H	4F
C5626	4C	4E	R5335	2D	4H	R5735	3J	3A	U5410	4H	4F
C5627	2B	3G	R5419	6C	4H	R5736	2J	3A	U5427A	4C	4J
C5628	4D	4E	R5420	6C	4H	R5737	4F	4E	U5427B	4D	4J
C5630	3B	4E	R5421	6C	4H	R5738	3J	3B	U5427C	4B	4J
C5631	5E	4E	R5422	5H	4F	R5739	2K	4A	U5427D	4C	4J
C5638	1B	3G	R5423	4E	4G	R5750	5M	1B	U5427E	4B	4J
C5640	7F	4D	R5424	5D	4G	R5751	4L	1A	U5436	3C	4H
C5651	3N	3A	R5425	5D	4E	R5752	4K	1A	U5445A	5F	4G
C5720	6H	3A	R5426	5D	3E	R5753	4K	1A	U5445B	4E	4G
C5724	4G	4F	R5427	5E	3E	R5754	7C	4C	U5445C	4F	4G
C5726	6G	3F	R5429	5F	3E	R5755	4K	2A	U5445D	3E	4G
C5728	9F	3A	R5432	2B	4G	R5758	7C	4C	U5445E	5E	4G
C5734	2J	3A	R5433	3B	4H	R5771	2L	3B	U5456A	2P	3A
C5735	2J	3A	R5434	3C	4H	R5810	5G	3D	U5456B	2P	3A
C5740	3P	3A	R5436	3B	4H	R5811	6G	4A	U5634A	5D	4E
C5755	7C	4C	R5437	4B	4J	R5812	10E	4D	U5634B	3B	4E
C5758	7C	4C	R5438	5B	4J	R5813	10C	3A	U5634C	4E	4E
C5775	5L	1A	R5439	5C	4J	R5814	6G	4A	U5634D	1E	4E
C5830	3K	4A	R5440	5D	4J	R5815	6H	4A	U5636A	7G	4D
C5848	5K	2A	R5442	4C	4J	R5820	9E	4D	U5636B	7G	4D
C5849	5K	2A	R5443	3P	3A	R5822	10C	3A	U5645A	5N	3B
C5850	5J	2A	R5444	3P	3A	R5823	6G	3F	U5645B	6M	3B
C5853	6K	2A	R5445	3P	2A	R5824	4G	4F	U5712A	6G	4A
C5865	4K	1A	R5519	5H	4G	R5825	9C	3A	U5712B	10E	4A
			R5523	5H	4F	R5826	9C	3A	U5712C	9D	4A
CR5522	4G	4F	R5524	2F	4F	R5827	7D	4E	U5712D	8C	4A
CR5526	3E	4G	R5525	4G	3F	R5828	7D	4E	U5712E	8C	4A
CR5623	4E	4E	R5530	4C	4J	R5829	2K	4A	U5728A	3P	4B
CR5653	2R	3A	R5540	2C	4G	R5830	2L	3A	U5728B	3J	4B
CR5721	4H	4F	R5541	3C	4G	R5831	6L	1A	U5728C	3L	4B
CR5735	3J	3A	R5542	7G	4E	R5832	3K	3A	U5728D	9D	4B
CR5751	5M	2B	R5544	7G	4D	R5833	8D	3A	U5728E	8R	4B
CR5772	2L	2B	R5557	3P	3B	R5834	8D	3A	U5755	7D	4D
CR5825	2K	3A	R5608	4G	4F	R5847	5J	2A	U5756A	2N	3A
CR5867	5L	1A	R5610	5G	4F	R5849	6K	2A	U5756B	3N	3A
			R5611	1G	4F	R5850	5K	2A	U5838A	5M	2B
J4234	3A	4H	R5612	1F	4F	R5851	6K	2A	U5838B	4J	2B
J4234	7S	4H	R5614	1E	4E	R5852	6K	2A	U5838C	4J	2B
J4242	1A	1D	R5616	1E	3E	R5853	6K	2A	U5845	4K	2A
			R5618	1E	3E	R5854	6J	2A	U5855	7E	4D
Q5400	3P	2A	R5620	1E	4E	R5868	4K	1A	U5870A	4L	1B
Q5442	8F	4D	R5622	2G	4F				U5875B	9R	1C
Q5512	1G	4E	R5623	3E	4E	TP5000	3B	4H	U5890B	5M	4B
Q5515	1F	4F	R5624	2E	4G	TP5002	4H	4H	U5890C	10P	4B
Q5518	4G	4F	R5626	2B	4G	TP5004	2D	4G	U5890D	10R	4B
Q5528	2B	4G	R5627	1F	4F	TP5006	5E	4E			
Q5530	4C	4H	R5628	2B	4G	TP5008	2F	4G			
Patrial A26 also shown on diagrams 24, 25, and 26.											
OTHER PARTS											
P4234	3A	CHASSIS	P4242	1A	CHASSIS	W4234	7A	CHASSIS	W4242	1A	CHASSIS
P4234	7S	CHASSIS				W4234	7S	CHASSIS			


SYNC PICOFF COMPARATOR
PULSE STRETCHER, EQUALIZING PULSE REMOVER, AND AUTO BASELINE GENERATOR
VERTICAL SYNC
SYNC-TIP CLAMP AND AUTOMATIC GAIN CONTROL
PHASE LOCKED LOOP
FIELD SYNC GENERATOR
BACK-PORCH CLAMP
DELAYED HORIZONTAL CLOCK
VARIABLE GAIN AMPLIFIER
FIXED GAIN AMPLIFIER WITH BACK PORCH CLAMP
VERTICAL BACK PORCH CLAMP
BACK PORCH CLAMP SWITCHING
WAVEFORMS
Static Sensitive Devices
See Maintenance Section
SEE DIAGRAM 24 FOR POWER DISTRIBUTION.
PARTIAL A26 TELEVISION AND COUNTER/TIMER/TRIGGER BOARD
6864-37

TV OPTION DIGITAL CIRCUITRY AND POWER DISTRIBUTION 24

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
ASSEMBLY A26											
C5371	8B	1C	J4242	2A	1D	R6301	7D	2C	U5580B	3L	4C
C5372	8B	3C	J5800	6N	2A	R6302	7E	2C	U5580D	5G	4C
C5373	8B	1C				R6303	7D	2C	U5580E	3G	4C
C5374	8B	1D	Q5370	3M	3C	R6304	7E	2B	U5580F	1J	4C
C5458	8B	3B	Q5870	7H	1C	R6305	7E	2B	U5580	8C	4C
C5460	8B	3C	Q5875	7K	2B	R6306	7E	2B	U5590A	4K	3B
C5462	8B	3A	Q5880	7K	2B	R6307	7F	2B	U5590B	3L	3B
C5465	8B	3B	Q5885	7J	1B	R6308	7F	2B	U5590	8C	3B
C5468	1G	3C							U5634	7B	4E
C5490	8B	2C	R5370	3M	4C	TP5026	3K	3B	U5636	7C	4D
C5633	7C	4E	R5371	3M	4C	TP5028	4J	3B	U5645	8C	3B
C5690	8B	3D	R5458	1H	3C	TP5030	4H	3B	U5712	7E	4A
C5731	7C	3D	R5460	1G	3C	TP5032	4H	3B	U5728	7E	4B
C5757	7F	2A	R5462	1G	3C	TP5034	3D	2D	U5755	7C	4D
C5770	8B	4C	R5464	2H	3C	TP5036	3D	3C	U5756	8C	3A
C5771	8B	4B	R5466	2H	3C	TP5038	5E	3E	U5764	3F	2C
C5772	8B	1D	R5468	2H	3C	TP5040	3D	2E	U5764	8D	2C
C5773	8B	3D	R5575	5H	2B	TP5042	5D	2D	U5775A	5H	3B
C5774	8B	3B	R5632	6C	4E	TP5044	3D	2C	U5775C	2H	3B
C5776	8B	2A	R5730	7C	4D				U5775D	4H	3B
C5777	8B	2A	R5756	7F	2A	U5300	3B	2D	U5775	8C	3B
C5778	8B	2B	R5864	4J	2B	U5300	8D	2D	U5790A	4J	3C
C5779	4J	2B	R5870	6H	1B	U5302	4B	2C	U5790B	4J	3C
C5804	6B	4C	R5871	7K	1B	U5302	8D	2C	U5790C	3K	3C
C5806	6B	4G	R5872	6G	1B	U5310	7C	4F	U5790D	4J	3C
C5808	6B	1E	R5873	8K	1B	U5315	7D	2C	U5790	8C	3C
C5810	7B	2C	R5874	6H	1B	U5410	7C	4F	U5838	8C	2B
C5812	7B	3A	R5875	8K	1B	U5427	7F	4J	U5845	7F	2A
C5814	7B	4G	R5876	6H	1B	U5436	7F	4H	U5855	7C	4D
C5872	6G	1B	R5877	6J	1B	U5445	7E	4G	U5870B	6L	1B
C5875	6L	1B	R5878	6K	1B	U5456	8C	3A	U5870C	7H	1B
C5960	8B	1C	R5880	7L	1B	U5459	1E	2D	U5870D	6H	1B
C6300	7E	2B	R5882	7G	1B	U5459	8D	2D	U5870	7C	1B
			R5883	7H	1B	U5460	3E	4C	U5875A	7J	1C
CR5870A	7G	1B	R5884	7H	1B	U5464	2F	3D	U5875	8C	1C
CR5870B	7G	1B	R5885	7H	1B	U5468	1H	3C	U5880C	4J	3D
CR5872	8K	1B	R5886	7H	1B	U5468	7C	3C	U5880	4D	3D
CR5874	5M	2B	R5887	8H	1B	U5565	3E	2D	U5880	8D	3D
CR5876	5M	2B	R5888	7H	1B	U5565	8E	2D	U5890A	2G	4B
CR5878	6M	2B	R5889	7J	1B	U5575B	3H	3C	U5890	8C	4B
			R5890	6M	1B	U5575	4G	3C			
J4232	1A	3H	R5892	6L	1B	U5575	8E	3C	W5500	7L	1C
J4232	3N	3H	R5893	6M	2B	U5580A	5F	4C			
Patrial A26 also shown on diagrams 23, 25, and 26.											
OTHER PARTS											
P4232	1A	CHASSIS	P4242	2A	CHASSIS	W4232	1A	CHASSIS	W4232	5N	CHASSIS
P4232	3N	CHASSIS	P5800	6N	CHASSIS				W4242	7A	CHASSIS



TV OPTION DIGITAL CIRCUITRY AND POWER DISTRIBUTION <24>

INITIAL TROUBLESHOOTING SETUP

The input signal during the troubleshooting that follows is a composite video signal. Set initial front-panel controls as follows:

CH 2 POSITION	Midrange

VERTICAL MODE

CH 1, CH 3, and CH 4	Off
CH 2	On

VOLTS/DIV

CH 2	500 mV
CH 2 VAR	In detent

Input Coupling

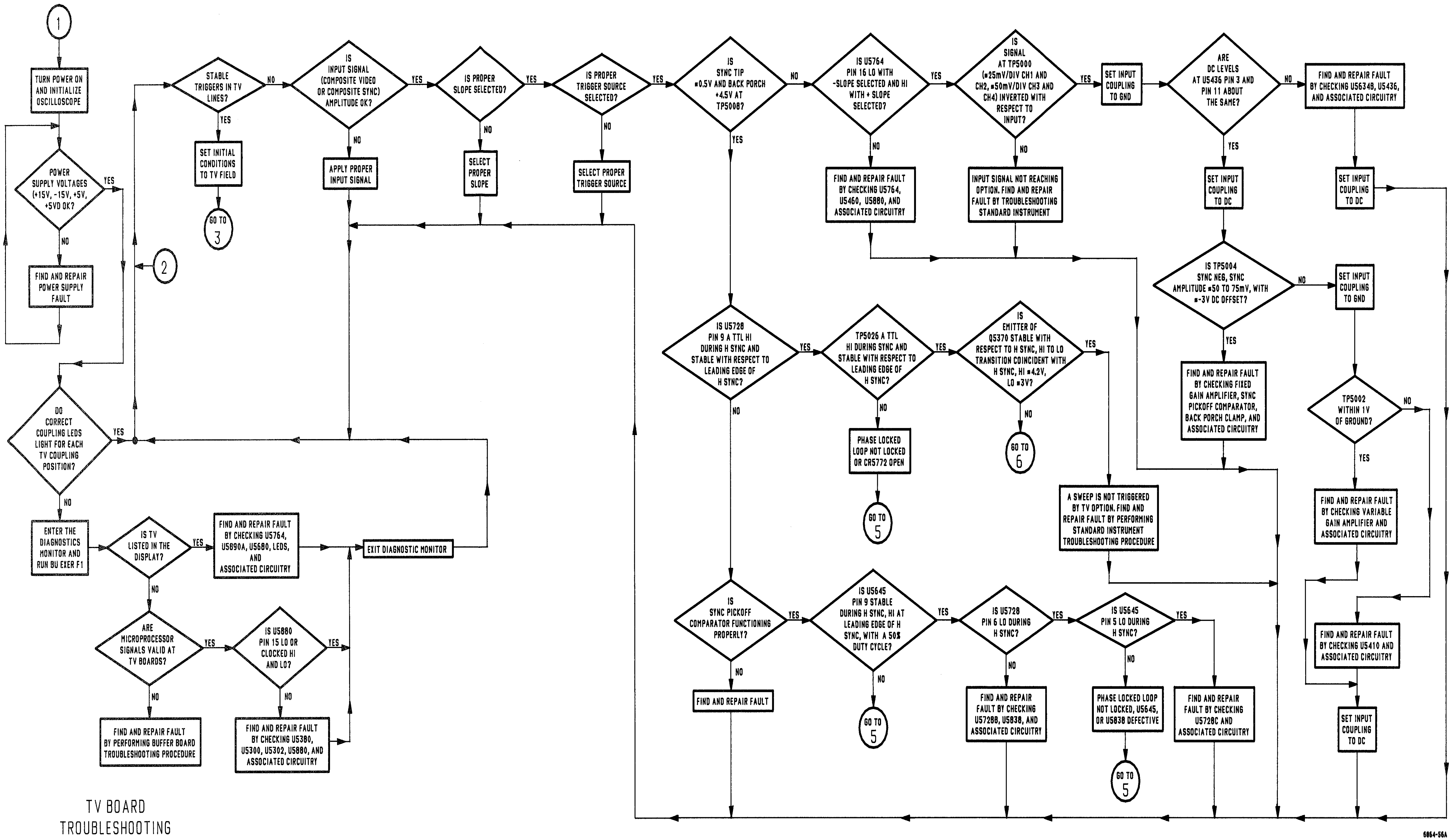
CH 2	1 MΩ DC

Horizontal

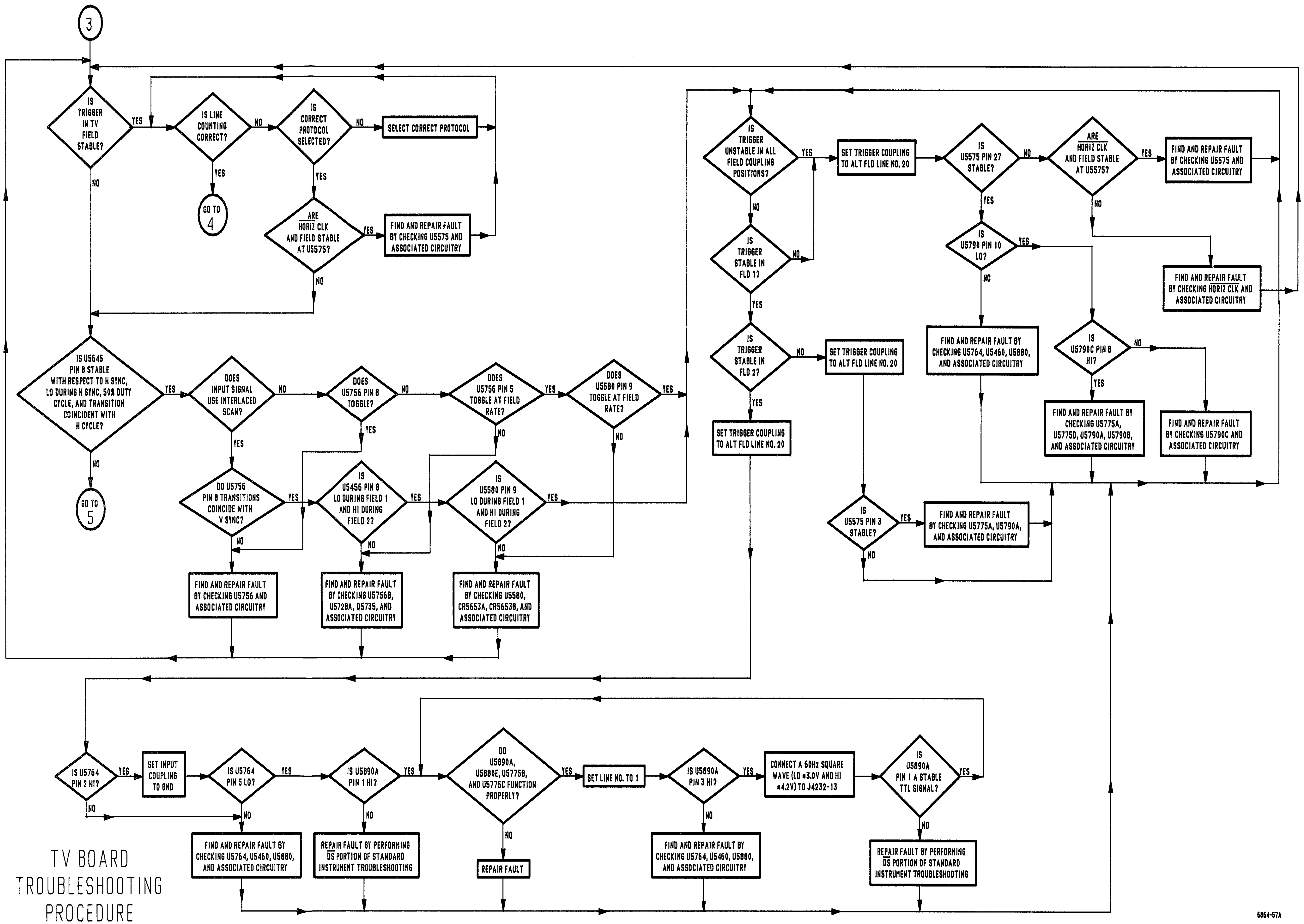
POSITION	Midrange
SEC/DIV VAR	In detent
ΔV and Δt	Displays off
X10 MAG	Off
ΔV and Δt	Displays off

Trigger

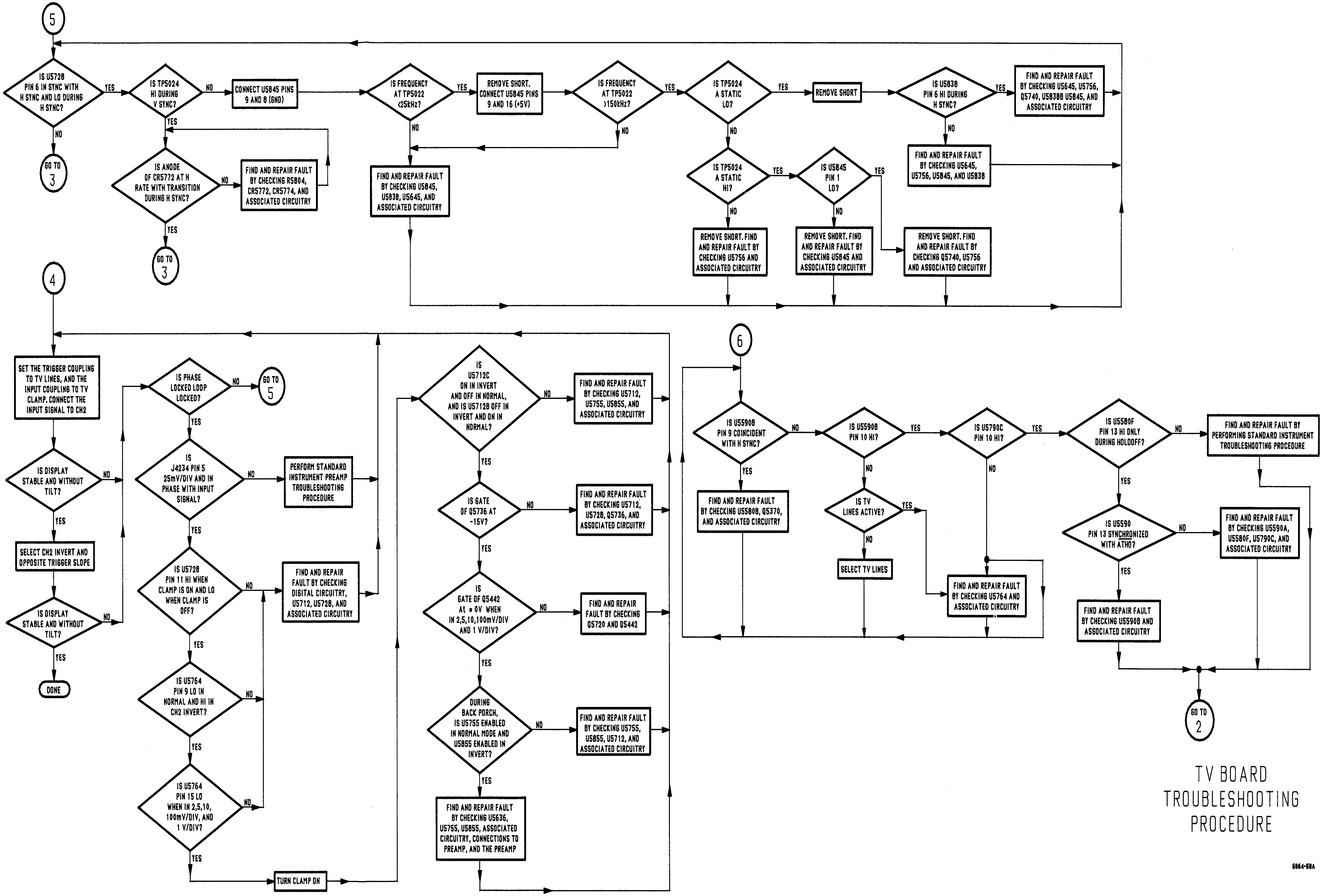
HOLDOFF	MIN (fully CCW)
SLOPE	+ for + sync −for −sync
MODE	AUTO
SOURCE	CH 2
COUPLING	LINES for lines troubleshooting, FLD1 line 1 for field troubleshooting



TV BOARD TROUBLESHOOTING PROCEDURE



TV BOARD
TROUBLESHOOTING
PROCEDURE



TV BOARD TROUBLESHOOTING PROCEDURE

6864-58A

TEST WAVEFORM SETUP INFORMATION

The numbered waveforms below were obtained at the test points indicated on the schematic diagram. The waveforms are representative of signals that may be expected at the associated points when the following setup conditions are observed. Any changes from the given setup conditions required to produce a given waveform are noted with that waveform illustration.

24X5B/2467B CTT OPTION SETUP

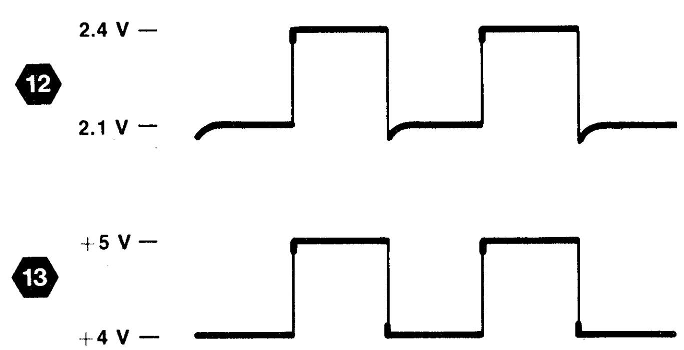
Connect a 6-division, 1-MHz square wave to the CH 2 input. Set the CTT Menu mode to count the frequency of the A Trigger event. Set initial front-panel controls as follows:

Trigger

MODE	AUTO LVL
SOURCE	CH 1
COUPLING	DC
HOLDOFF	MIN (Fully CCW)
SLOPE	+

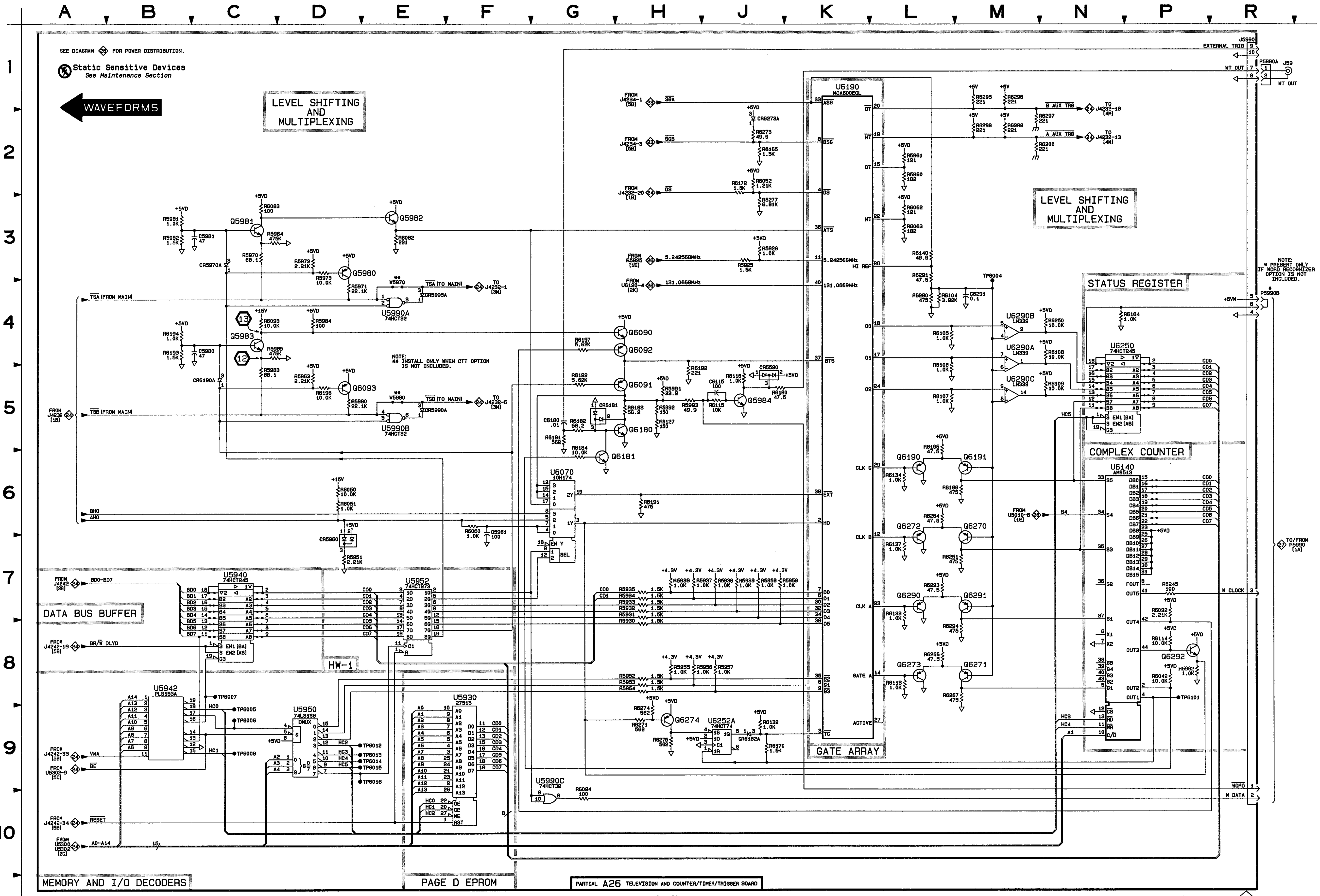
TEST OSCILLOSCOPE SETUP

Using a X10 probe with the test oscilloscope, set its Trigger Slope, Trigger Level, Volts/Div, and Time/Div ranges as required to obtain the indicated displays.



COUNTER/TIMER/TRIGGER 25

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
ASSEMBLY A26											
C5961	6F	3G	R5932	7H	2H	R6093	4C	3G	R6275	9H	1H
C5980	4C	3G	R5933	7H	2G	R6094	10G	3G	R6277	3J	1H
C5981	3C	3G	R5934	7H	2F	R6104	4L	1F	R6290	4L	1F
C6115	5J	1J	R5935	7H	2F	R6105	4L	2G	R6291	3L	2G
C6180	5G	2G	R5936	7H	2F	R6106	5L	1G	R6293	7L	1G
C6291	4M	1F	R5937	7H	1F	R6107	5L	1G	R6294	8M	1F
			R5938	7J	2G	R6108	4N	1G	R6295	1M	2G
CR5590	5J	1H	R5939	7J	2H	R6109	5N	1G	R6296	1M	1G
CR5960	7D	3G	R5951	7D	3G	R6113	8L	1G	R6297	2M	3H
CR5970A	3C	3G	R5952	8H	2H	R6114	8P	1H	R6298	2M	2G
CR5990A	5E	3F	R5953	8H	2H	R6115	5H	1J	R6299	2M	1G
CR5995A	4E	3F	R5954	8H	2H	R6116	5J	1H	R6300	2M	3H
CR6162A	9J	1H	R5955	8H	2H	R6127	5H	1J			
CR6181	5G	3G	R5956	8H	1H	R6132	9J	1H	TP6004	4M	1G
CR6190A	5C	3F	R5957	8J	1H	R6133	7L	1G	TP6005	9C	3E
CR6273A	2J	3H	R5958	7J	2H	R6134	6L	1G	TP6006	9C	3E
			R5959	7J	2H	R6137	7L	1G	TP6007	8C	2E
J5990	1M	1F	R5960	2L	2G	R6140	3L	2G	TP6008	9C	3E
			R5961	2L	1G	R6164	4N	3F	TP6012	9D	3F
Q5980	3D	3G	R5962	8P	3G	R6165	2J	3H	TP6013	9D	3F
Q5981	3C	3G	R5963	5D	3F	R6166	6M	1F	TP6014	9D	3F
Q5982	3E	3G	R5964	3C	3G	R6170	9J	1H	TP6015	9D	3E
Q5983	4C	3G	R5970	3C	3G	R6172	2J	1H	TP6016	9D	3E
Q5984	5J	1J	R5971	4D	3G	R6180	5J	1H	TP6101	8P	1H
Q6090	4H	3G	R5972	3D	3G	R6181	5G	3G			
Q6091	5H	3H	R5973	3D	3G	R6182	5G	2G	U5930	9F	2F
Q6092	4H	3H	R5980	5D	3F	R6183	5H	3H	U5940	7C	2E
Q6093	5D	3F	R5981	3B	3G	R6184	6G	3G	U5942	8B	3E
Q6180	5H	3G	R5982	3B	3G	R6191	6H	3H	U5950	9D	3F
Q6181	6G	3G	R5983	5C	3G	R6192	5H	3H	U5952	7E	3E
Q6190	6L	1F	R5984	4D	2G	R6193	4B	3G	U5990A	4E	3F
Q6191	6M	1F	R5985	4C	3G	R6194	4B	3F	U5990B	5E	3F
Q6270	6M	1G	R5991	5H	1J	R6195	5L	1G	U5990C	10G	3F
Q6271	8M	1G	R5992	5H	1J	R6197	4G	3H	U6070	6G	3H
Q6272	6L	1G	R5993	5H	1J	R6198	5D	3F	U6140	6N	2E
Q6273	8L	1H	R6042	8P	2G	R6199	5G	3G	U6190	1K	2H
Q6274	9H	1H	R6050	6D	2G	R6245	7P	2F	U6250	4N	3F
Q6290	7L	1G	R6051	6D	3G	R6250	4N	2G	U6252A	9J	1H
Q6291	7M	1F	R6052	2J	2H	R6251	7M	1G	U6290A	4M	1G
Q6292	8P	1H	R6060	6F	3G	R6264	6L	1H	U6290B	4M	1G
			R6062	3L	3F	R6266	8L	1H	U6290C	5M	1G
R5925	3J	1G	R6063	3L	2F	R6267	8M	1G			
R5926	3J	2G	R6082	3E	3H	R6271	9H	1H	W5970	4E	3H
R5930	8H	2H	R6083	3C	3G	R6273	2J	3H	W5980	5E	3H
R5931	7H	2H	R6092	7P	3H	R6274	9H	1H			
Patrial A26 also shown on diagrams 23, 24, and 26.											
OTHER PARTS											
J59	1R	CHASSIS	P5990A	1R	CHASSIS	P5990B	4R	CHASSIS			

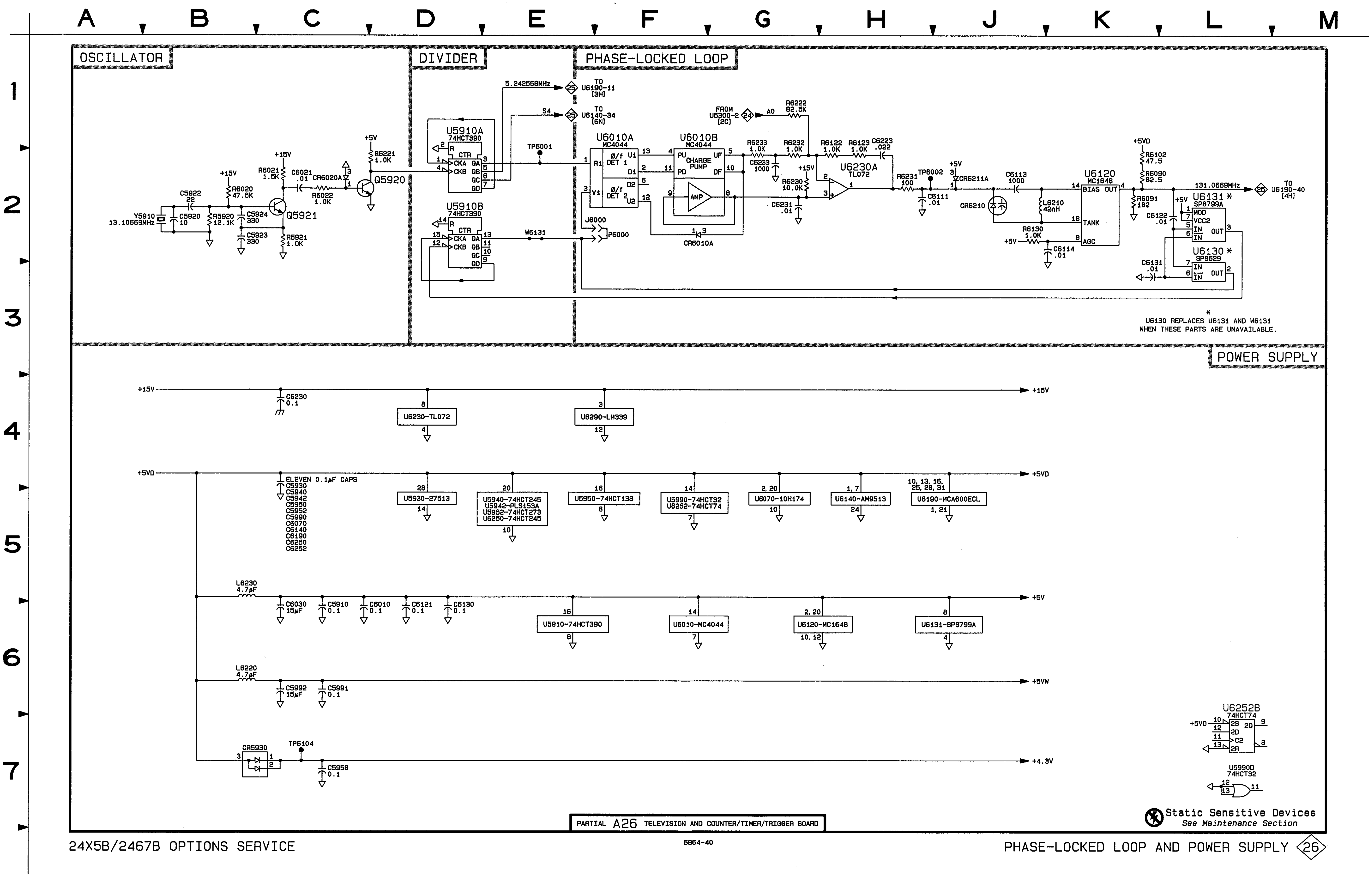


SEE DIAGRAM 26 FOR POWER DISTRIBUTION.
Static Sensitive Devices
See Maintenance Section
WAVEFORMS
LEVEL SHIFTING AND MULTIPLEXING
LEVEL SHIFTING AND MULTIPLEXING
STATUS REGISTER
COMPLEX COUNTER
GATE ARRAY
DATA BUS BUFFER
HW-1
MEMORY AND I/O DECODERS
PAGE D EPROM
NOTE: ** INSTALL ONLY WHEN CTT OPTION IS NOT INCLUDED.
NOTE: * PRESENT ONLY IF WORD RECOGNIZER OPTION IS NOT INCLUDED.
PARTIAL A26 TELEVISION AND COUNTER/TIMER/TRIGGER BOARD
6864-39

COUNTER/TIMER/TRIGGER POWER DISTRIBUTION ⟨26⟩

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
ASSEMBLY A26											
C5910	6C	2J	C6190	5C	3G	R5921	2C	2J	U5942	5E	3E
C5920	2B	2J	C6223	2H	3J	R6020	2B	1J	U5950	5F	3F
C5922	2B	2J	C6230	4C	3H	R6021	2C	2J	U5952	5E	3E
C5923	2B	2J	C6231	2G	3J	R6022	2C	2J	U5990D	7L	3F
C5924	2B	2J	C6233	2G	3J	R6090	2K	2H	U5990	5F	3F
C5930	4C	2F	C6250	5C	3F	R6091	2K	3H	U6010A	2F	2J
C5940	5C	1E	C6252	5C	2D	R6102	2K	2H	U6010B	2F	2J
C5942	5C	3E				R6122	2H	3H	U6010	6F	2J
C5950	5C	2F	CR5930	7C	2H	R6123	2H	3H	U6070	5G	3H
C5952	5C	3E	CR6010A	2F	2J	R6130	2J	3J	U6120	2K	3J
C5958	7C	2H	CR6020A	2C	2J	R6221	2D	2J	U6120	6H	3J
C5990	5C	3G	CR6210	2J	3J	R6222	1G	3H	U6130	2L	2J
C5991	6C	1E	CR6211A	2J	3J	R6230	2G	3J	U6131	2L	2J
C5992	6C	2E				R6231	2H	3H	U6131	6J	2J
C6010	6C	2J	J6000	2F	2J	R6232	2G	3J	U6140	5H	2E
C6021	2C	2J				R6233	2G	2J	U6190	5J	2H
C6030	6C	1J	L6210	2J	3J				U6230A	2H	3H
C6070	5C	3H	L6220	6B	1E	TP6001	2E	2J	U6230	4D	3H
C6111	2H	3J	L6230	5B	1J	TP6002	2H	3J	U6250	5E	3F
C6113	2J	3J				TP6104	7C	1H	U6252B	7L	1H
C6114	2K	3J	P6000	2F	2J				U6252	5F	1H
C6121	6D	3J				U5910A	1D	2J	U6290	4F	1G
C6122	2F	3H	Q5920	2D	2J	U5910B	2D	2J			
C6130	6D	2J	Q5921	2C	2J	U5910	6E	2J	W6131	2E	2J
C6131	3K	2J				U5930	5D	2F			
C6140	5C	3D	R5920	2B	2J	U5940	5E	2E	Y5910	2B	2J

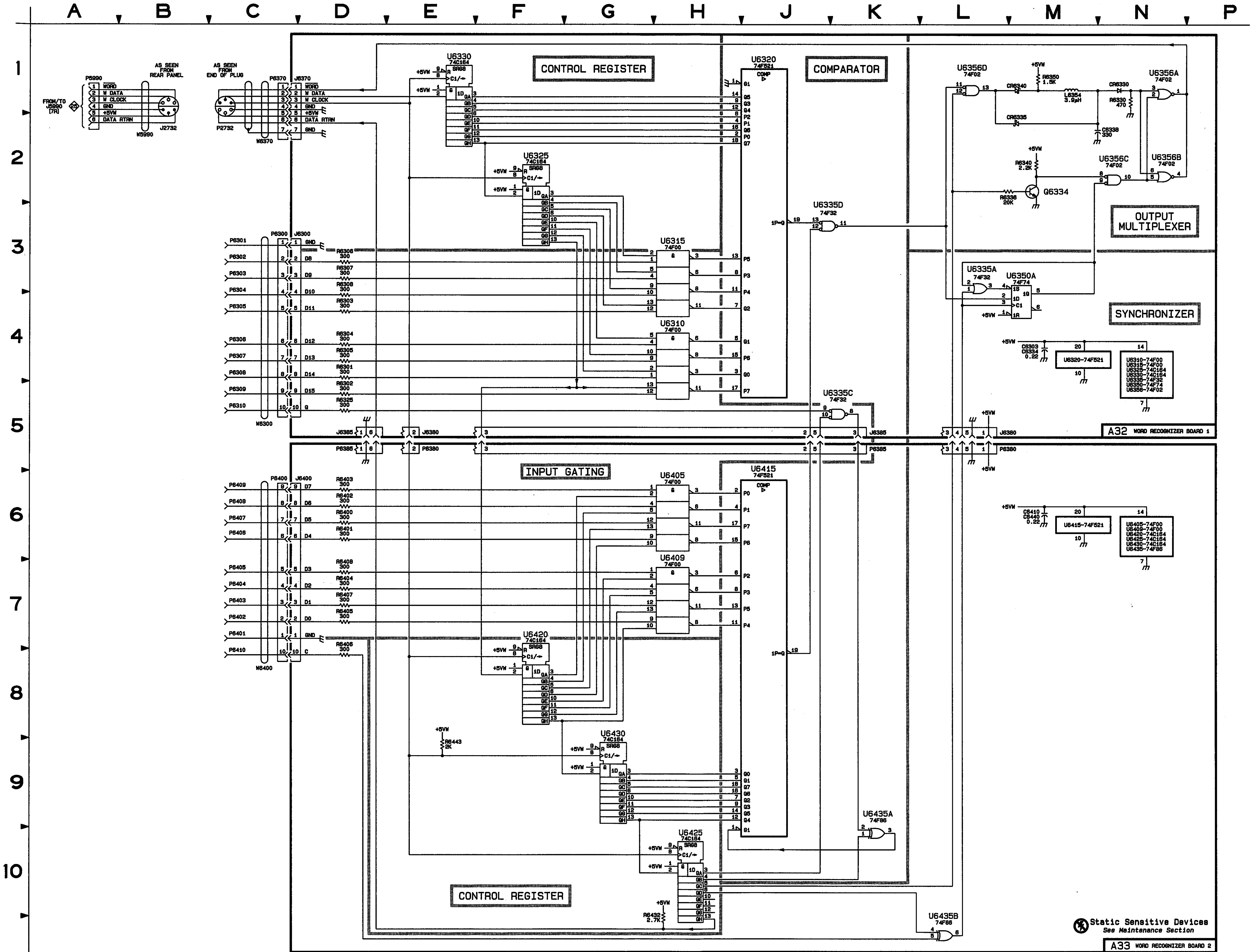
Patrial A26 also shown on diagrams 23, 24, and 25.

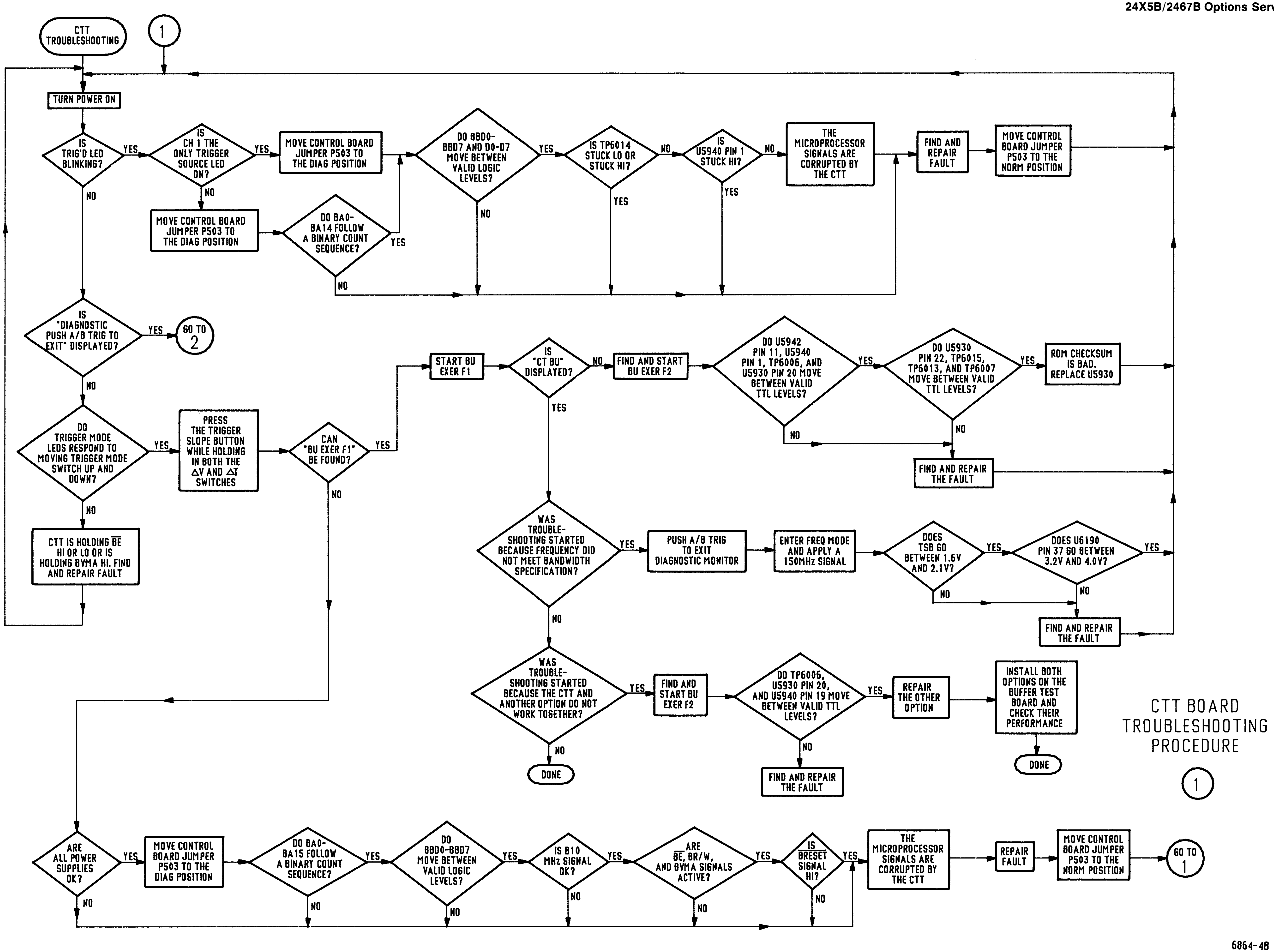

OSCILLATOR
DIVIDER
PHASE-LOCKED LOOP
POWER SUPPLY
U6130 REPLACES U6131 AND W6131 WHEN THESE PARTS ARE UNAVAILABLE.
Static Sensitive Devices
See Maintenance Section
PARTIAL A26 TELEVISION AND COUNTER/TIMER/TRIGGER BOARD

6864-40

WORD RECOGNIZER 27

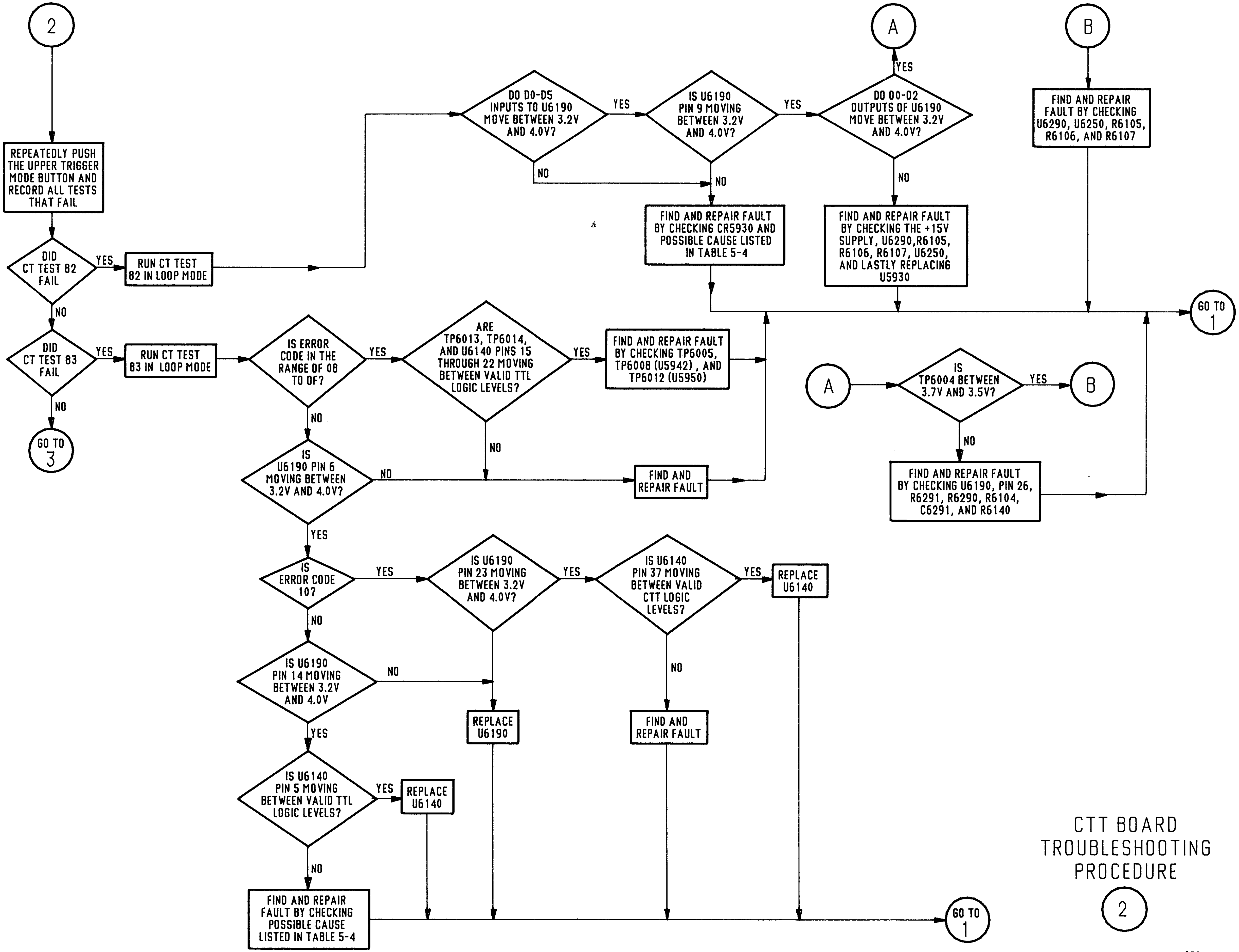
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
ASSEMBLY A32											
C6303	4M	2A	L6354	1M	2C	R6336	2M	2C	U6335A	3L	2B
C6334	4M	1C				R6340	2M	2C	U6335C	5K	2B
C6338	2N	1C	Q6334	2M	2B	R6350	1M	1C	U6335D	3J	2B
									U6335	4N	2B
CR6330	1N	1C	R6301	4D	1A	U6310	4H	1A	U6350A	3M	1C
CR6335	2M	2C	R6302	5D	1A	U6310	4N	1A	U6350	5N	1C
CR6340	1M	2C	R6303	4D	2A	U6315	3H	2A	U6356A	1N	2C
			R6304	4D	1A	U6315	4N	2A	U6356B	2N	2C
J6300	3D	2A	R6305	4D	2A	U6320	1J	1B	U6356C	2N	2C
J6370	1D	2C	R6306	3D	2A	U6320	4M	1B	U6356D	1L	2C
J6380	5E	1C	R6307	3D	2A	U6325	2F	2B	U6356	5N	2C
J6380	5L	1C	R6308	3D	2A	U6325	4N	2B			
J6385	5D	2C	R6325	5D	2B	U6330	1E	1B			
J6385	5K	2C	R6330	1N	1C	U6330	4N	1B			
ASSEMBLY A33											
C6410	6M	3B	R6400	6D	3A	R6443	9E	4C	U6425	10H	4B
C6440	6M	4C	R6401	6D	4A				U6425	6N	4B
			R6402	6D	3A	U6405	6H	3A	U6430	6N	3C
J6400	6D	4A	R6403	6D	3A	U6405	6N	3A	U6430	9G	3C
			R6404	7D	4A	U6409	6N	4A	U6435A	10K	4C
P6380	5E	4C	R6405	7D	4A	U6409	7H	4A	U6435B	11L	4C
P6380	5L	4C	R6406	8D	4A	U6415	6J	4B	U6435	6N	4C
P6385	5D	3C	R6407	7D	4A	U6415	6M	4B			
P6385	5K	3C	R6408	7D	4A	U6420	6N	3B			
			R6432	10H	4C	U6420	7F	3B			
OTHER PARTS											
J2732	2B	CHASSIS	P6304	4C	CHASSIS	P6400	6C	CHASSIS	P6408	6C	CHASSIS
			P6305	4C	CHASSIS	P6401	7C	CHASSIS	P6409	6C	CHASSIS
P2732	2C	CHASSIS	P6306	4C	CHASSIS	P6402	7C	CHASSIS	P6410	8C	CHASSIS
P5990	1A	CHASSIS	P6307	4C	CHASSIS	P6403	7C	CHASSIS			
P6300	3C	CHASSIS	P6308	4C	CHASSIS	P6404	7C	CHASSIS	W5990	2B	CHASSIS
P6301	3C	CHASSIS	P6309	5C	CHASSIS	P6405	7C	CHASSIS	W6300	5C	CHASSIS
P6302	3C	CHASSIS	P6310	5C	CHASSIS	P6406	6C	CHASSIS	W6370	2C	CHASSIS
P6303	3C	CHASSIS	P6370	1C	CHASSIS	P6407	6C	CHASSIS			


CONTROL REGISTER
COMPARATOR
OUTPUT MULTIPLEXER
SYNCHRONIZER
INPUT GATING
CONTROL REGISTER
AS SEEN FROM REAR PANEL
AS SEEN FROM END OF PLUG
FROM/TO J5990 (7R)
WORD
W DATA
W CLOCK
GND
+5VW
DATA RTRN
U6330 74C164
U6325 74C164
U6320 74F521
U6315 74F00
U6310 74F00
U6335D 74F32
U6335A 74F32
U6335C 74F32
U6350A 74F74
U6356D 74F02
U6356A 74F02
U6356C 74F02
U6356B 74F02
Q6334
U6405 74F00
U6409 74F00
U6415 74F521
U6420 74C164
U6430 74C164
U6425 74C164
U6435A 74F86
U6435B 74F86
A32 WORD RECOGNIZER BOARD 1
A33 WORD RECOGNIZER BOARD 2
Static Sensitive Devices
See Maintenance Section



CTT BOARD TROUBLESHOOTING PROCEDURE

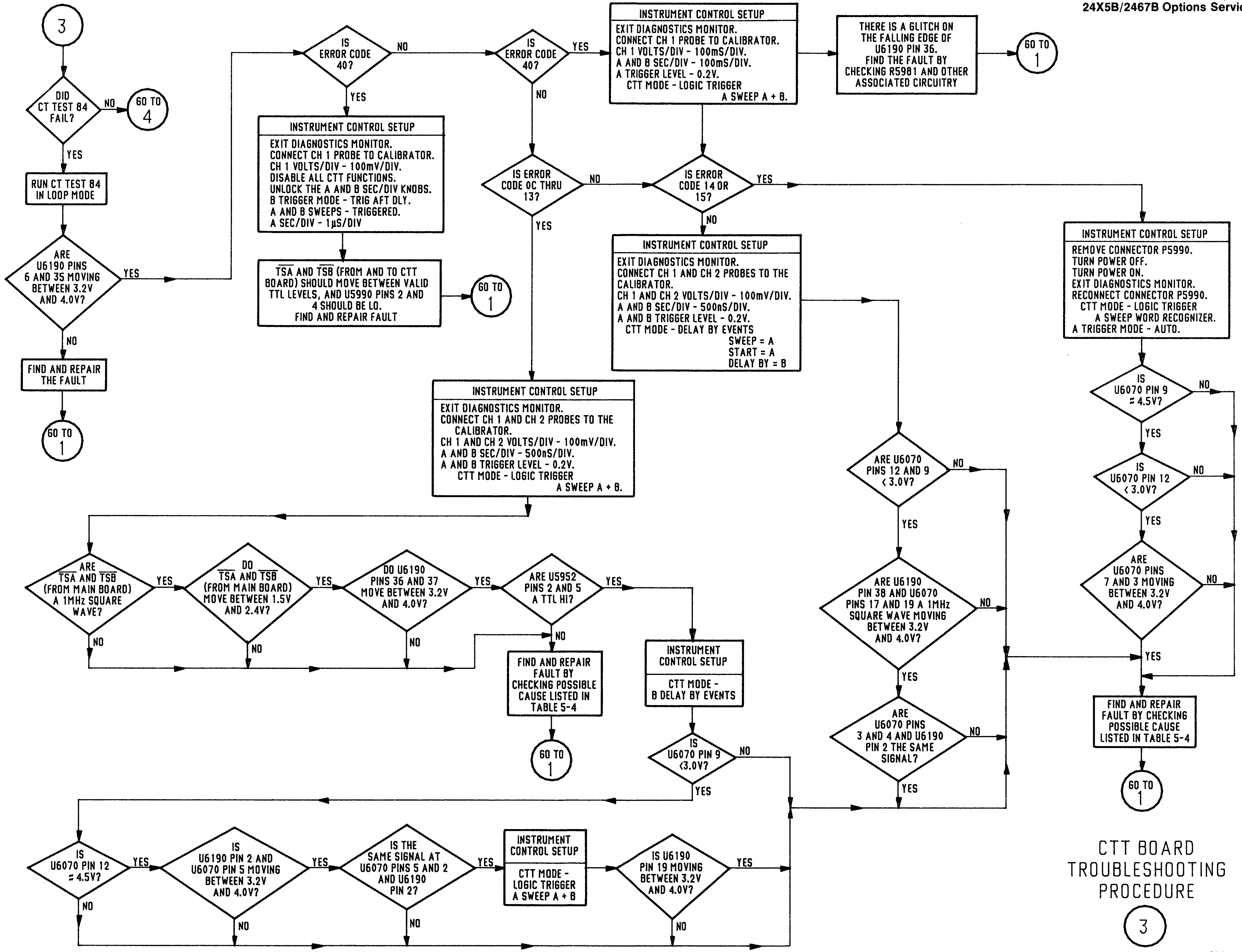
1



CTT BOARD TROUBLESHOOTING PROCEDURE

2

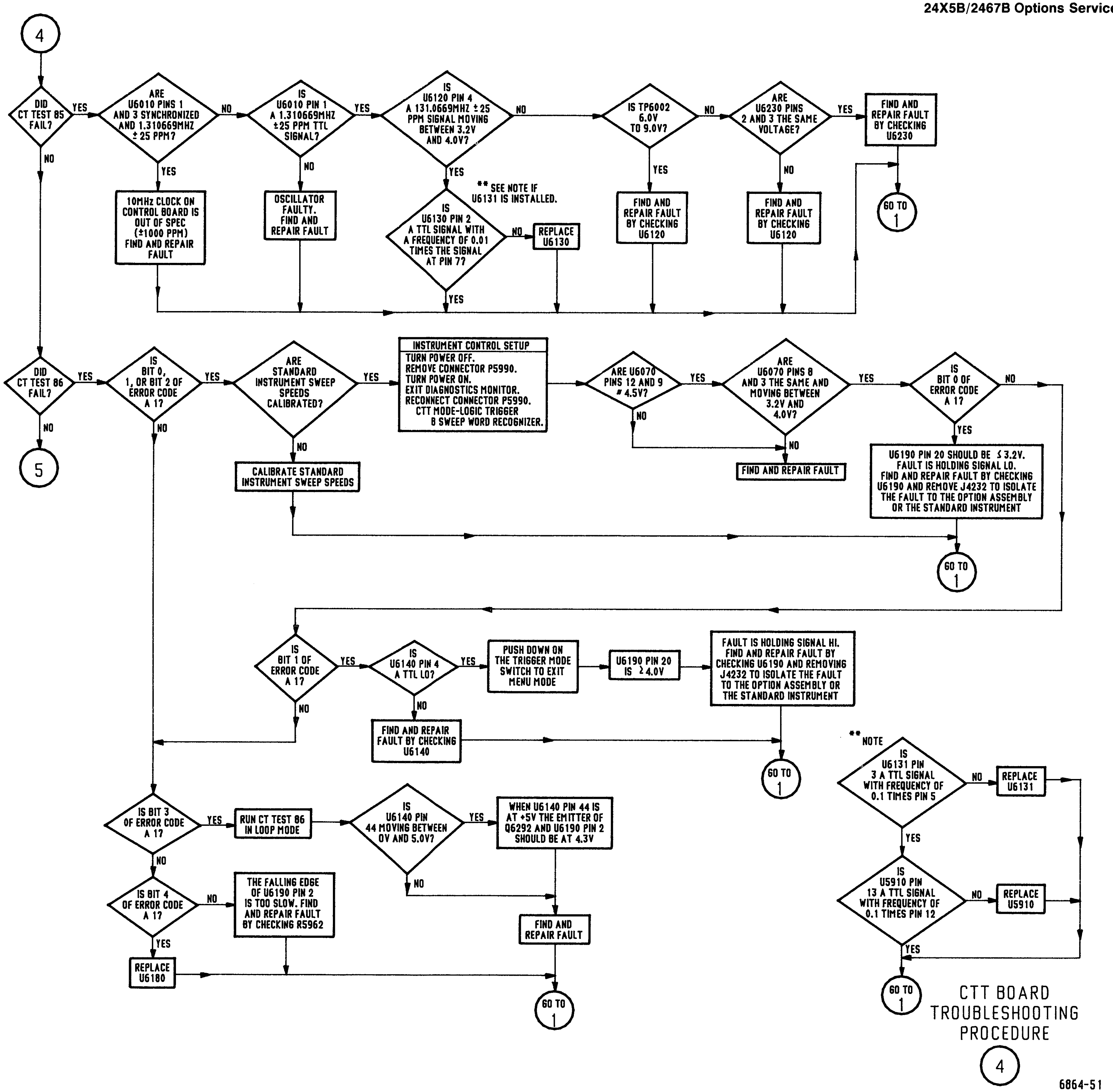
6864-49



CTT BOARD TROUBLESHOOTING PROCEDURE

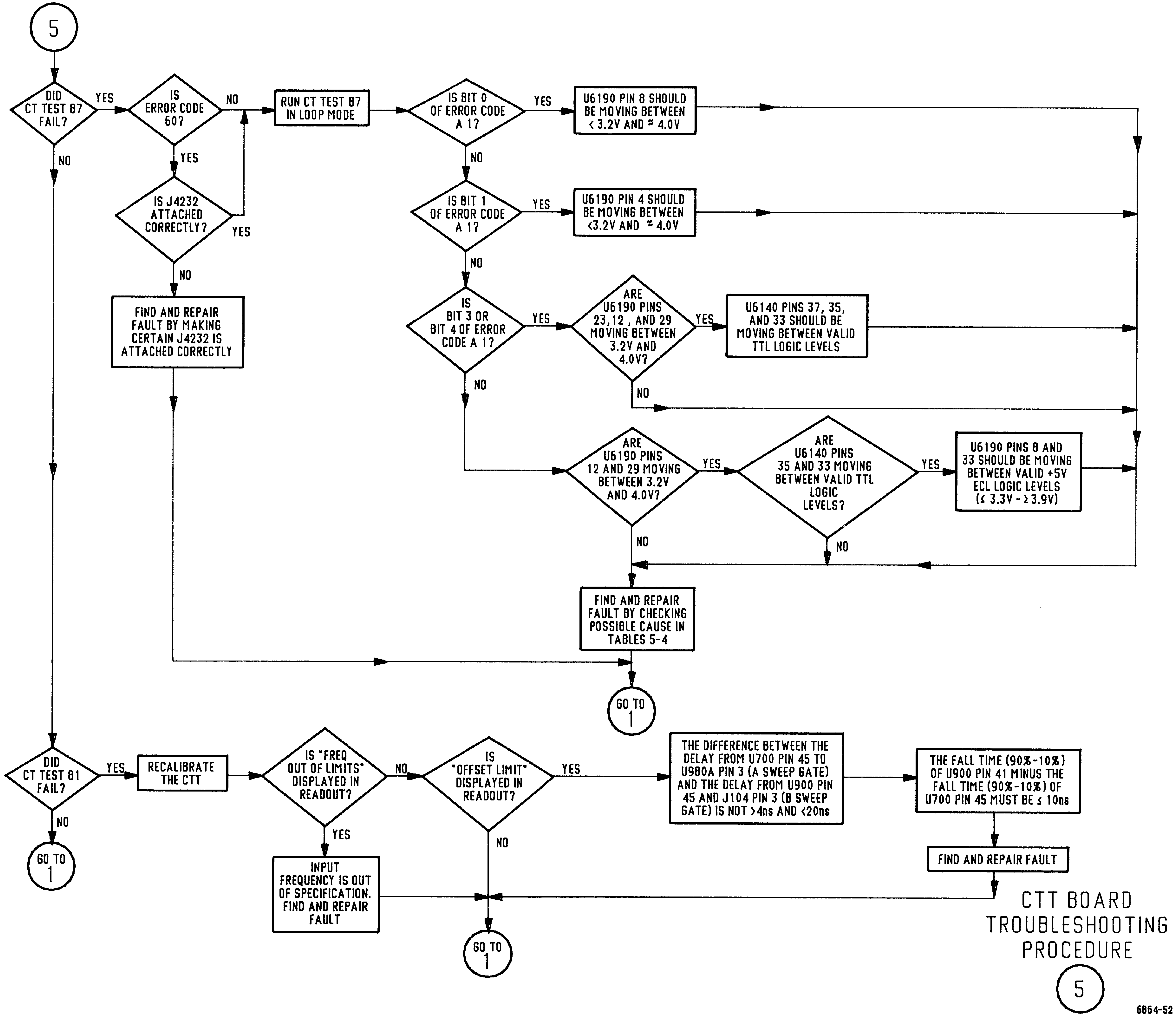
3

6864-50



CTT BOARD TROUBLESHOOTING PROCEDURE

4



CTT BOARD TROUBLESHOOTING PROCEDURE 5

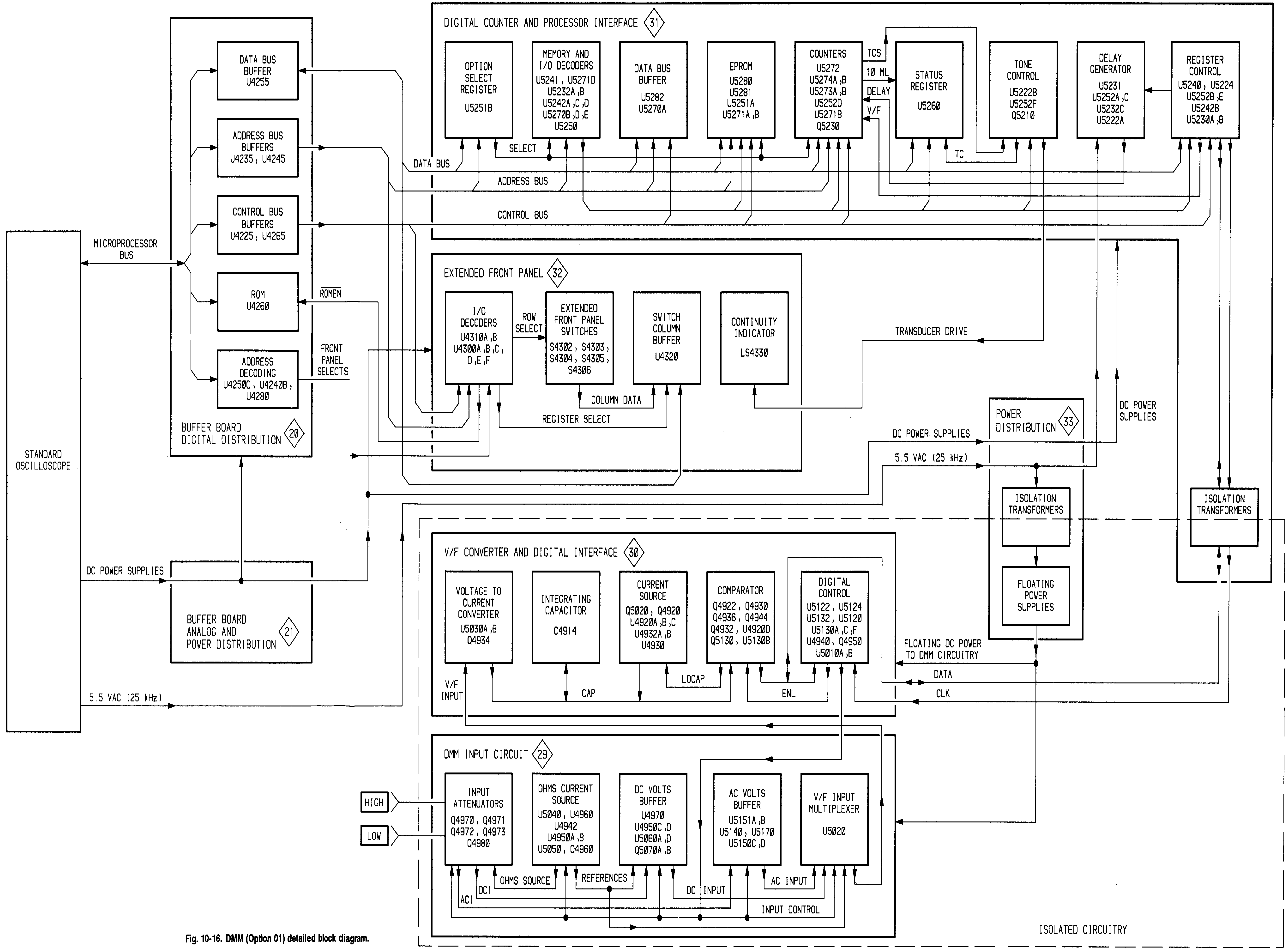


Fig. 10-16. DMM (Option 01) detailed block diagram.

4182-12A

A29—DMM BOARD

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C4910	32	CR5130	29	Q4972	28	R5036	29	R5252	30	U5151	32
C4911	29	CR5163	28	Q4973	28	R5039	29	R5270	30	U5170	28
C4912	29	CR5164	28	Q4980	28	R5041	29	R5271	30	U5222	30
C4913	29	CR5170	28	Q5020	29	R5042	29			U5222	32
C4914	29	CR5210	30	Q5070	28	R5043	29	RT4980	28	U5224	30
C4915	32	CR5211	30	Q5124	29	R5044	28	RT5180	28	U5224	32
C4932	32	CR5212	30	Q5130	29	R5045	28			U5230	30
C4960	28	CR5221	30	Q5210	30	R5047	29	T5210	32	U5230	32
C4961	32			Q5230	30	R5048	28	T5230	30	U5231	30
C4962	32	DS5210	30			R5049	28			U5231	32
C4963	32			R4910	29	R5054	28	TP4910	32	U5232	30
C5015	29	E1	28	R4911	29	R5055	28	TP4960	28	U5232	32
C5020	29	E2	28	R4913	29	R5056	28	TP4980	28	U5240	30
C5031	29	E3	28	R4914	29	R5057	28	TP5140	28	U5240	32
C5050	32	E4	28	R4915	29	R5058	28	TP5210	32	U5241	30
C5051	28	E5	28	R4916	29	R5060	28	TP5270	30	U5241	32
C5052	32	E6	28	R4917	29	R5063	28	TP5271	32	U5242	30
C5060	28	E7	28	R4920	29	R5064	28	TP5290	30	U5242	32
C5070	28	E8	28	R4921	29	R5066	28			U5250	30
C5071	28	E9	28	R4922	29	R5070	28	U4920	29	U5250	32
C5110	32	E10	28	R4923	29	R5071	28	U4920	32	U5251	30
C5111	32	E11	28	R4924	29	R5072	28	U4930	29	U5251	32
C5112	32	E12	28	R4925	29	R5073	28	U4930	32	U5252	30
C5122	29	E13	28	R4926	29	R5075	28	U4932	29	U5252	32
C5124	29	E14	28	R4927	29	R5080	28	U4932	32	U5260	30
C5130	29	E15	28	R4930	29	R5081	28	U4940	29	U5260	32
C5134	29	E16	28	R4932	29	R5082	28	U4940	32	U5270	30
C5140	28	E17	28	R4934	29	R5083	28	U4942	28	U5270	32
C5142	32	E18	28	R4950	29	R5090	28	U4942	32	U5271	30
C5150	28			R4951	28	R5122	29	U4944	29	U5271	32
C5151	32	F4990	28	R4952	28	R5124	29	U4950	28	U5272	30
C5152	28	F5220	32	R4953	29	R5130	29	U4950	32	U5272	32
C5153	32			R4954	29	R5131	28	U4960	28	U5273	30
C5155	28	J4990	28	R4955	29	R5132	29	U4960	32	U5273	32
C5160	28	J4991	28	R4957	28	R5133	29	U4970	28	U5274	30
C5170	28	J5090	28	R4958	28	R5134	29	U4970	32	U5274	32
C5171	28	J5210	30	R4960	28	R5150	28	U5010	29	U5280	30
C5220	32	J5220	32	R4970	28	R5151	28	U5010	32	U5280	32
C5222	30	J5290	30	R4971	28	R5167	28	U5020	28	U5281	30
C5224	30	J5290	32	R4972	28	R5168	28	U5020	32	U5281	32
C5230	32	J5291	30	R4973	28	R5170	28	U5030	29	U5282	30
C5231	32	J5291	32	R4974	28	R5171	28	U5030	32	U5282	32
C5232	30			R4975	28	R5172	28	U5040	28		
C5250	32	K4980	28	R4976	28	R5173	28	U5040	32	VR5010	32
C5251	32	K4981	28	R4977	28	R5174	28	U5050	28	VR5020	29
C5280	32	K4990	28	R4978	28	R5176	28	U5060	28	VR5031	29
C5281	32	K5090	28	R4979	28	R5177	28	U5060	32	VR5160	28
C5290	32	K5091	28	R4980	28	R5181	28	U5110	32	VR5162	28
		K5180	28	R5010	29	R5182	28	U5112	32	VR5210	30
CR4952	28	K5190	28	R5011	29	R5190	28	U5120	29		
CR4970	28	K5191	28	R5012	32	R5191	28	U5120	32	W4980	28
CR4971	28			R5013	28	R5210	30	U5122	29	W5070	28
CR4980	28	Q4920	29	R5014	28	R5211	30	U5122	32	W5075	28
CR4981	28	Q4922	29	R5015	29	R5212	32	U5124	29	W5080	28
CR4982	28	Q4930	29	R5016	29	R5220	30	U5124	32	W5085	28
CR5030	29	Q4932	29	R5017	29	R5221	30	U5130	29	W5260	30
CR5031	29	Q4934	29	R5020	29	R5222	30	U5130	32		
CR5110	32	Q4936	29	R5021	29	R5224	30	U5132	29	Y4910	29
CR5111	32	Q4950	29	R5030	29	R5230	30	U5140	28		
CR5112	32	Q4952	28	R5032	29	R5231	30	U5140	32		
CR5113	32	Q4960	28	R5033	29	R5232	30	U5150	28		
CR5114	32	Q4970	28	R5034	29	R5233	30	U5150	32		
CR5115	32	Q4971	28	R5035	29	R5251	30	U5151	28		

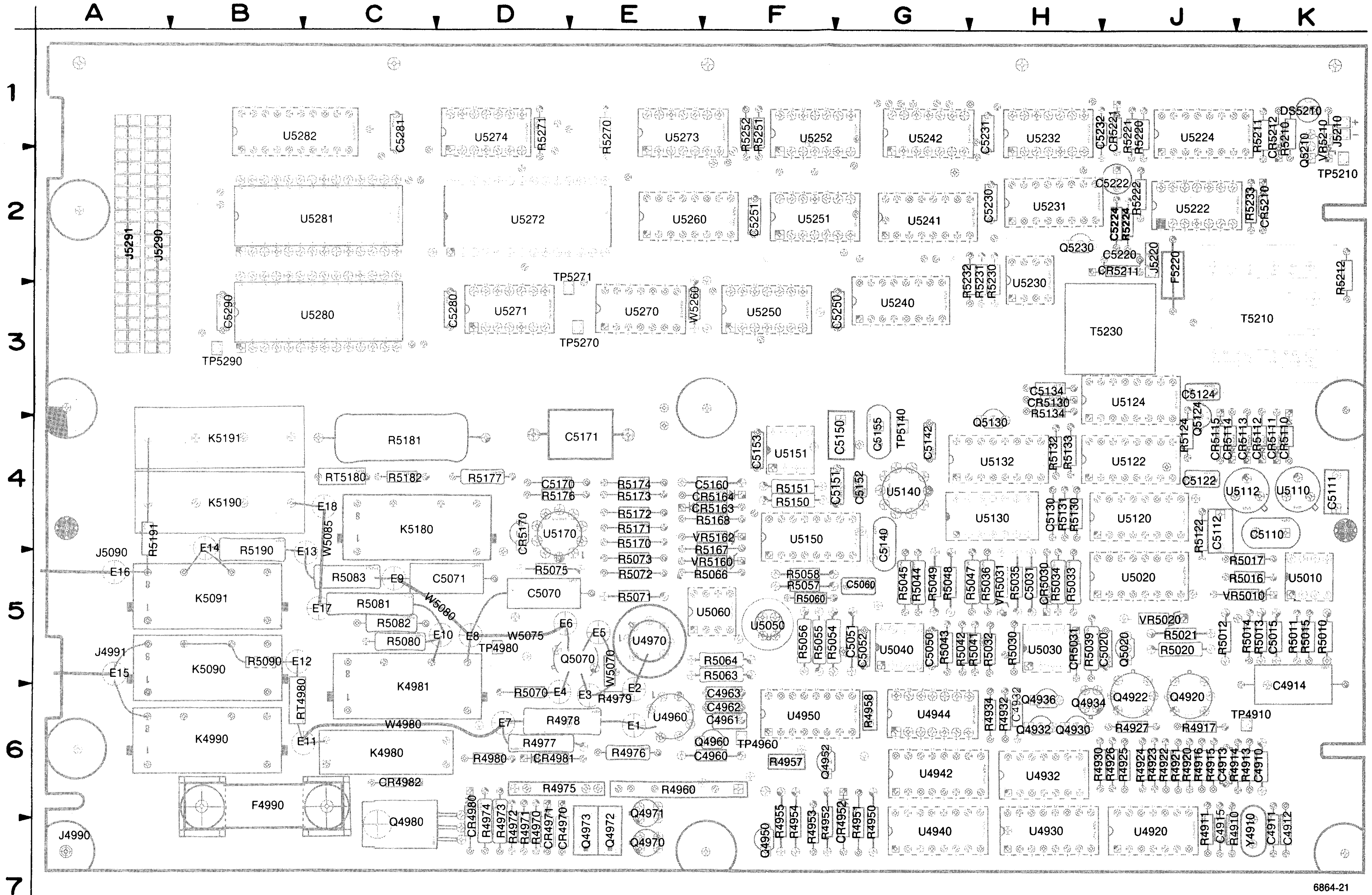


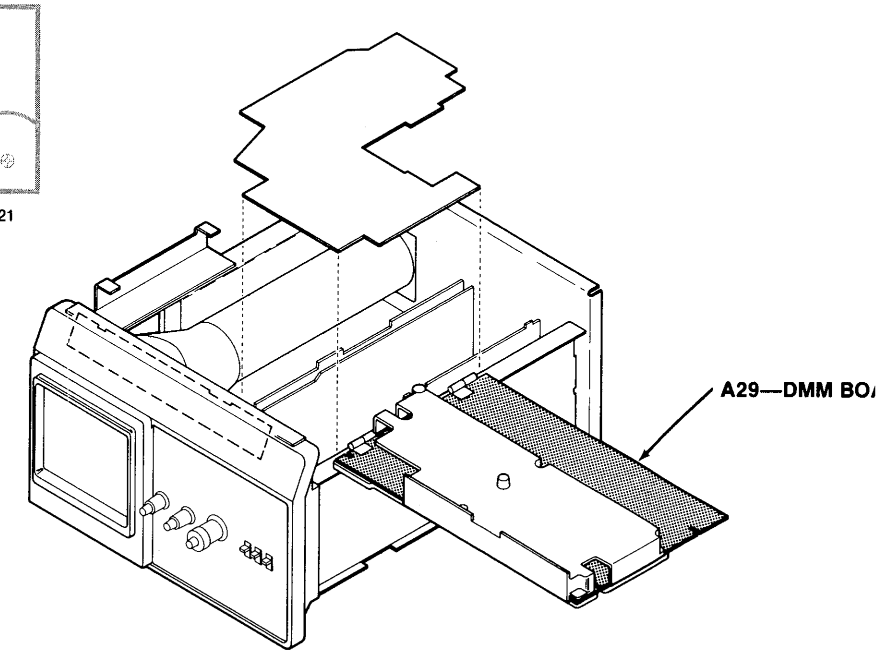
Figure 10-17. A29—DMM board.

Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE

Component Number
A23 A2 R1234
Assembly Number — Subassembly Number (if used) — Schematic Circuit Number

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.



DMM INPUT CIRCUIT 28

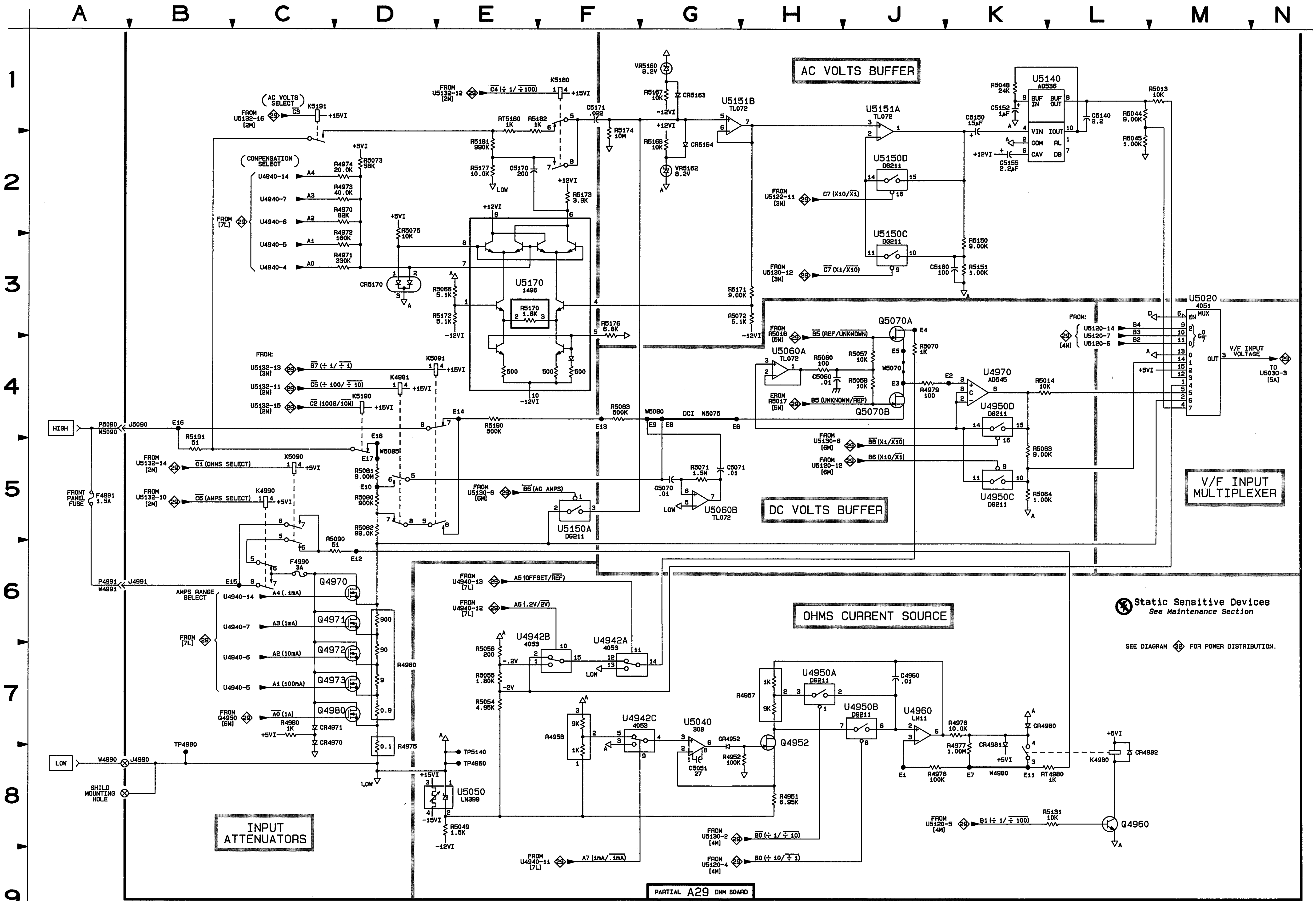
ASSEMBLY A29

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C4960	7J	6F				R4980	7C	6D	R5191	5B	4A
C5051	8G	5G	F4990	6C	6B	R5013	1M	5K			
C5060	4H	5G				R5014	4K	5K	RT4980	8L	6C
C5070	5G	5D	J4990	8B	7A	R5044	1L	5G	RT5180	1E	4C
C5071	5G	5D	J4991	6B	5A	R5045	2L	5G			
C5140	1L	4G	J5090	4B	5A	R5048	1K	5G	TP4960	8E	6F
C5150	1K	4G				R5049	8E	5G	TP4980	8B	5D
C5152	1K	4G	K4980	8L	6C	R5054	7E	5F	TP5140	8E	4G
C5155	2K	4G	K4981	4B	6C	R5055	7E	5F			
C5160	3K	4F	K4990	5C	6B	R5056	7E	5F	U4942A	7F	6G
C5170	2E	4D	K5090	5C	5B	R5057	4J	5F	U4942B	7F	6G
C5171	1F	4E	K5091	4B	5B	R5058	4J	5F	U4942C	7F	6G
			K5180	1F	4C	R5060	4H	5G	U4950A	7H	6F
CR4952	7G	7G	K5190	4B	4B	R5063	5K	5F	U4950B	7J	6F
CR4970	7C	7D	K5191	1C	4B	R5064	5K	5F	U4950C	5K	6F
CR4971	7C	7D				R5066	3E	5F	U4950D	4K	6F
CR4980	7K	7D	Q4952	7H	6F	R5070	4J	6D	U4960	7J	6E
CR4981	7K	6D	Q4960	8L	6F	R5071	5G	5E	U4970	4K	5E
CR4982	8L	6C	Q4970	6D	7E	R5072	3H	5E	U5020	3M	5J
CR5163	1G	4F	Q4971	6D	6E	R5073	2D	5E	U5040	7G	5G
CR5164	2G	4F	Q4972	7D	7E	R5075	2D	5D	U5050	8E	5F
CR5170	3D	4D	Q4973	7D	7E	R5080	5D	5C	U5060A	4H	5F
			Q4980	7D	7C	R5081	5D	5C	U5060B	5G	5F
E1	8J	6E	Q5070A	3J	5E	R5082	5D	5C	U5140	1K	4G
E2	4K	6E	Q5070B	4J	5E	R5083	4F	5C	U5150A	5F	4F
E3	4J	6E				R5090	6C	5B	U5150C	3J	4F
E4	3J	6D	R4951	8H	7G	R5131	8L	4H	U5150D	2J	4F
E5	4J	5E	R4952	8H	7F	R5150	3K	4F	U5151A	1J	4F
E6	4G	5E	R4957	7H	6F	R5151	3K	4F	U5151B	1G	4F
E7	8K	6D	R4958	7F	6G	R5167	1G	4F	U5170	3E	4D
E8	4G	5D	R4960	7D	6E	R5168	2G	4F			
E9	4G	5C	R4970	2D	7D	R5170	3E	4E	VR5160	1G	5F
E10	5D	5D	R4971	3D	7D	R5171	3H	4E	VR5162	2G	4F
E11	8K	6C	R4972	3D	7D	R5172	3E	4E			
E12	6D	5C	R4973	2D	7D	R5173	2F	4E	W4980	8K	6C
E13	4F	5C	R4974	2D	7D	R5174	1F	4E	W5070	4J	5E
E14	4E	4B	R4975	8D	6D	R5176	3F	4D	W5075	4G	5D
E15	6C	5A	R4976	7K	6E	R5177	2E	4D	W5080	4G	5D
E16	4B	5A	R4977	8K	6D	R5181	2E	4C	W5085	5D	4C
E17	5D	5C	R4978	8J	6D	R5182	1E	4C			
E18	5D	4C	R4979	4J	6E	R5190	4E	4B			

Patrial A29 also shown on diagrams 29, 30, and 32.

OTHER PARTS

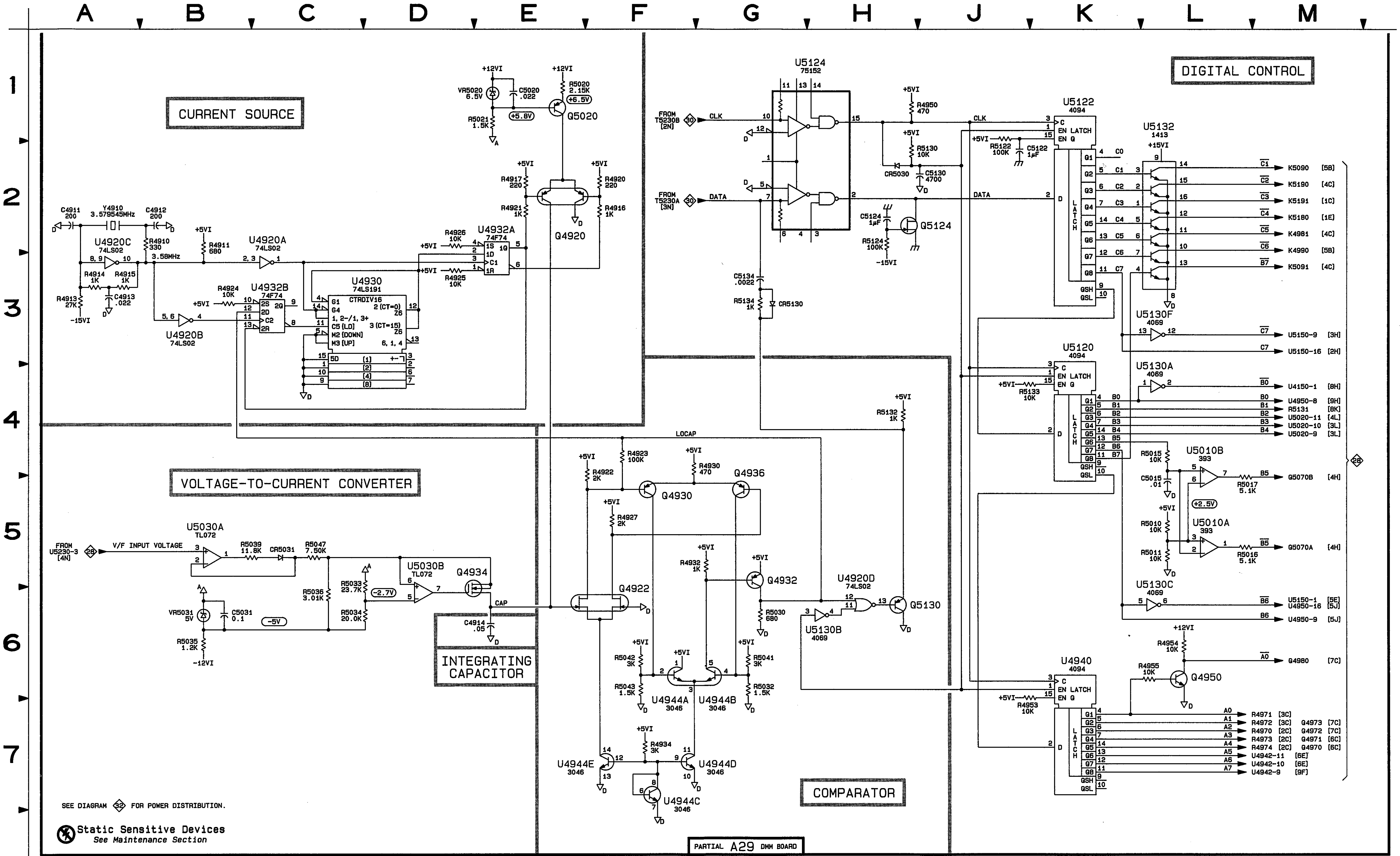
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
F4991	5A	CHASSIS	P4991	6A	CHASSIS				W4991	6A	CHASSIS
			P5090	4A	CHASSIS	W4990	8A	CHASSIS	W5090	4A	CHASSIS


AC VOLTS BUFFER
DC VOLTS BUFFER
OHMS CURRENT SOURCE
V/F INPUT MULTIPLEXER
INPUT ATTENUATORS
PARTIAL A29 DMM BOARD
Static Sensitive Devices
See Maintenance Section
SEE DIAGRAM 32 FOR POWER DISTRIBUTION.
HIGH
LOW
FRONT PANEL FUSE
SHILD MOUNTING HOLE
U5170 1496
U5151B TL072
U5151A TL072
U5140 AD536
U5020 4051
U4970 AD545
U5060A TL072
U5060B TL072
U5050 LM399
U5040 308
U4960 LM11
Q5070A
Q5070B
Q4952
Q4960
Q4970
Q4971
Q4972
Q4973
Q4980

DMM V/F CONVERTER AND DIGITAL CONTROL 29

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
ASSEMBLY A29											
C4911	2A	7K				R5016	5L	5K	U4932A	2E	6H
C4912	2B	7K	R4910	2B	7J	R5017	5L	5K	U4932B	3C	6H
C4913	3A	6J	R4911	2B	7J	R5020	1E	5J	U4940	6K	7G
C4914	6E	5K	R4913	3A	6K	R5021	1E	5J	U4944A	6F	6G
C5015	5L	5K	R4914	3A	6J	R5030	6G	5H	U4944B	6G	6G
C5020	1E	5J	R4915	3A	6J	R5032	6G	5H	U4944C	7F	6G
C5031	6B	5H	R4916	2F	6J	R5033	5D	5H	U4944D	7F	6G
C5122	2J	4J	R4917	2E	6J	R5034	6D	5H	U4944E	7F	6G
C5124	2H	3J	R4920	2F	6J	R5035	6B	5H	U5010A	5L	5K
C5130	2J	4H	R4921	2E	6J	R5036	6C	5H	U5010B	4L	5K
C5134	3G	3H	R4922	4F	6J	R5039	5B	5H	U5030A	5B	5H
			R4923	4F	6J	R5041	6G	5H	U5030B	5D	5H
CR5030	2H	5H	R4924	3B	6J	R5042	6F	5G	U5120	3K	4J
CR5031	5C	5H	R4925	3D	6J	R5043	6F	5G	U5122	1K	4J
CR5130	3G	3H	R4926	2D	6J	R5047	5C	5H	U5124	1G	3J
			R4927	5F	6J	R5122	1J	4J	U5130A	4L	4H
Q4920	2E	6J	R4930	4F	6J	R5124	2H	4J	U5130B	6H	4H
Q4922	6F	6J	R4932	5G	6H	R5130	2H	4H	U5130C	6L	4H
Q4930	5F	6H	R4934	7F	6H	R5132	4H	4H	U5130F	3L	4H
Q4932	5G	6H	R4950	1H	7G	R5133	4J	4H	U5132	2L	4H
Q4934	5D	6H	R4953	6J	7F	R5134	3G	3H			
Q4936	5G	6H	R4954	6L	7F				VR5020	1E	5J
Q4950	6L	7F	R4955	6L	7F	U4920B	3B	7J	VR5031	6B	5H
Q5020	1E	5J	R5010	5L	5K	U4920C	3A	7J			
Q5124	2H	4J	R5011	5L	5K	U4920D	6H	7J	Y4910	2A	7K
Q5130	6H	4H	R5015	4L	5K	U4930	3C	7H			

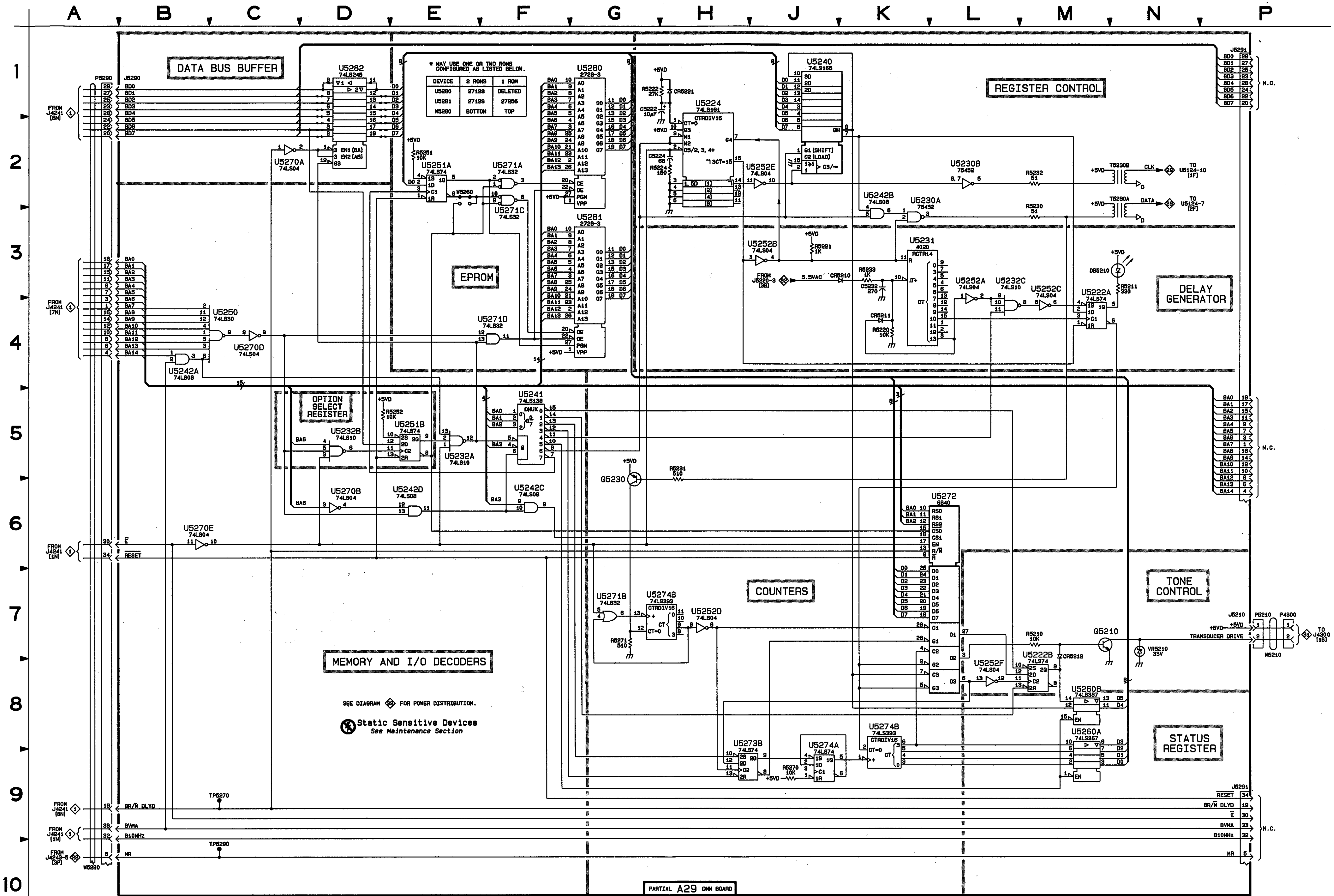
Patrial A29 also shown on diagrams 28, 30, and 32.



DMM V/F CONVERTER AND DIGITAL CONTROL 29

DMM DIGITAL COUNTER AND PROCESSOR INTERFACE 30

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
ASSEMBLY A29											
C5222	1H	2J	R5221	3J	1J	U5230B	2L	2H	U5260B	8M	2E
C5224	2H	2J	R5222	1H	2J	U5231	3K	2H	U5270A	2C	3E
C5232	3K	1H	R5224	2H	2J	U5232A	5E	1H	U5270B	6D	3E
			R5230	3M	2H	U5232B	5D	1H	U5270D	4C	3E
CR5210	3K	2K	R5231	6H	2H	U5232C	4L	1H	U5270E	6B	3E
CR5211	4K	2J	R5232	2M	2H	U5240	1J	3G	U5271A	2F	3D
CR5212	7M	1K	R5233	3K	2K	U5241	5F	2G	U5271B	7G	3D
CR5221	1H	1J	R5251	2E	1F	U5242A	4B	1G	U5271C	2F	3D
			R5252	5D	1F	U5242B	3K	1G	U5271D	4F	3D
DS5210	3N	1K	R5270	9J	1E	U5242C	6F	1G	U5272	6L	2D
			R5271	7G	1D	U5242D	6E	1G	U5273B	9H	1E
J5210	7P	1K				U5250	4C	3F	U5274A	9J	1D
J5290	1B	2A	T5230A	2N	3J	U5251A	2E	2F	U5274B	7G	1D
J5291	1P	2A	T5230B	2N	3J	U5251B	5E	2F	U5274B	8K	1D
J5291	9P	2A				U5252A	3L	1F	U5280	1G	3C
			TP5270	9C	3E	U5252A	4L	1F	U5281	3G	2C
Q5210	7M	1K	TP5290	10C	3B	U5252B	3J	1F	U5282	1D	1B
Q5230	6G	2H				U5252C	4M	1F			
			U5222A	4M	2J	U5252D	7H	1F	VR5210	7N	1K
R5210	7M	1K	U5222B	8M	2J	U5252E	2J	1F			
R5211	3N	1K	U5224	1H	1J	U5252F	8L	1F	W5260	2E	3F
R5220	4K	1J	U5230A	3K	2H	U5260A	8M	2E			
Patrial A29 also shown on diagrams 28, 29, and 32.											
OTHER PARTS											
P4300	7P	CHASSIS	P5290	1A	CHASSIS	W5210	7P	CHASSIS			
P5210	7P	CHASSIS				W5290	10A	CHASSIS			


DATA BUS BUFFER
REGISTER CONTROL
EPROM
DELAY GENERATOR
OPTION SELECT REGISTER
COUNTERS
TONE CONTROL
MEMORY AND I/O DECODERS
STATUS REGISTER
SEE DIAGRAM 32 FOR POWER DISTRIBUTION.
Static Sensitive Devices
See Maintenance Section
* MAY USE ONE OR TWO ROMS CONFIGURED AS LISTED BELOW.
DEVICE | 2 ROMS | 1 ROM
U5280 | 27128 | DELETED
U5281 | 27128 | 27256
W5260 | BOTTOM | TOP
PARTIAL A29 DMM BOARD

6864-44

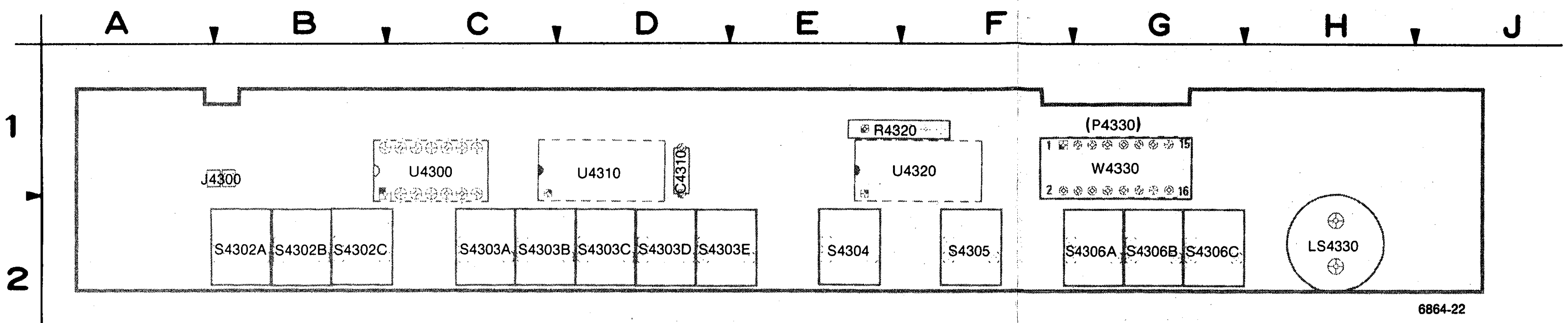
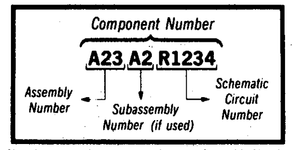


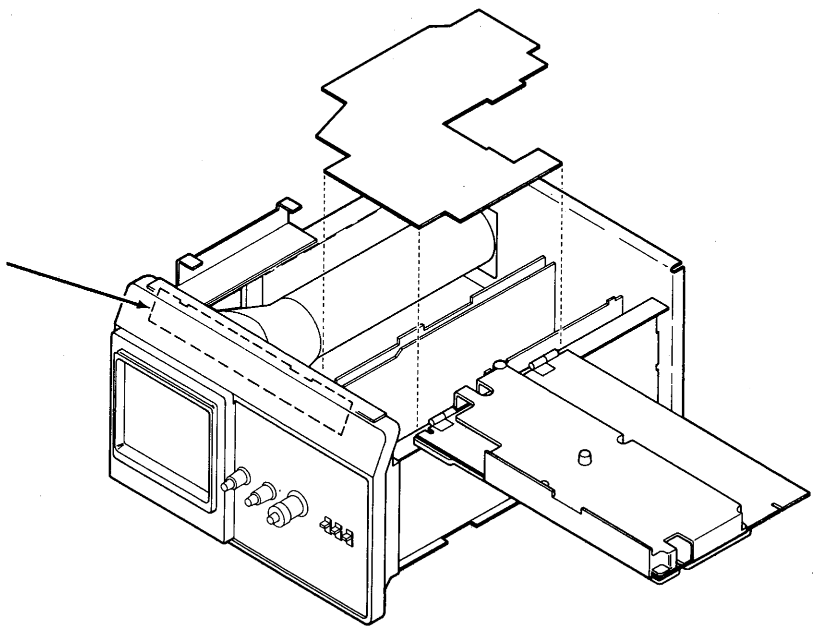
Figure 10-18. A30—Extended Front Panel board.

Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

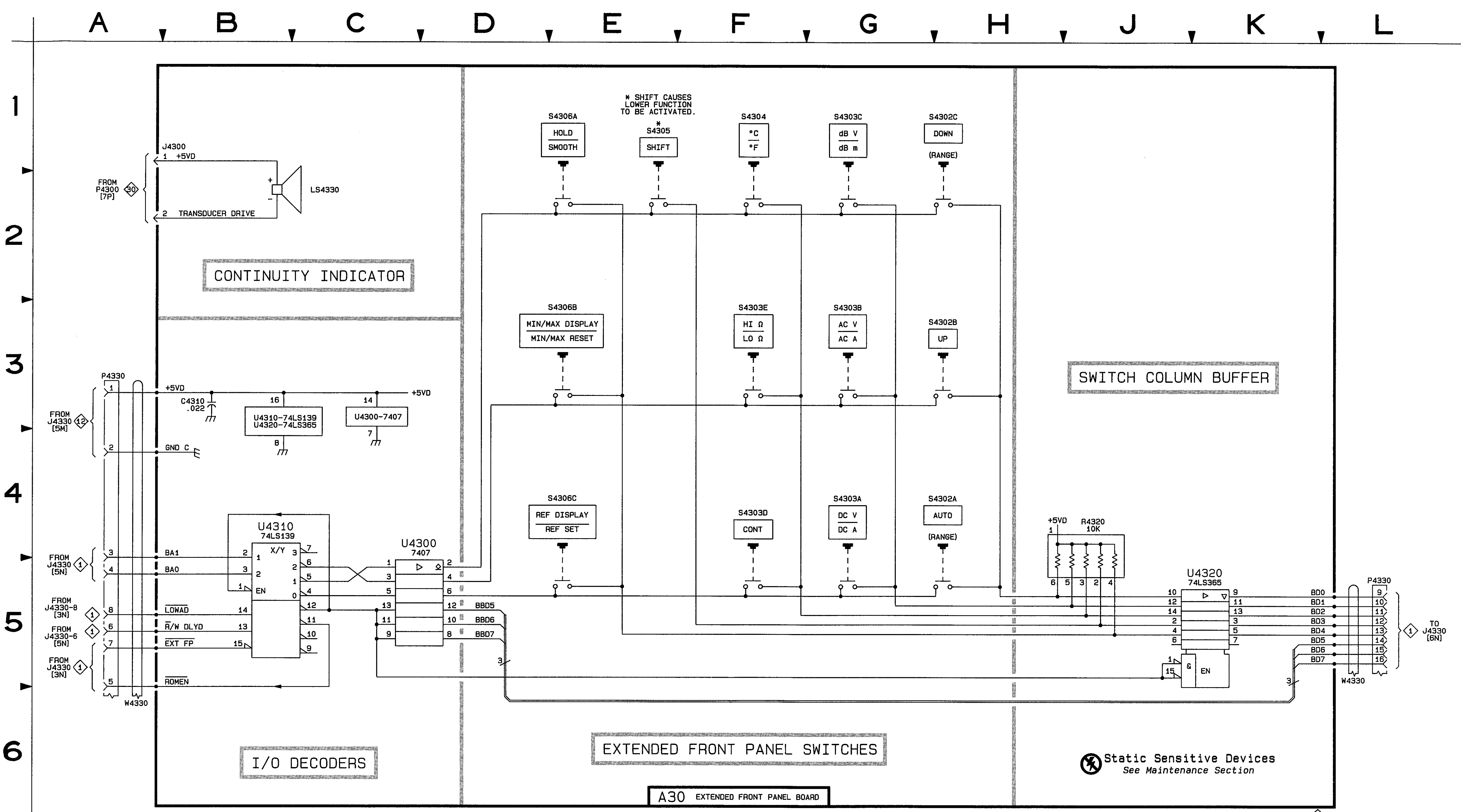


A30—EXTENDED FRONT PANEL BOARD

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C4310	31	P4330	31	S4304	31	U4320	31
				S4305	31		
J4300	31	R4320	31	S4306	31	W4330	31
LS4330	31	S4302	31	U4300	31		
		S4303	31	U4310	31		

DMM EXTENDED FRONT PANEL 31

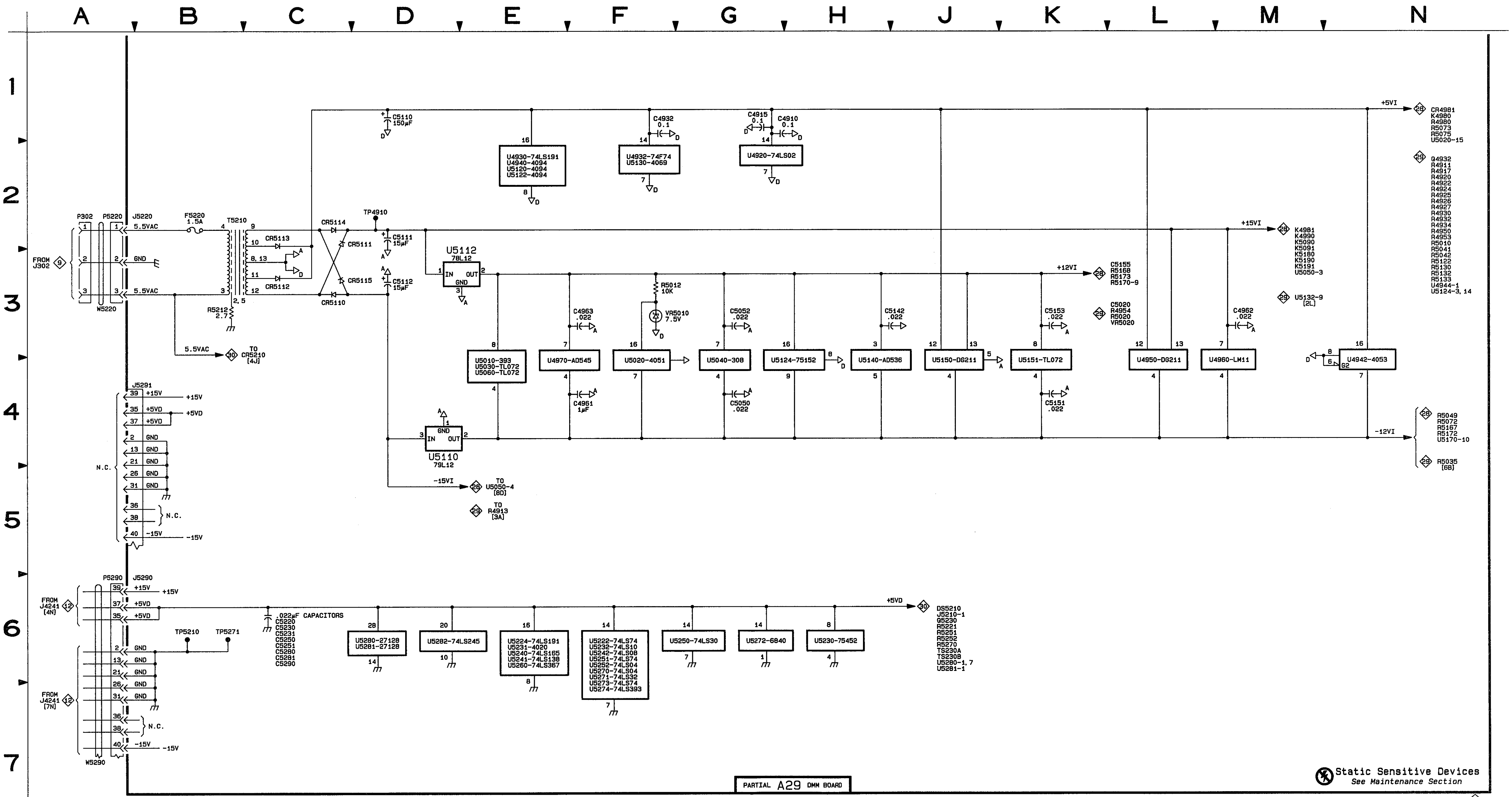
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
ASSEMBLY A30											
C4310	3B	1D	R4320	4J	1E	S4303D	4F	2D	U4300	4C	1C
						S4303E	3F	2D	U4310	3B	1D
J43O0	1B	1B	S4302A	4H	2B	S4304	1F	2E	U4310	4B	1D
			S4302B	3H	2B	S4305	1E	2F	U4320	3B	1F
LS4330	2C	2H	S4302C	1H	2B	S4306A	1E	2G	U4320	5K	1F
			S4302C	2H	2B	S4306B	3E	2G			
P4330	3A	1G	S4303A	4G	2C	S4306C	4E	2G	W4330	5L	1G
P4330	5L	1G	S4303B	3G	2C				W4330	6A	1G
			S4303C	1G	2D	U4300	3C	1C			



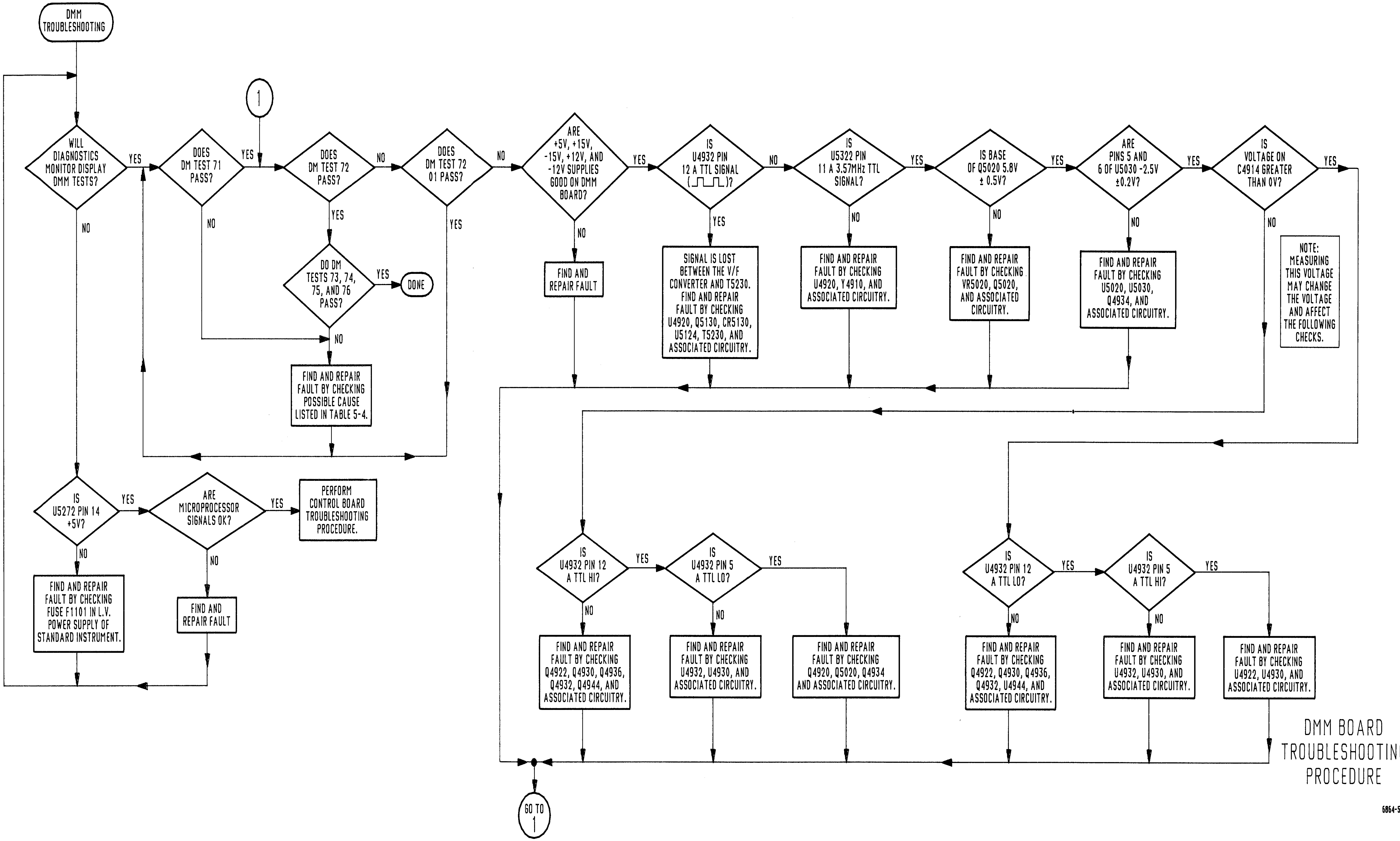
CONTINUITY INDICATOR
SWITCH COLUMN BUFFER
I/O DECODERS
EXTENDED FRONT PANEL SWITCHES
* SHIFT CAUSES LOWER FUNCTION TO BE ACTIVATED.
S4306A HOLD SMOOTH
S4305 SHIFT
S4304 °C °F
S4303C dB V dB m
S4302C DOWN (RANGE)
S4306B MIN/MAX DISPLAY MIN/MAX RESET
S4303E HI Ω LO Ω
S4303B AC V AC A
S4302B UP
S4306C REF DISPLAY REF SET
S4303D CONT
S4303A DC V DC A
S4302A AUTO (RANGE)
J4300
LS4330
U4310 74LS139
U4300 7407
U4320 74LS365
R4320 10K
P4330
W4330
Static Sensitive Devices
See Maintenance Section
A30 EXTENDED FRONT PANEL BOARD

DMM POWER DISTRIBUTION 32

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
ASSEMBLY A29											
C4910	1G	6K	CR5110	3C	4K	U4930	2E	7H	U5230	6H	2H
C4915	1G	7J	CR5111	2C	4K	U4932	2F	6H	U5231	6E	2H
C4932	1F	6H	CR5112	3C	4K	U4940	2E	7G	U5232	6F	1H
C4961	4F	6F	CR5113	2C	4K	U4942	4N	6G	U5240	6E	3G
C4962	3M	6F	CR5114	2C	4J	U4950	4L	6F	U5241	6E	2G
C4963	3F	6F	CR5115	3C	4J	U4960	4M	6E	U5242	6F	1G
C5050	4G	5G				U4970	4E	5E	U5250	6G	3F
C5052	3G	5G	F5220	2B	2J	U5010	4E	5K	U5251	6F	2F
C5110	1D	4K				U5020	4F	5J	U5252	6F	1F
C5111	2D	4K	J5220	2B	2J	U5030	4E	5H	U5260	6E	2E
C5112	3D	4J	J5290	6B	2A	U5040	4G	5G	U5270	6F	3E
C5142	3H	4G	J5291	4B	2A	U5060	4E	5F	U5271	6F	3D
C5151	4K	4G				U5110	4D	4K	U5272	6G	2D
C5153	3K	4F	R5012	3F	5J	U5112	3D	4K	U5273	7F	1E
C5220	6C	2J	R5212	3B	2K	U5120	2E	4J	U5274	7F	1D
C5230	6C	2H				U5122	2E	4J	U5280	6D	3C
C5231	6C	1H	T5210	2B	3K	U5124	4G	3J	U5281	6D	2C
C5250	6C	3G				U5130	2F	4H	U5282	6D	1B
C5251	6C	2F	TP4910	2D	6K	U5140	4H	4G			
C5280	6C	3D	TP5210	6B	2K	U5150	4J	4F	VR5010	3F	5K
C5281	6C	1C	TP5271	6B	3E	U5151	4K	4F			
C5290	6C	3B				U5222	6F	2J			
			U4920	2G	7J	U5224	6E	1J			
Patrial A29 also shown on diagrams 28, 29, and 30.											
OTHER PARTS											
P302	2A	CHASSIS	P5290	6A	CHASSIS	W5220	3A	CHASSIS			
P5220	2A	CHASSIS				W5290	6A	CHASSIS			

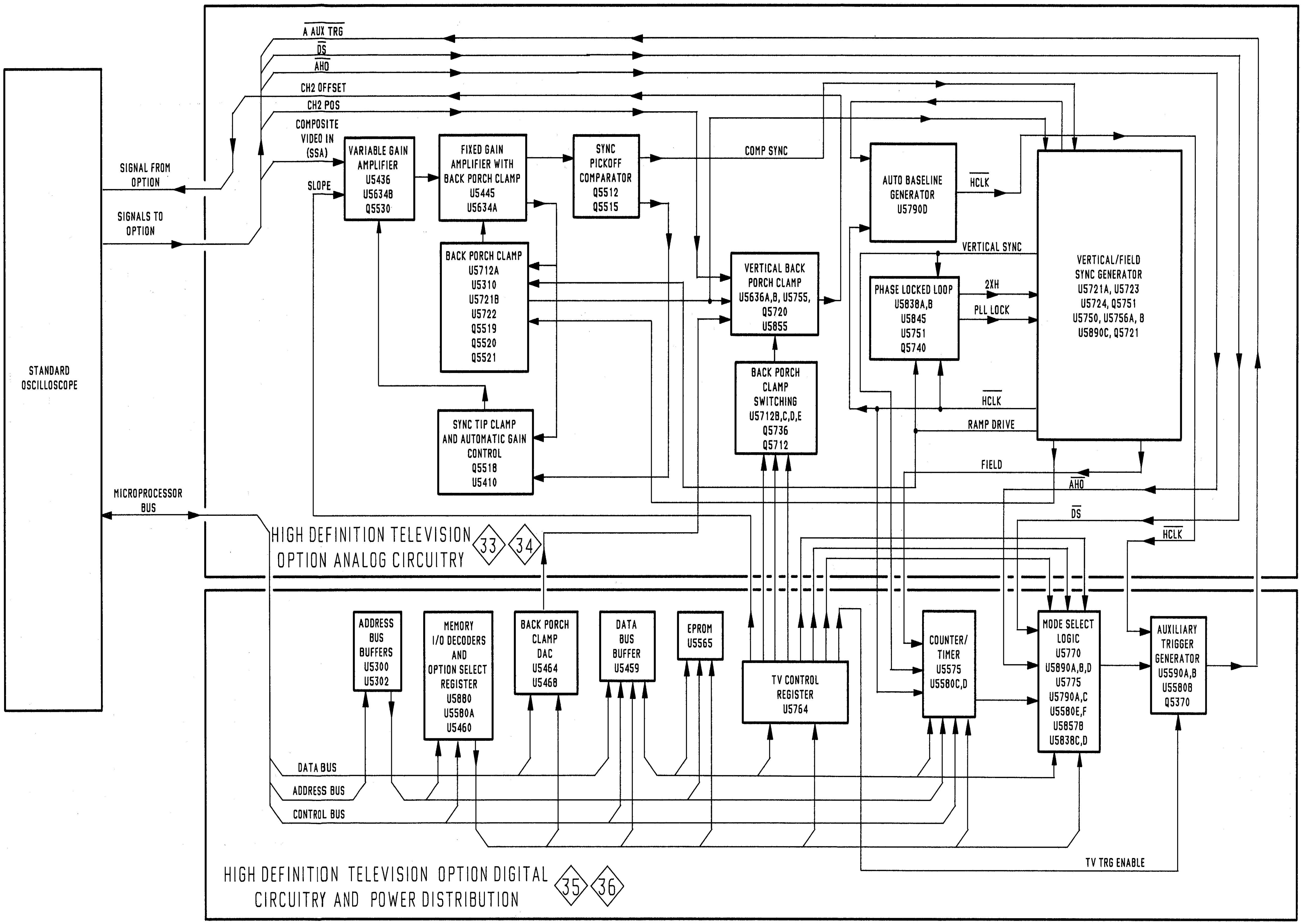


PARTIAL A29 DMM BOARD
Static Sensitive Devices
See Maintenance Section



DMM BOARD TROUBLESHOOTING PROCEDURE

6864-54



STANDARD OSCILLOSCOPE
SIGNAL FROM OPTION
SIGNALS TO OPTION
MICROPROCESSOR BUS
A AUX TRG
DS
AHO
CH2 OFFSET
CH2 POS
COMPOSITE VIDEO IN (SSA)
SLOPE
VARIABLE GAIN AMPLIFIER U5436 U5634B Q5530
FIXED GAIN AMPLIFIER WITH BACK PORCH CLAMP U5445 U5634A
SYNC PICKOFF COMPARATOR Q5512 Q5515
COMP SYNC
BACK PORCH CLAMP U5712A U5310 U5721B U5722 Q5519 Q5520 Q5521
SYNC TIP CLAMP AND AUTOMATIC GAIN CONTROL Q5518 U5410
VERTICAL BACK PORCH CLAMP U5636A,B, U5755, Q5720 U5855
BACK PORCH CLAMP SWITCHING U5712B,C,D,E Q5736 Q5712
AUTO BASELINE GENERATOR U5790D
HCLK
VERTICAL SYNC
PHASE LOCKED LOOP U5838A,B U5845 U5751 Q5740
2XH
PLL LOCK
VERTICAL/FIELD SYNC GENERATOR U5721A, U5723 U5724, Q5751 U5750, U5756A, B U5890C, Q5721
HCLK
RAMP DRIVE
FIELD
AHO
DS
HCLK
HIGH DEFINITION TELEVISION OPTION ANALOG CIRCUITRY 33 34
ADDRESS BUS BUFFERS U5300 U5302
MEMORY I/O DECODERS AND OPTION SELECT REGISTER U5880 U5580A U5460
BACK PORCH CLAMP DAC U5464 U5468
DATA BUS BUFFER U5459
EPROM U5565
TV CONTROL REGISTER U5764
COUNTER/ TIMER U5575 U5580C,D
MODE SELECT LOGIC U5770 U5890A,B,D U5775 U5790A,C U5580E,F U5857B U5838C,D
AUXILIARY TRIGGER GENERATOR U5590A,B U5580B Q5370
DATA BUS
ADDRESS BUS
CONTROL BUS
TV TRG ENABLE
HIGH DEFINITION TELEVISION OPTION DIGITAL CIRCUITRY AND POWER DISTRIBUTION 35 36

6864-65

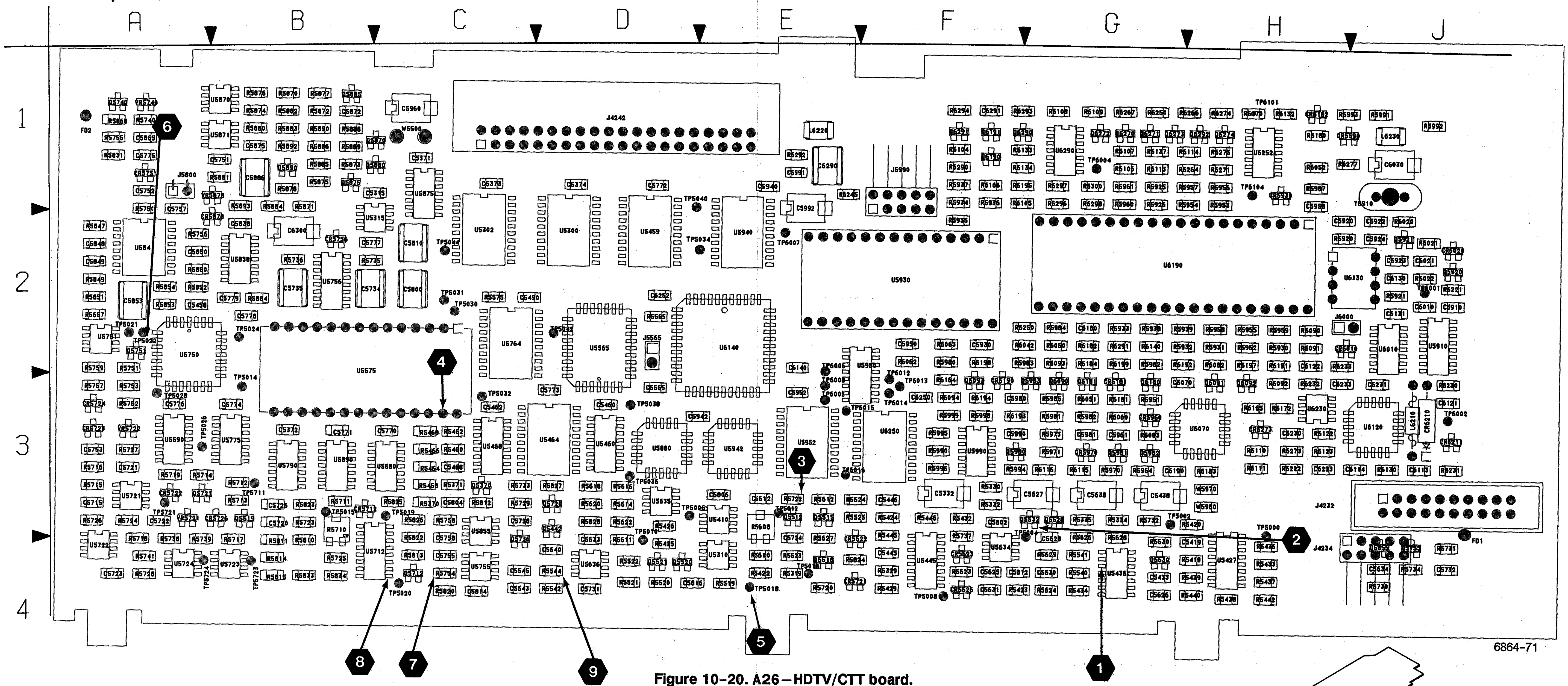
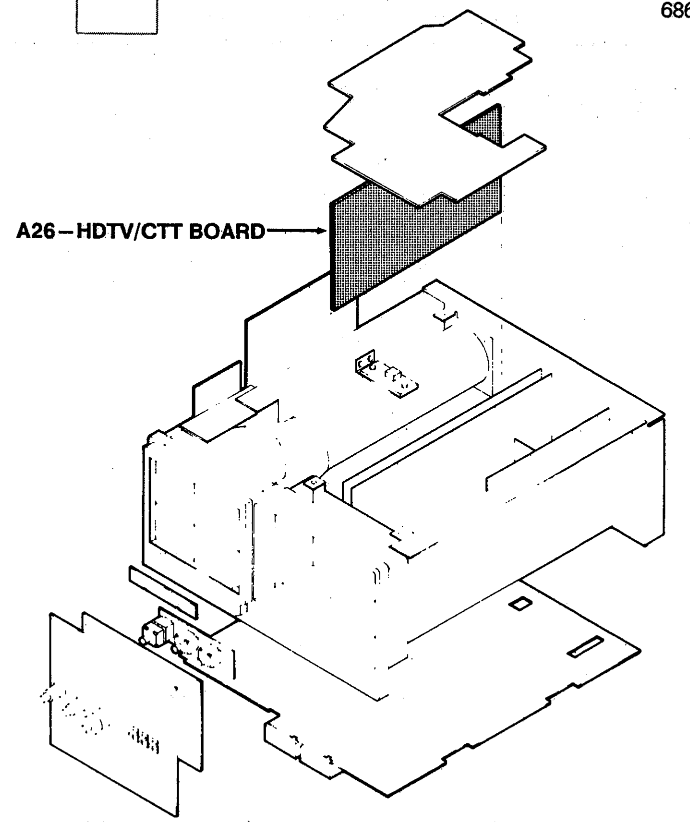


Figure 10-20. A26—HDTV/CTT board.



Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE

Component Number

A23 A2 R1234

Assembly Number — *Subassembly Number (if used)* — *Schematic Circuit Number*

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List

A26—HDTV/CTT BOARD

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C5315	36	C5806	36	CR5712	34	Q5980	25	R5530	33	R5755	34
C5332	33	C5810	36	CR5721	33	Q5981	25	R5540	33	R5756	36
C5371	36	C5812	36	CR5722	33	Q5982	25	R5541	33	R5757	33
C5372	36	C5814	36	CR5723	33	Q5983	25	R5542	34	R5758	35
C5373	36	C5816	36	CR5724	33	Q6090	25	R5544	34	R5759	33
C5374	36	C5838	36	CR5726	33	Q6091	25	R5565	35	R5810	33
C5419	33	C5848	34	CR5751	34	Q6092	25	R5575	35	R5811	33
C5433	33	C5849	34	CR5756	34	Q6093	25	R5608	33	R5812	34
C5438	33	C5850	34	CR5878	36	Q6180	25	R5610	33	R5813	34
C5445	34	C5853	34	CR5930	26	Q6181	25	R5611	33	R5814	33
C5458	36	C5865	34	CR5960	25	Q6190	25	R5612	33	R5815	33
C5460	36	C5872	36	CR5970	25	Q6191	25	R5614	33	R5820	34
C5462	36	C5875	36	CR6010	26	Q6270	25	R5616	33	R5822	34
C5468	35	C5886	36	CR6020	26	Q6271	25	R5618	33	R5823	33
C5490	36	C5910	26	CR6162	25	Q6272	25	R5620	33	R5824	33
C5543	34	C5920	26	CR6181	25	Q6273	25	R5622	33	R5825	34
C5545	36	C5922	26	CR6190	25	Q6274	25	R5623	33	R5826	34
C5565	36	C5923	26	CR6210	26	Q6290	25	R5624	33	R5827	34
C5612	33	C5924	26	CR6211	26	Q6291	25	R5626	33	R5828	34
C5625	33	C5930	26	CR6273	25	Q6292	25	R5627	33	R5831	34
C5626	33	C5940	26					R5628	33	R5833	34
C5627	33	C5942	26	J4232	35	R5319	33	R5629	33	R5834	34
C5628	33	C5950	26	J4234	33	R5329	33	R5657	34	R5847	34
C5630	33	C5952	26	J4242	33	R5330	33	R5710	33	R5849	34
C5631	33	C5958	26	J5565	35	R5332	33	R5711	33	R5850	34
C5633	36	C5960	36	J5800	36	R5334	33	R5712	33	R5851	34
C5634	36	C5961	25	J5990	25	R5335	33	R5713	33	R5852	34
C5638	33	C5980	25	J6000	26	R5370	35	R5714	33	R5853	34
C5640	34	C5981	25			R5371	35	R5715	33	R5854	34
C5715	33	C5990	26	L6210	26	R5419	33	R5716	33	R5864	34
C5720	33	C5991	26	L6220	26	R5420	33	R5717	33	R5868	34
C5721	33	C5992	26	L6230	26	R5422	33	R5718	33	R5870	36
C5722	36	C6010	26			R5423	33	R5719	33	R5871	36
C5723	36	C6021	26	Q5370	35	R5424	33	R5720	33	R5872	36
C5724	33	C6030	26	Q5442	34	R5425	33	R5722	33	R5873	36
C5726	33	C6070	26	Q5512	33	R5426	33	R5723	33	R5874	36
C5728	34	C6113	26	Q5515	33	R5429	33	R5724	33	R5875	36
C5731	36	C6114	26	Q5518	33	R5432	33	R5725	34	R5876	36
C5732	36	C6121	26	Q5519	33	R5433	33	R5726	33	R5877	36
C5734	34	C6122	26	Q5520	33	R5434	33	R5727	33	R5878	36
C5735	34	C6130	26	Q5521	33	R5436	33	R5728	33	R5880	36
C5751	36	C6131	26	Q5528	33	R5437	33	R5729	34	R5881	36
C5752	36	C6140	26	Q5530	33	R5438	33	R5730	34	R5882	36
C5753	33	C6180	25	Q5532	33	R5439	33	R5731	34	R5883	36
C5755	34	C6190	26	Q5712	34	R5440	33	R5732	33	R5884	36
C5757	36	C6223	26	Q5720	34	R5442	33	R5733	34	R5885	36
C5758	35	C6230	26	Q5721	33	R5458	35	R5734	34	R5886	36
C5770	36	C6231	26	Q5736	34	R5460	35	R5735	34	R5888	36
C5771	36	C6233	26	Q5740	34	R5462	35	R5736	34	R5889	36
C5772	36	C6250	26	Q5751	34	R5464	35	R5737	33	R5890	36
C5773	36	C6252	26	Q5755	34	R5466	35	R5738	33	R5892	36
C5774	36	C6290	25	Q5855	34	R5468	35	R5739	33	R5893	36
C5775	34	C6291	25	Q5870	36	R5519	33	R5740	34	R5920	26
C5776	36	C6300	36	Q5875	36	R5520	33	R5741	33	R5921	26
C5777	36			Q5880	36	R5521	33	R5750	34	R5925	25
C5778	36	CR5522	33	Q5885	36	R5522	33	R5751	34	R5926	25
C5779	34	CR5526	33	Q5890	36	R5523	33	R5752	33	R5930	25
C5800	36	CR5590	25	Q5920	26	R5524	33	R5753	34	R5931	25
C5802	36	CR5623	33	Q5921	26	R5525	33	R5754	34	R5932	25
C5804	36										

A26 – HDTV/CTT BOARD (CONT)

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
R5933	25	R6042	25
R5934	25	R6050	25
R5935	25	R6051	25
R5936	25	R6052	25
R5937	25	R6060	25
R5938	25	R6062	25
R5939	25	R6063	25
R5951	25	R6082	25
R5952	25	R6083	25
R5953	25	R6090	26
R5954	25	R6091	26
R5955	25	R6092	25
R5956	25	R6093	25
R5957	25	R6094	25
R5958	25	R6104	25
R5959	25	R6105	25
R5960	25	R6106	25
R5961	25	R6107	25
R5962	25	R6108	25
R5964	25	R6109	25
R5970	25	R6110	25
R5971	25	R6111	25
R5973	25	R6113	25
R5980	25	R6114	25
R5981	25	R6115	25
R5982	25	R6116	25
R5983	25	R6122	26
R5984	25	R6123	26
R5985	25	R6130	26
R5987	25	R6132	25
R5990	25	R6133	25
R5991	25	R6134	25
R5992	25	R6137	25
R5993	25	R6140	25
R5994	25	R6164	25
R5995	25	R6165	25
R5996	25	R6166	25
R5998	25	R6170	25
R5999	25	R6172	25
R6020	26	R6180	25
R6021	26	R6181	25
R6022	26	R6182	25

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
R6183	25	TP5008	33
R6184	25	TP5010	33
R6191	25	TP5012	33
R6192	25	TP5014	33
R6193	25	TP5015	33
R6194	25	TP5016	33
R6195	25	TP5018	33
R6197	25	TP5019	34
R6198	25	TP5020	34
R6199	25	TP5021	34
R6221	26	TP5022	34
R6222	26	TP5024	34
R6230	26	TP5026	35
R6231	26	TP5028	35
R6232	26	TP5030	35
R6233	26	TP5031	35
R6245	25	TP5032	35
R6250	25	TP5034	35
R6251	25	TP5036	35
R6264	25	TP5038	35
R6266	25	TP5040	35
R6267	25	TP5042	35
R6271	25	TP5044	35
R6273	25	TP5711	33
R6274	25	TP5721	33
R6275	25	TP5723	33
R6277	25	TP5725	33
R6290	25	TP6001	26
R6291	25	TP6002	26
R6292	25	TP6004	25
R6293	25	TP6005	25
R6294	25	TP6006	25
R6296	25	TP6007	25
R6297	25	TP6008	25
R6298	25	TP6012	25
R6300	25	TP6013	25
		TP6014	25
TP5000	33	TP6015	25
TP5002	33	TP6016	25
TP5004	33	TP6101	25
TP5006	33	TP6104	26

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
		U5875	36
U5300	35	U5875	35
U5302	35	U5880	35
U5310	33	U5890	35
U5315	36	U5890	34
U5410	33	U5890	35
U5427	33	U5910	26
U5436	33	U5930	25
U5445	33	U5940	25
U5459	35	U5942	25
U5460	35	U5950	25
U5464	35	U5952	25
U5468	35	U5990	26
U5565	35	U5990	25
U5575	35	U5990	26
U5580	35	U6010	26
U5590	35	U6070	25
U5634	33	U6120	26
U5635	33	U6130	26
U5636	34	U6140	25
U5712	34	U6190	25
U5721	33	U6230	26
U5722	33	U6250	25
U5723	33	U6252	26
U5724	33	U6252	25
U5750	34	U6252	26
U5751	34	U6290	26
U5755	34	U6290	25
U5756	34		
U5764	35	VR5721	33
U5775	35	VR5722	33
U5790	35	VR5740	34
U5790	36	VR5878	36
U5790	35		
U5790	34	W5445	33
U5838	34	W5446	33
U5838	35	W5500	25
U5845	34	W5970	25
U5855	34	W5980	25
U5870	36		
U5871	36	Y5910	26

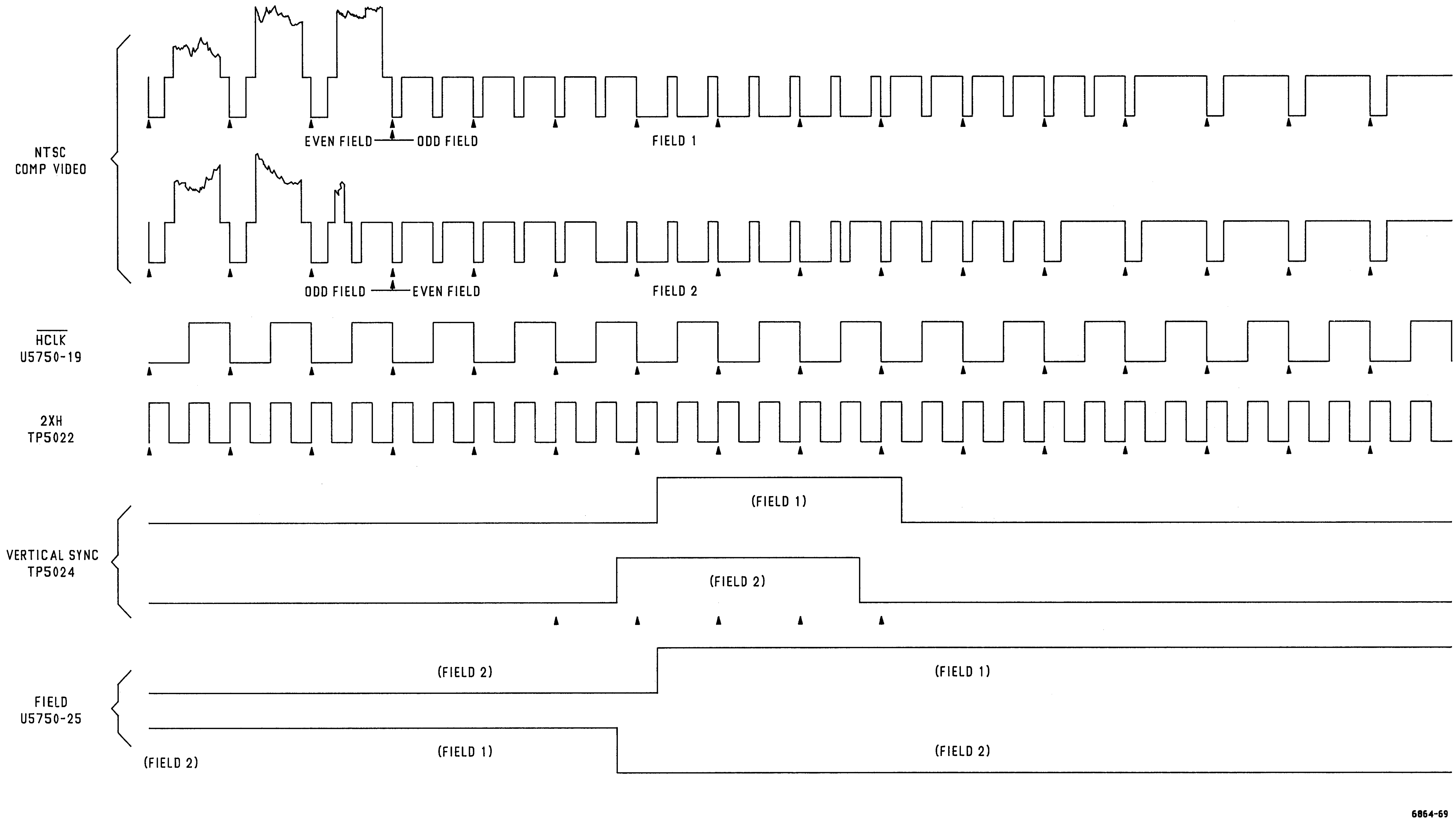


Figure 10-21a. HDTV Option timing diagram.

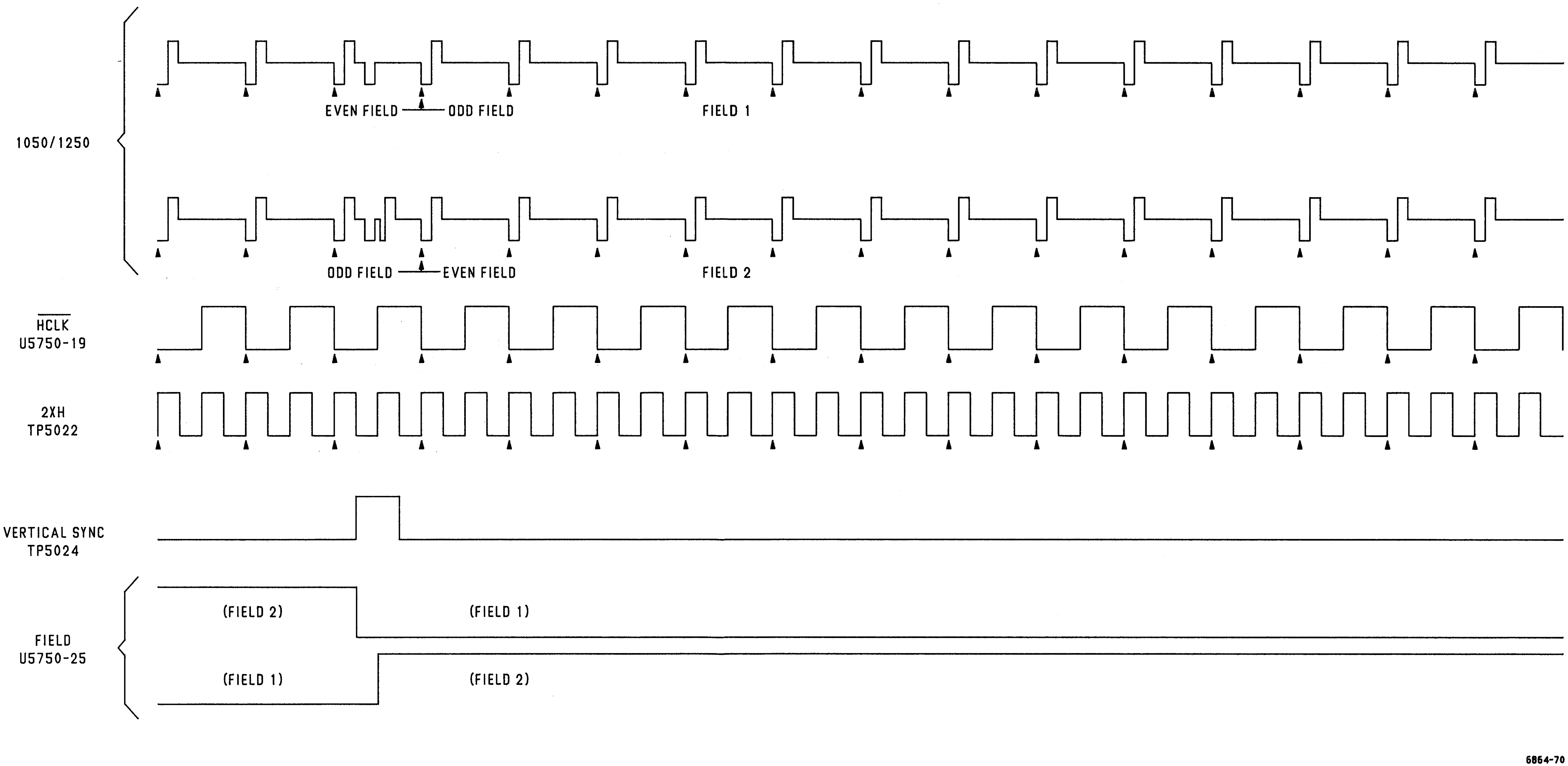
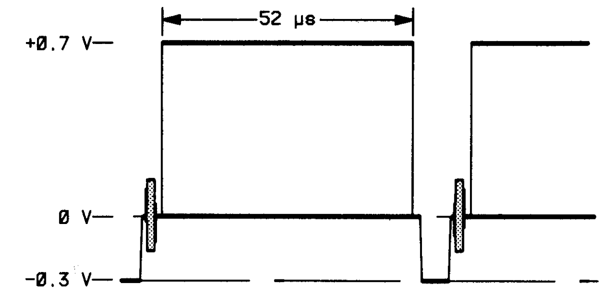
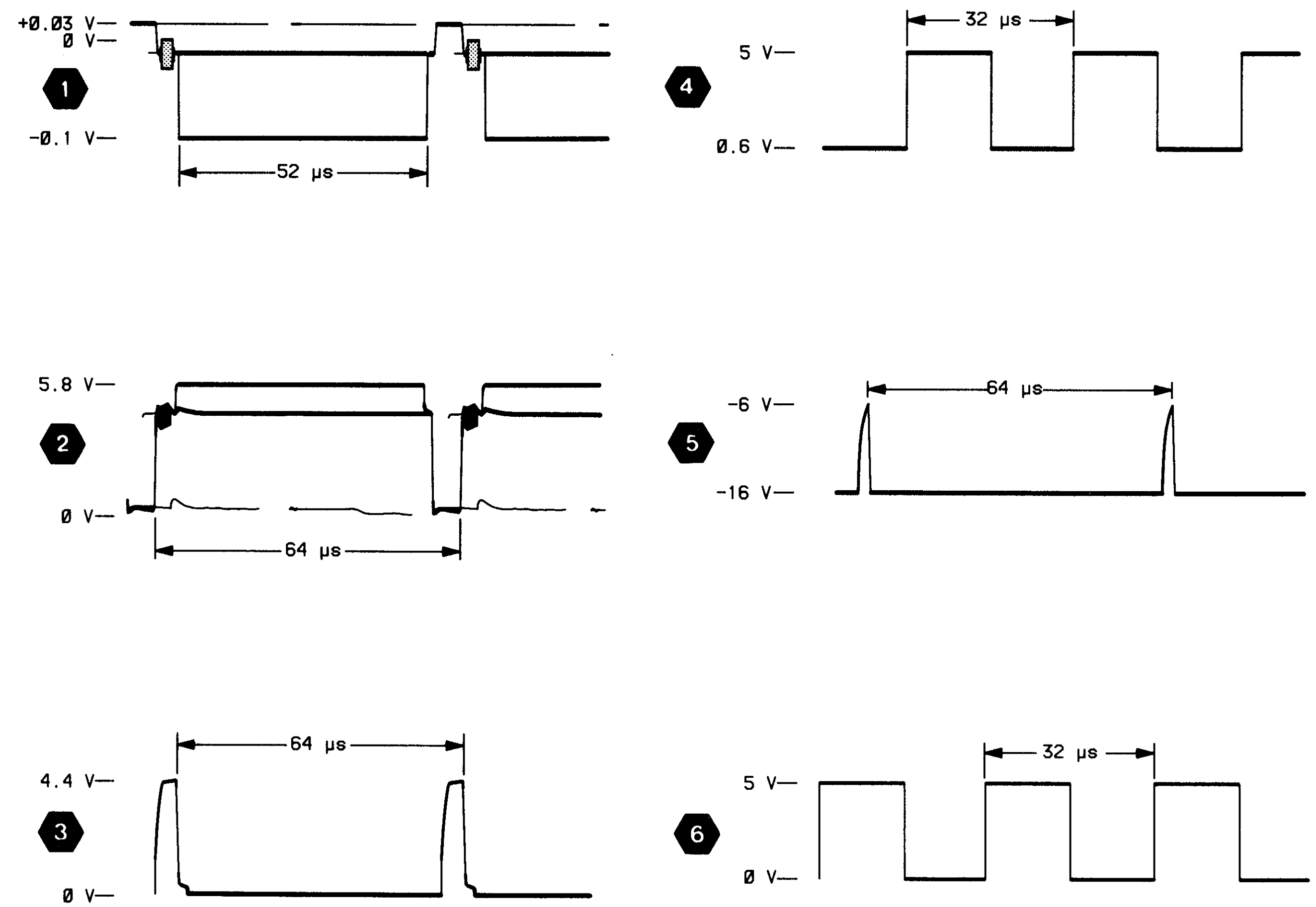


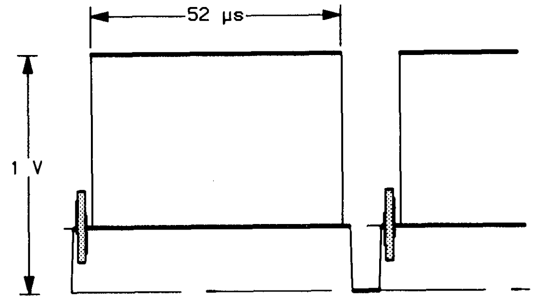
Figure 10-21b. HDTV Option timing diagram.

INPUT SIGNAL WHILE OBSERVING WAVEFORMS 1 THROUGH 6.

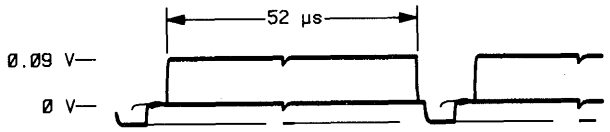




INPUT SIGNAL WHILE OBSERVING WAVEFORMS 7 THROUGH 9. CONNECT A FIELD SQUAREWAVE FROM A TV GENERATOR TO THE CH 2 INPUT. SET CH 2 INPUT COUPLING TO TV CLAMP.



7



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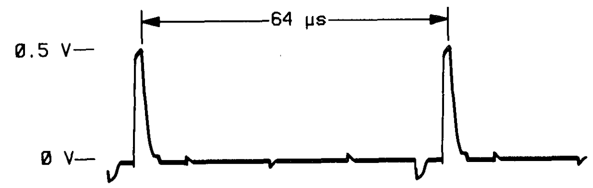
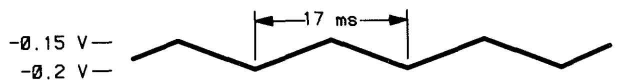


9



A AND B SEC/DIV 5 ms.

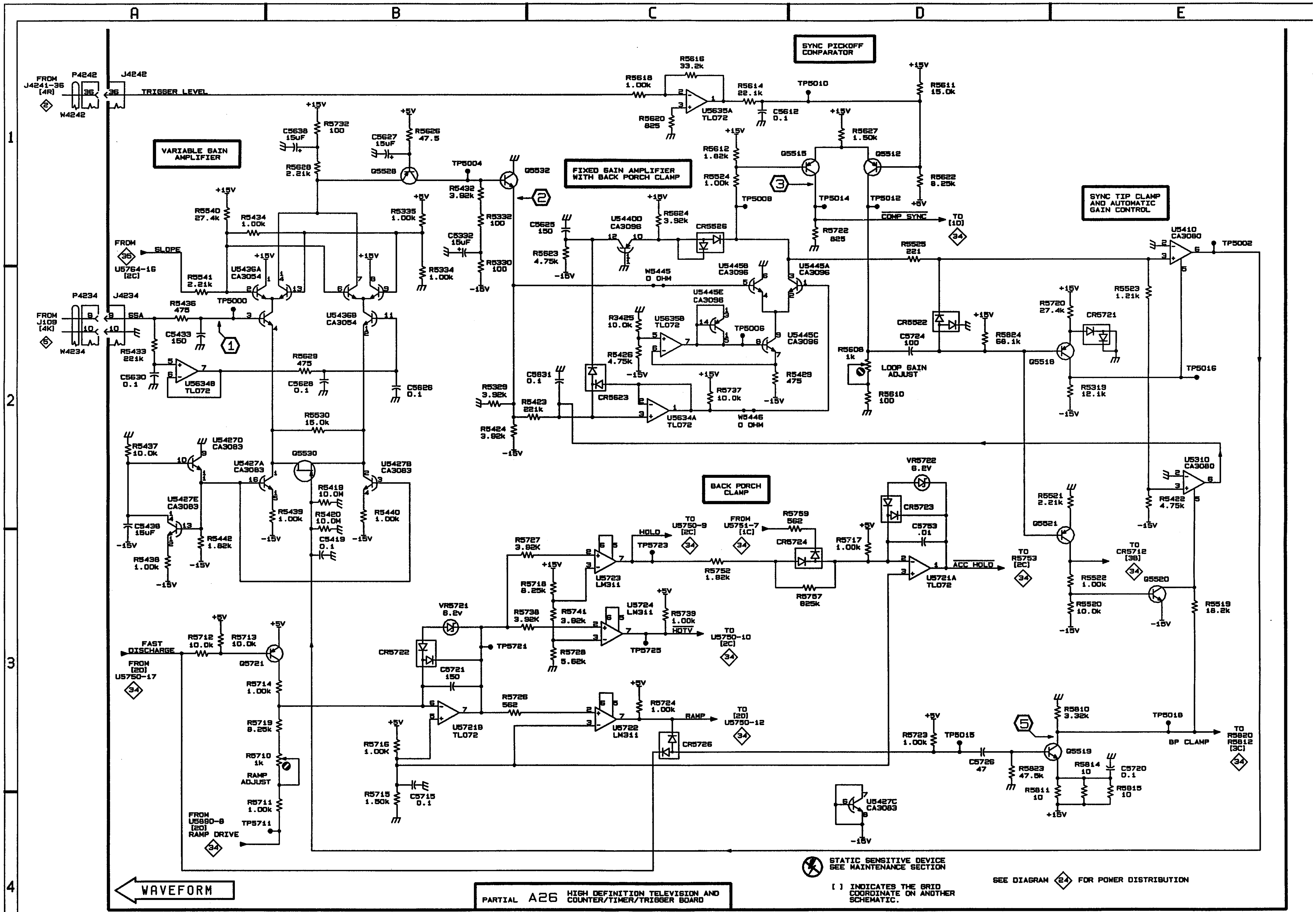
4630-52

HDTV OPTION ANALOG CIRCUITRY DIAGRAM 33

Assembly A26

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C5332	1B	3F	R5319	2E	4E	R5623	1C	4F	TP5008	1C	4F
C5419	3B	4H	R5329	2B	4F	R5624	1C	4G	TP5010	1D	4D
C5433	2A	4G	R5330	1B	3F	R5626	1B	4G	TP5012	1D	3E
C5438	2A	3G	R5332	1B	3F	R5627	1D	4E	TP5014	1D	3B
C5612	1C	3E	R5334	2B	4G	R5628	1B	4G	TP5015	3D	4B
C5625	1C	4F	R5335	1B	4G	R5629	2B	4G	TP5016	2E	4E
C5626	2B	4G	R5419	2B	4H	R5710	3B	4B	TP5018	3E	4E
C5627	1B	3G	R5420	2B	4H	R5711	4B	3B	TP5711	4B	3B
C5628	2B	4G	R5422	2E	4E	R5712	3A	3B	TP5721	3B	4A
C5630	2A	4G	R5423	2C	4G	R5713	3A	3B	TP5723	3D	4A
C5631	2C	4F	R5424	2B	4F	R5714	3B	3A	TP5725	3C	4A
C5638	1B	3G	R5425	2C	4D	R5715	4B	3A			
C5715	3B	3A	R5426	2C	4D	R5716	3B	3A	U5310	2E	4E
C5720	3E	4B	R5429	2C	4F	R5717	3D	4B	U5410	1E	4E
C5721	3B	3A	R5432	1B	4F	R5718	3C	4A	U5427A	2A	4H
C5724	2D	4E	R5433	2A	4H	R5719	3B	3A	U5427B	2B	4H
C5726	3D	3B	R5434	1A	4G	R5720	2E	4E	U5427C	4D	4H
C5753	3D	3A	R5436	2A	4H	R5722	1D	3E	U5427D	2A	4H
			R5437	2A	4H	R5723	3D	4B	U5427E	2A	4H
CR5522	2D	4F	R5438	3A	4H	R5724	3C	4A	U5436A	2A	4G
CR5526	1C	4F	R5439	2B	4H	R5726	3B	4A	U5436B	2B	4G
CR5623	2C	4F	R5440	2B	4H	R5727	3B	3A	U5445A	2D	4F
CR5721	2E	4F	R5442	3A	4H	R5728	3C	4A	U5445B	2C	4F
CR5722	3B	3A	R5519	3E	4E	R5732	1B	4G	U5445C	2C	4F
CR5723	2D	3A	R5520	3E	4D	R5737	2C	4F	U5445D	1C	4F
CR5724	3D	3A	R5521	2E	4D	R5738	3B	4A	U5445E	2C	4F
CR5726	3C	4B	R5522	3E	4D	R5739	3C	4A	U5634A	2C	4F
			R5523	2E	4E	R5741	3C	4A	U5634B	2A	4F
J4234	2A	4H	R5524	1C	3F	R5752	3C	3A	U5635A	1C	3D
J4242	1A	1D	R5525	1D	4F	R5757	3D	3A	U5635B	2C	3D
			R5530	2B	4G	R5759	2D	3A	U5721A	3D	3A
			R5540	1A	4G	R5810	3E	4B	U5721B	3B	3A
Q5512	1D	4E	R5541	2A	4G	R5811	3E	4B	U5722	3C	4A
Q5515	1D	4E	R5608	2D	4E	R5814	3E	4B	U5723	3C	4B
Q5518	2E	4E	R5610	2D	4E	R5815	3E	4B	U5724	3C	4A
Q5519	3D	4B	R5611	1D	4D	R5823	3D	3B			
Q5520	3E	4D	R5612	1C	3E	R5824	2D	4F	VR5721	3B	4A
Q5521	2E	4D	R5614	1C	3D				VR5722	2D	3A
Q5528	1B	4G	R5616	1C	3D	TP5000	2A	4H			
Q5530	2B	4G	R5618	1C	3D	TP5002	1E	3H	W5445	2C	4F
Q5532	1B	4G	R5620	1C	3D	TP5004	1B	4G	W5446	2C	4F
Q5721	3B	3A	R5622	1D	4D	TP5006	2C	3E			

Partial A26 also shown on diagrams 25, 26, 34, 35 and 36.

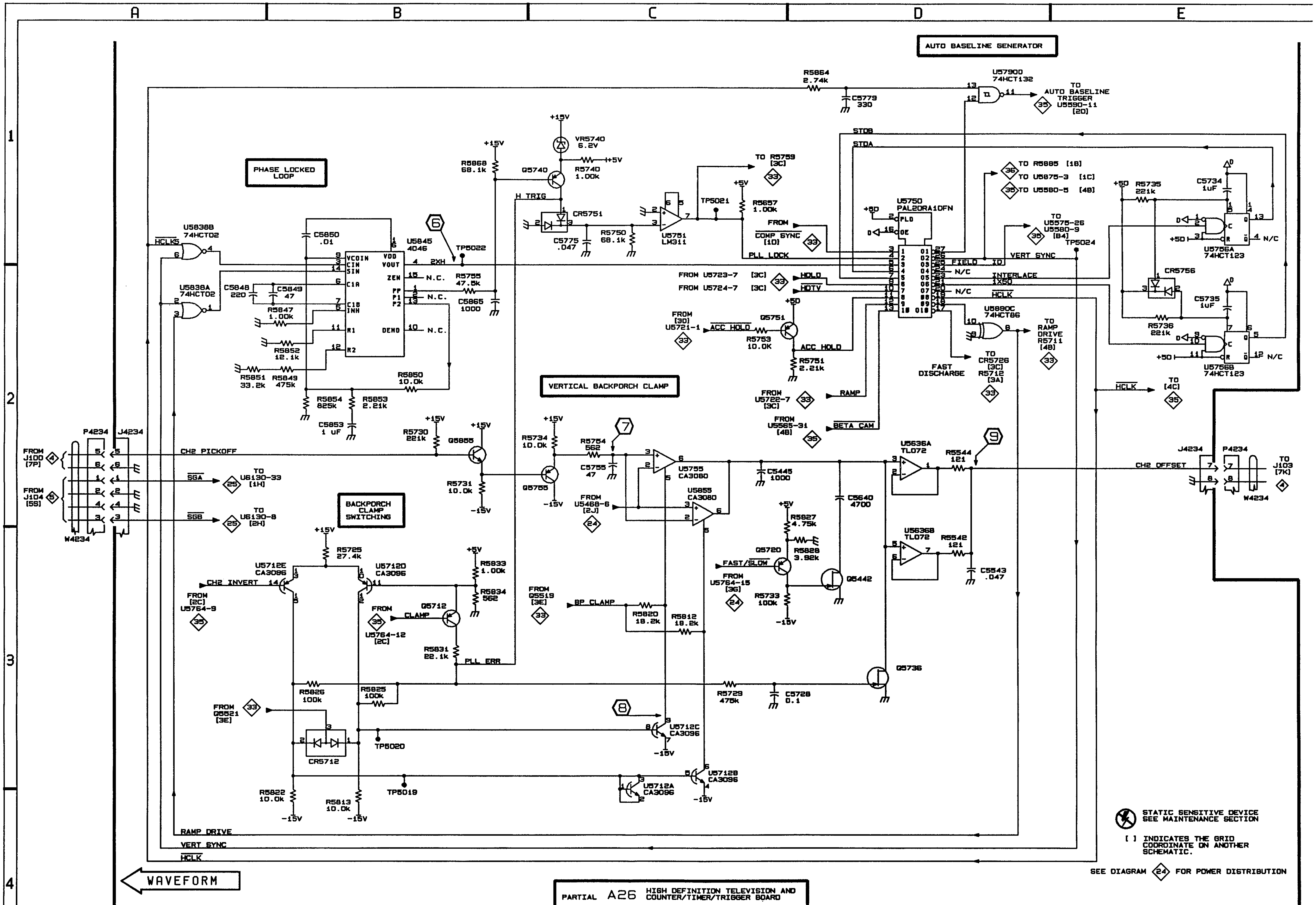

A
B
C
D
E
1
2
3
4
SYNC PICKOFF COMPARATOR
VARIABLE GAIN AMPLIFIER
FIXED GAIN AMPLIFIER WITH BACK PORCH CLAMP
SYNC TIP CLAMP AND AUTOMATIC GAIN CONTROL
BACK PORCH CLAMP
FROM J4241-36 [4R]
TRIGGER LEVEL
FROM U5764-16 [2C]
SLOPE
FROM J109 [4K]
SSA
FAST DISCHARGE
FROM [2D] U5750-17
FROM U5680-8 [2D] RAMP DRIVE
RAMP ADJUST
LOOP GAIN ADJUST
COMP SYNC
TO [1D]
HOLD
TO U5750-9 [2C]
FROM U5751-7 [1C]
ACC HOLD
TO R5753 [2C]
TO CR5712 [3B]
HDTV
TO U5750-10 [2C]
RAMP
TO [2D] U5750-12
BP CLAMP
TO R5820 R5812 [3C]
STATIC SENSITIVE DEVICE SEE MAINTENANCE SECTION
[ ] INDICATES THE GRID COORDINATE ON ANOTHER SCHEMATIC.
SEE DIAGRAM 34 FOR POWER DISTRIBUTION
WAVEFORM
PARTIAL A26 HIGH DEFINITION TELEVISION AND COUNTER/TIMER/TRIGGER BOARD

HDTV OPTION ANALOG CIRCUITRY (CONT) DIAGRAM 34

Assembly A26

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C5445	2C	4F	Q5740	1C	1A	R5813	4B	4C	TP5022	1B	2A
C5543	3D	4C	Q5751	2D	3A	R5820	3C	4C	TP5024	1E	2B
C5640	2D	4D	Q5755	2C	4J	R5822	4B	4C			
C5728	3C	4C	Q5855	2B	4J	R5825	3B	3C	U5636A	2D	4D
C5734	1E	2C				R5826	3B	4C	U5636B	3D	4D
C5735	2E	2B	R5542	3D	4D	R5827	2C	3D	U5712A	3C	4C
C5755	2C	4C	R5544	2D	4D	R5828	3D	4D	U5712B	3C	4C
C5775	1C	1A	R5657	1C	2A	R5831	3B	1A	U5712C	3C	4C
C5779	1D	2B	R5725	3B	4B	R5833	3B	4B	U5712D	3B	4C
C5848	2A	2A	R5729	3C	3C	R5834	3B	4B	U5712E	3B	4C
C5849	2B	2A	R5730	2B	4J	R5847	2B	2A	U5750	1D	3A
C5850	1B	2A	R5731	2B	4J	R5849	2B	2A	U5751	1C	2A
C5853	2B	2A	R5733	3C	3C	R5850	2B	2A	U5755	2C	4C
C5865	2B	1A	R5734	2C	4J	R5851	2A	2A	U5756A	1E	2B
			R5735	1E	2C	R5852	2B	2A	U5756B	2E	2B
CR5712	3B	4B	R5736	2E	2B	R5853	2B	2A	U5790D	1D	3B
CR5751	1C	1A	R5740	1C	1A	R5854	2B	2A	U5838A	2A	2B
CR5756	2E	2B	R5750	1C	2A	R5864	1D	2B	U5838B	1A	2B
			R5751	2D	3A	R5868	1B	1A	U5845	1B	2A
Q5442	3D	4D	R5753	2D	3A				U5855	2C	4C
Q5712	3B	4C	R5754	2C	4C	TP5019	3B	4C	U5890C	2D	3B
Q5720	3C	3D	R5755	2B	1A	TP5020	3B	4C			
Q5736	3D	4C	R5812	3C	3C	TP5021	1C	2A	VR5740	1C	1A

Partial A26 also shown on diagrams 25, 26, 33, 35 and 36.


AUTO BASELINE GENERATOR
PHASE LOCKED LOOP
VERTICAL BACKPORCH CLAMP
BACKPORCH CLAMP SWITCHING
WAVEFORM
PARTIAL A26 HIGH DEFINITION TELEVISION AND COUNTER/TIMER/TRIGGER BOARD
STATIC SENSITIVE DEVICE SEE MAINTENANCE SECTION
[ ] INDICATES THE GRID COORDINATE ON ANOTHER SCHEMATIC.
SEE DIAGRAM 24 FOR POWER DISTRIBUTION

6884-62

HDTV OPTION DIGITAL CIRCUITRY DIAGRAM 35

Assembly A26

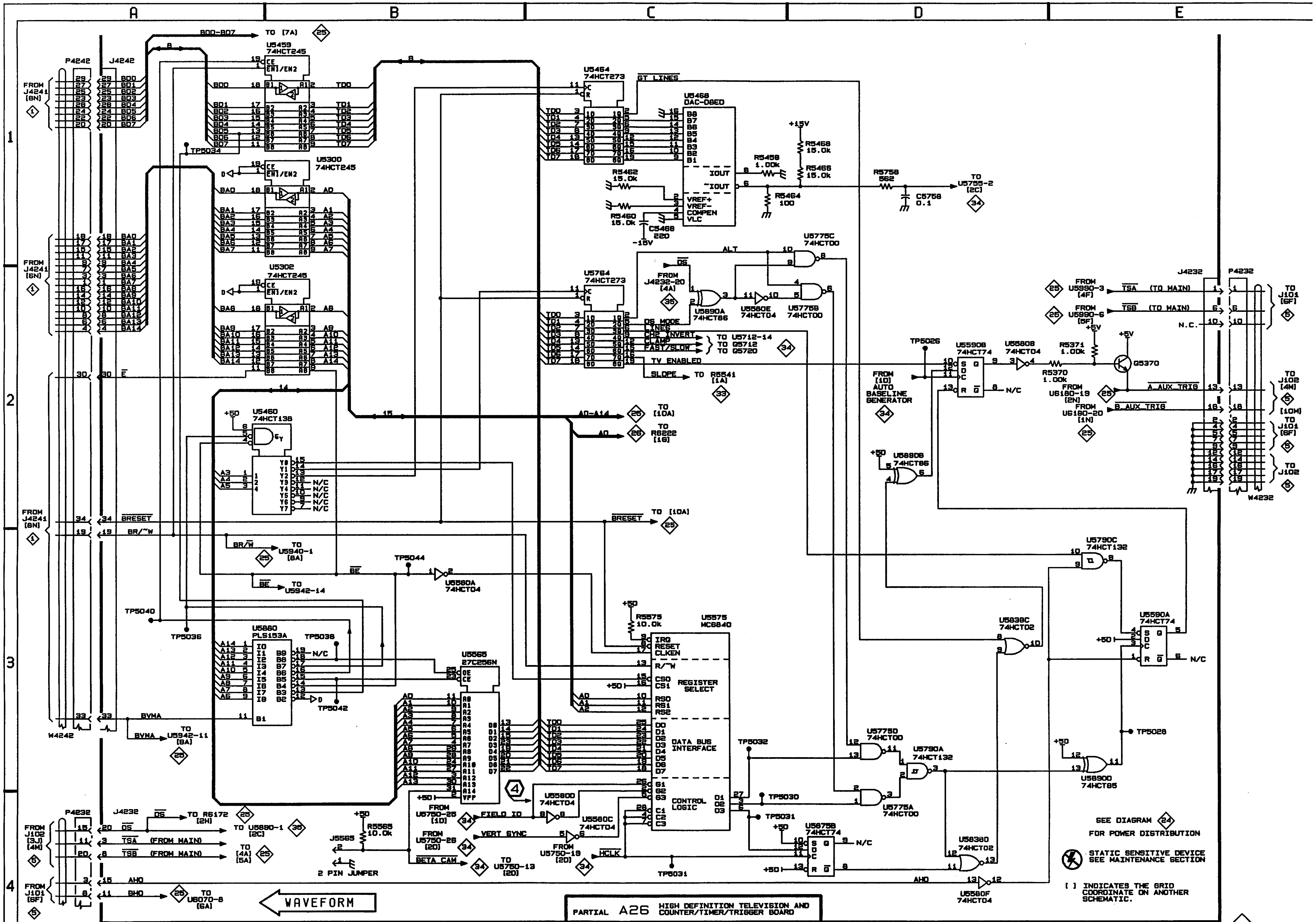
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C5468	1C	3C
C5758	1D	4C
J4232	2E	3H
J5565	4B	2D
Q5370	2E	3C
R5370	2E	3C
R5371	2E	3C
R5458	1C	3C
R5460	1C	3C
R5462	1C	3C
R5464	1C	3C
R5466	1D	3C
R5468	1D	3C

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
R5565	4B	2D
R5575	3C	2C
R5758	1D	4C
TP5026	2D	3A
TP5028	3E	3A
TP5030	4C	2C
TP5031	4C	2C
TP5032	3C	3C
TP5034	1A	2E
TP5036	3A	3D
TP5038	3B	3D
TP5040	3A	2E
TP5042	3B	2D
TP5044	3B	2C

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
U5300	1B	2D
U5302	2B	2C
U5459	1B	2D
U5460	2A	3D
U5464	1C	3D
U5468	1C	3C
U5565	3B	2D
U5575	3C	3C
U5580A	3B	3C
U5580B	2D	3C
U5580C	4C	3C
U5580D	4C	3C
U5580E	2C	3C
U5580F	4D	3C
U5590A	3E	3A

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
U5590B	2D	3A
U5764	2C	2C
U5775A	3D	3B
U5775B	2D	3B
U5775C	1D	3B
U5775D	3D	3B
U5790A	3D	3B
U5790C	3E	3B
U5838C	3D	2B
U5838D	4D	2B
U5875B	4D	1C
U5880	3A	3D
U5890A	2C	3B
U5890B	2D	3B
U5890D	3E	3B

Partial A26 also shown on diagrams 25, 26, 33, 34 and 36.

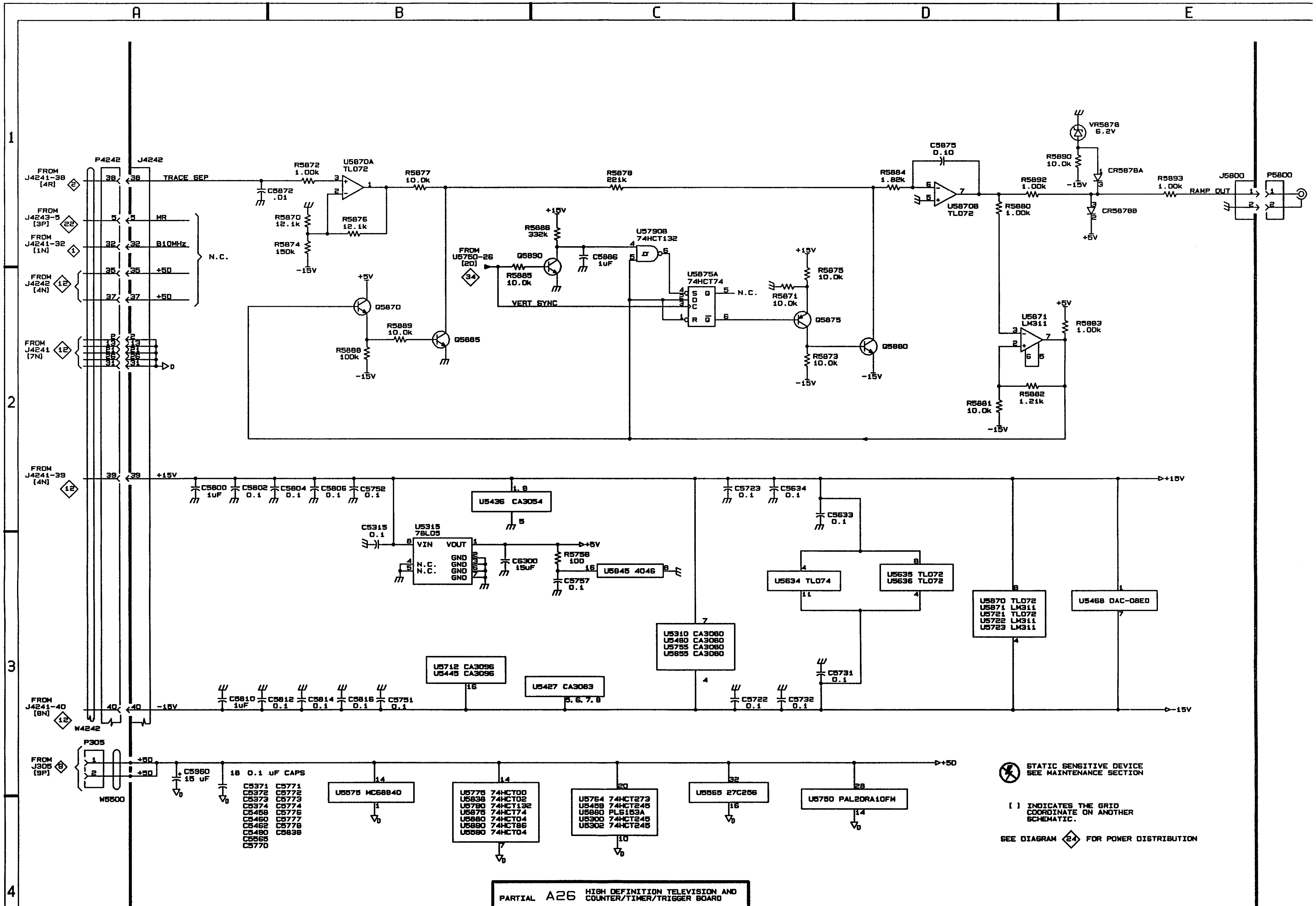

PARTIAL A26 HIGH DEFINITION TELEVISION AND COUNTER/TIMER/TRIGGER BOARD
WAVEFORM
U5459 74HCT245
U5300 74HCT245
U5302 74HCT245
U5464 74HCT273
U5468 DAC-08ED
U5764 74HCT273
U5460 74HCT138
U5880 PLS153A
U5565 27C256N
U5575 MC6840
U5590A 74HCT74
U5590B 74HCT74
U5875B 74HCT74
U5790A 74HCT132
U5790C 74HCT132
U5838C 74HCT02
U5838D 74HCT02
U5775A 74HCT00
U5775B 74HCT00
U5775C 74HCT00
U5890A 74HCT86
U5890B 74HCT86
U5890D 74HCT86
Q5370
P4242
J4242
W4242
J4232
P4232
W4232
GT LINES
DS MODE
LINES
CH2 INVERT
CLAMP
FAST/SLOW
TV ENABLED
SLOPE
REGISTER SELECT
DATA BUS INTERFACE
CONTROL LOGIC
2 PIN JUMPER
SEE DIAGRAM 24 FOR POWER DISTRIBUTION
STATIC SENSITIVE DEVICE SEE MAINTENANCE SECTION
[ ] INDICATES THE GRID COORDINATE ON ANOTHER SCHEMATIC.

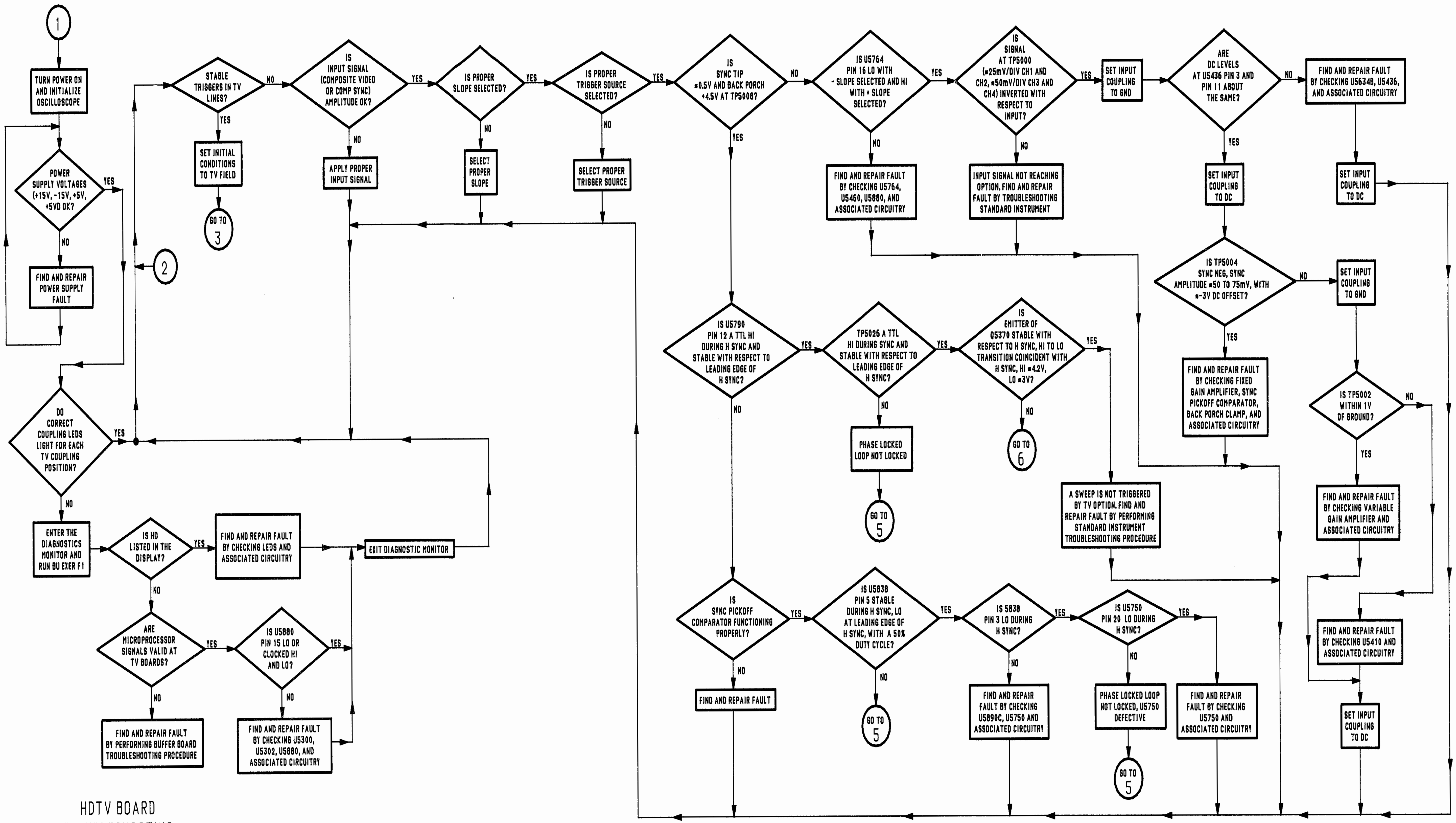
HDTV OPTION POWER DISTRIBUTION DIAGRAM 36

Assembly A26

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C5315	2B	2C	C5772	3A	1D	CR5878A	1E	2B	R5880	1D	1B
C5371	3A	1C	C5773	3A	3D	CR5878B	1E	2B	R5881	2D	1B
C5372	3A	3B	C5774	3A	3B				R5882	2D	1B
C5373	3A	1C	C5776	3A	3A	J5800	1E	1A	R5883	2E	1B
C5374	3A	1D	C5777	3A	2B				R5884	1D	2B
C5458	3A	2A	C5778	3A	2B	Q5870	2B	1C	R5885	1B	1B
C5460	3A	3D	C5800	2A	2C	Q5875	2D	1B	R5886	1C	1B
C5462	3A	3C	C5802	2A	4F	Q5880	2D	1C	R5888	2B	1B
C5490	3A	2C	C5804	2B	3C	Q5885	2B	1B	R5889	2B	1B
C5545	3A	4C	C5806	2B	3E	Q5890	1C	1B	R5890	1E	1B
C5565	3A	3D	C5810	3A	2C				R5892	1D	1B
C5633	2D	4D	C5812	3A	4G	R5756	3C	2A	R5893	1E	2B
C5634	2C	4J	C5814	3B	4C	R5870	1B	1B			
C5722	3C	4A	C5816	3B	4E	R5871	2C	2B	U5315	3B	2C
C5723	2C	4A	C5838	3A	2B	R5872	1B	1B	U5790B	1C	3B
C5731	3D	4D	C5872	1A	1B	R5873	2D	1B	U5870A	1B	1B
C5732	3C	4J	C5875	1D	1B	R5874	1B	1B	U5870B	1D	1B
C5751	3B	1B	C5886	1C	1B	R5875	2D	1B	U5871	2D	1B
C5752	2B	2A	C5960	3A	1C	R5876	1B	1B	U5875A	2C	1C
C5757	3C	2A	C6300	3B	2B	R5877	1B	1B			
C5770	3A	3C				R5878	1C	2B	VR5878	1E	2B
C5771	3A	3B									

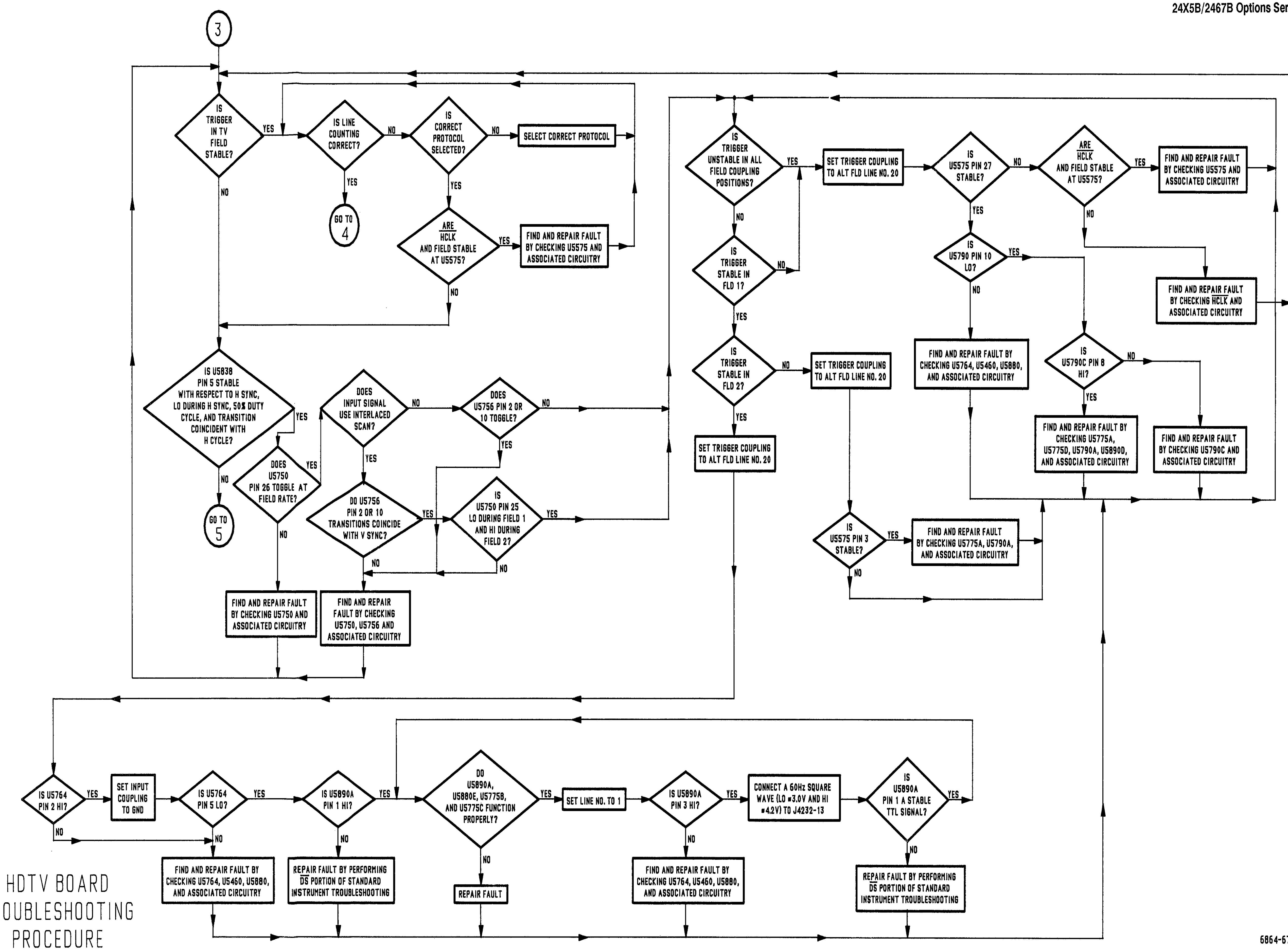
Partial A26 also shown on diagrams 25, 26, 33, 34 and 35.


PARTIAL A26 HIGH DEFINITION TELEVISION AND COUNTER/TIMER/TRIGGER BOARD
STATIC SENSITIVE DEVICE SEE MAINTENANCE SECTION
[ ] INDICATES THE GRID COORDINATE ON ANOTHER SCHEMATIC.
SEE DIAGRAM 24 FOR POWER DISTRIBUTION
TRACE SEP
RAMP OUT
VERT SYNC
18 0.1 uF CAPS



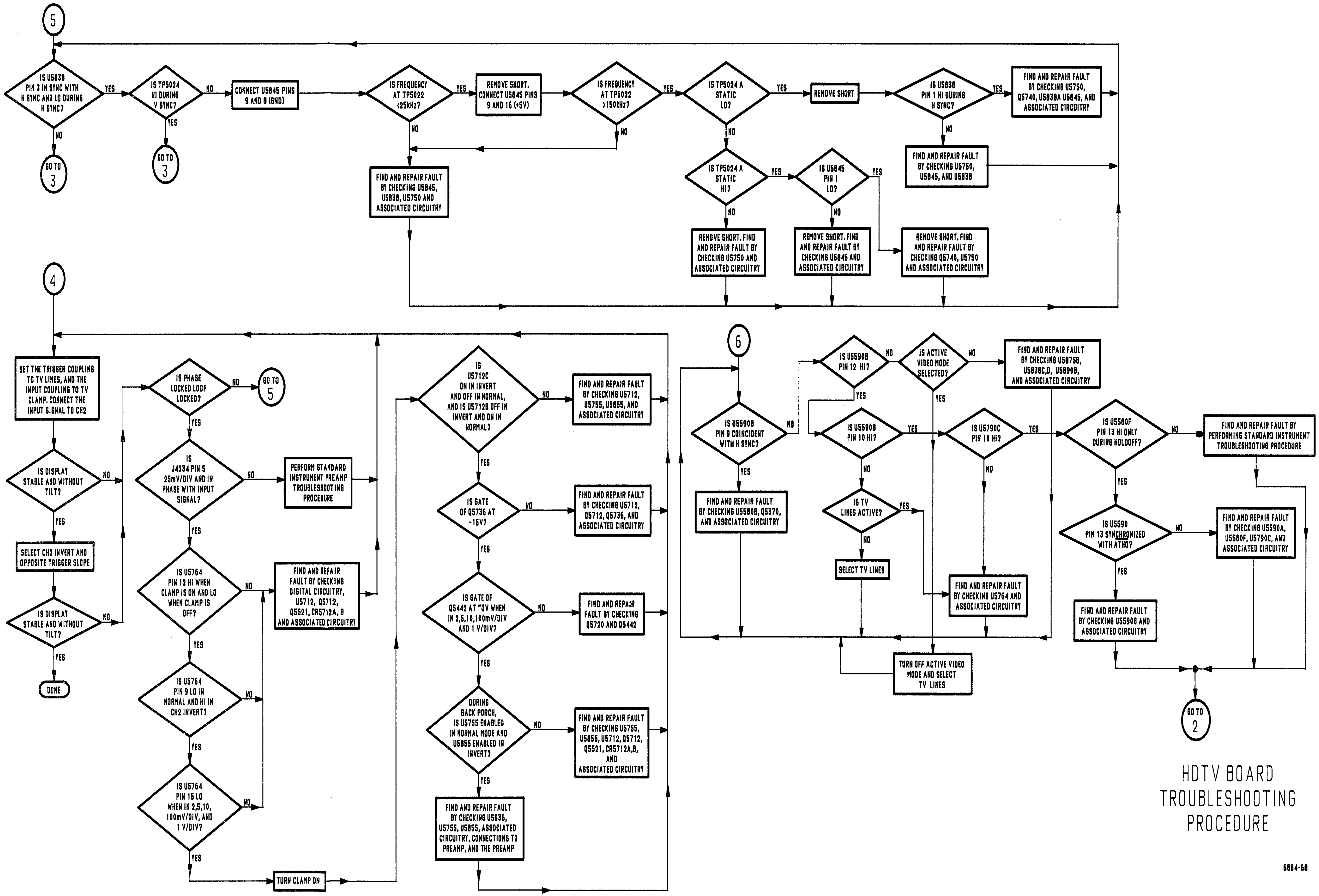
HDTV BOARD TROUBLESHOOTING PROCEDURE

6864-66



HDTV BOARD TROUBLESHOOTING PROCEDURE

6864-67



HDTV BOARD
TROUBLESHOOTING
PROCEDURE

6864-68

J/P4300 — A29 TO A30

Pin	Line Name	Schem
1	+5VD	30,31
2	TRANSDUCER DRIVE	30,31

J/P/W4330 — A5 TO A30

Pin	Line Name	Schem
1	$+5V_D$	21,31
2	GND C	12,31
3	BA1	1,31
4	BA0	1,31
5	ROMEN	1,31
6	R/W DLYD	1,31
7	EXT FP	1,31
8	LOWAD	1,31
9	BD0	1,31
10	BD1	1,31
11	BD2	1,31
12	BD3	1,31
13	BD4	1,31
14	BD5	1,31
15	BD6	1,31
16	BD7	1,31

J/P/W4540 — A22 TO A23

Pin	Line Name	Schem
1	+5VD	22
2	LOCK	22
3	SRQ	22
4	REM	22

J/P4800 — A23 TO GPIB CONNECTOR

Pin	Line Name	Schem
1	DIO1	22
2	DIO5	22
3	DIO2	22
4	DIO6	22
5	DIO3	22
6	DIO7	22
7	DIO4	22
8	DIO8	22
9	EOI	22
10	REN	22
11	DAV	22
12	GND G	22
13	NRFD	22
14	GND G	22
15	NDAC	22
16	GND G	22
17	IFC	22
18	GND G	22
19	SRQ	22
20	GND G	22
21	ATN	22
22	GND G	22
23	GND	22
24	GND G	22

J/P/W4990 — A29

Pin	Line Name	Schem
1	LOW	28

J/P/W4991 — A29

Pin	Line Name	Schem
1	FRONT PANEL FUSE	28

J/P/W5090 — A29

Pin	Line Name	Schem
1	HIGH	28

J/P/W5210 — A29 TO A30

Pin	Line Name	Schem
1	+5VD	30
2	TRANSDUCER DRIVE	30

J/P5220 — A3 TO A29

Pin	Line Name	Schem
1	5.5VAC	9,32
2	GND	9,32
3	5.5VAC	9,32

J/P5290 — A5 TO A29

Pin	Line Name	Schem
1	BA7	30
2	DGND	32
3	BA6	30
4	BA14	30
5	MR	30
6	BA13	30
7	BA5	30
8	BA12	30
9	BA4	30
10	BA11	30
11	BA3	30
12	BA10	30
13	DGND	32
14	BA9	30
15	BA2	30
16	BA8	30
17	BA1	30
18	BA0	30
19	BR/W DLYD	30
20	BD7	30
21	DGND	30
22	BD6	30
23	BD3	30
24	BD5	30
25	BD2	30
26	DGND	32
27	BD1	30
28	BD4	30
29	BD0	30
30	E	30
31	DGND	32
32	B10MHZ	30
33	BVMA	30
34	RESET	30
35	$+5V_D$	32
36	TRIGIN	32
37	$+5V_D$	32
38	TRACE SEP 1	32
39	+15V	32
40	−15V	32

J/P5291 — A29

Pin	Line Name	Schem
1	BA7	30
2	DGND	32
3	BA6	30
4	BA14	30
5	MR	30
6	BA13	30
7	BA5	30
8	BA12	30
9	BA4	30
10	BA11	30
11	BA3	30
12	BA10	30
13	DGND	32
14	BA9	30
15	BA2	30
16	BA8	30
17	BA1	30
18	BA0	30
19	BR/W DLYD	30
20	BD7	30
21	DGND	32
22	BD6	30
23	BD3	30
24	BD5	30
25	BD2	30
26	DGND	32
27	BD1	30
28	BD4	30
29	BD0	30
30	E	30
31	DGND	32
32	10MHZ	30
33	VMA	30
34	BRESET	30
35	$+5V_D$	32
36	NC	32
37	$+5V_D$	32
38	NC	32
39	+15V	32
40	−15V	32

J5800 — A26

Pin	Line Name	Schem
1	RAMP OUT	24
2	GND	24

J/P/W5990 — A26 TO WORD RECOGNIZER CONNECTOR

Pin	Line Name	Schem
1	WORD	25,27
2	WDATA	25,27
3	WCLOCK	25,27
4	GND	25,27
5	$+5V_W$	25,27
6	DATA RETURN	25,27
7	WT OUT	25
8	GND	25
9	EXT TRIG	25
10	GND	25

J/P/W6370 — WORD RECOGNIZER CONNECTOR TO A32

Pin	Line Name	Schem
1	WORD	27
2	WDATA	27
3	WCLOCK	27
4	GND	27
5	$+5V_W$	27
6	DATA RTRN	27
7	GND	27

J/P6380 — A32 TO A33

Pin	Line Name	Schem
1	$+5V_W$	27
2	WCLOCK	27
3	SYNCH	27
4	GATED CLOCK	27
5	GND	27

J/P6385 — A32 TO A33

Pin	Line Name	Schem
1	GND	27
2	LOWBYTEEQUAL	27
3	SERIAL DATA	27
4	GATED Q	27
5	Q DONT CARE	27
6	DATA RETURN	27

J/P/W6300 — A32 TO WORD RECOGNIZER PROBES

Pin	Line Name	Schem
1	GND	27
2	D8	27
3	D9	27
4	D10	27
5	D11	27
6	D12	27
7	D13	27
8	D14	27
9	D15	27
10	Q	27

J/P/W6400 — A33 TO WORD RECOGNIZER PROBES

Pin	Line Name	Schem
1	GND	27
2	D0	27
3	D1	27
4	D2	27
5	D3	27
6	D4	27
7	D5	27
8	D6	27
9	D7	27
10	C	27

J/P100		A1 TO A26
Pin	Line Name	Schem
1	GND	4,23
2	CH2 PO	4,23

J/P101		A1 TO A26
Pin	Line Name	Schem
1	TSA TO MAIN	5,24
2	GND	5,24
3	TSA FROM MAIN	5,24
4	GND	5,24
5	GND	5,24
6	TSB TO MAIN	5,24
7	GND	5,24
8	TSB FROM MAIN	5,24
9	GND	5,24
10	NC	5,24

J/P102		A1 TO A26
Pin	Line Name	Schem
1	BHO	5,24
2	GND	5,24
3	A AUX TRG	5,24
4	GND	5,24
5	AHO	5,24
6	NC	5,24
7	GND	5,24
8	B AUX TRG	5,24
9	GND	5,24
10	DS	5,24

J/P103		A1 TO A26
Pin	Line Name	Schem
1	CH2 OFFSET	4,23
2	GND	4,23

J/P104		A1 TO A26
Pin	Line Name	Schem
1	SGA	5,23
2	GND	5,23
3	SGB	5,23
4	GND	5,23

J/P109		A1 TO A26
Pin	Line Name	Schem
1	SSA	5,23
2	GND	5,23

J/P302		A3 TO A29
Pin	Line Name	Schem
1	5.5VAC	9,32
2	GND	9,32
3	5.5VAC	9,32

J/P303		A3 TO A23
Pin	Line Name	Schem
1	GND	9,22
2	+5VD	9,22
3	GND	9,22

J/P305		A3 TO A26
Pin	Line Name	Schem
1	+5VD	9,24
2	+5VD	9,24

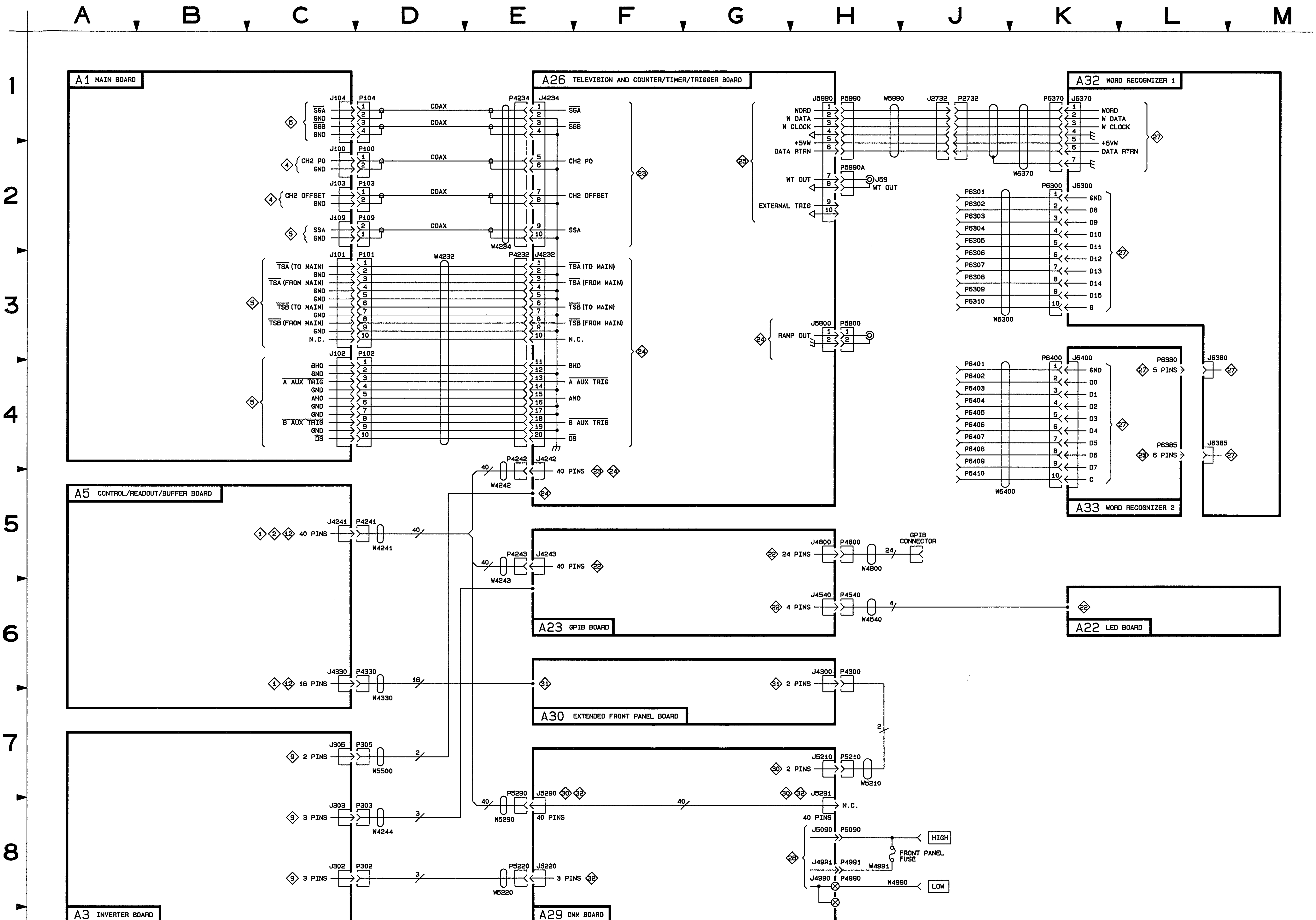
J/P/W4232		A1 TO A26
Pin	Line Name	Schem
1	TSA TO MAIN	24
2	AGND	24
3	TSA FROM MAIN	24
4	AGND	24
5	AGND	24
6	TSB TO MAIN	24
7	AGND	24
8	TSB FROM MAIN	24
9	AGND	24
10	NC	24
11	BHO	24
12	AGND	24
13	A AUX TRIG	24
14	AGND	24
15	AHO	24
16	AGND	24
17	AGND	24
18	B AUX TRIG	24
19	AGND	24
20	DS	24

J/P/W4234		A1 TO A26
Pin	Line Name	Schem
1	SGA	23
2	GND	23
3	SGB	23
4	GND	23
5	CH2 PO	23
6	GND	23
7	CH2 OFFSET	23
8	GND	23
9	SSA	23
10	GND	23

J/P/W4241		A5 TO A29
Pin	Line Name	Schem
1	BA7	1,30
2	DGND	12,32
3	BA6	1,30
4	BA14	1,30
5	MR	1,22
6	BA13	1,30
7	BA5	1,30
8	BA12	1,30
9	BA4	1,30
10	BA11	1,30
11	BA3	1,30
12	BA10	1,30
13	DGND	12,32
14	BA9	1,30
15	BA2	1,30
16	BA8	1,30
17	BA1	1,30
18	BA0	1,30
19	BR/W DLYD	1,30
20	BD7	1,30
21	DGND	12,32
22	BD6	1,30
23	BD3	1,30
24	BD5	1,30
25	BD2	1,30
26	DGND	12,32
27	BD1	1,30
28	BD4	1,30
29	BD0	1,30
30	E	1,30
31	DGND	12,32
32	B10MHZ	1,30
33	BVMA	1,30
34	RESET	1,30
35	$+5V_D$	12,32
36	TRIGIN	12,32
37	$+5V_D$	12,32
38	TRACE SEP 1	12,32
39	+15V	1,32
40	−15V	1,32

J/P/W4242		A5 TO A26
Pin	Line Name	Schem
1	BA7	1,24
2	DGND	12,24
3	BA6	1,24
4	BA14	1,24
5	MR	1,22
6	BA13	1,24
7	BA5	1,24
8	BA12	1,24
9	BA4	1,24
10	BA11	1,24
11	BA3	1,24
12	BA10	1,24
13	DGND	12,24
14	BA9	1,24
15	BA2	1,24
16	BA8	1,24
17	BA1	1,24
18	BA0	1,24
19	BR/W DLYD	1,24
20	BD7	1,24
21	DGND	12,24
22	BD6	1,24
23	BD3	1,24
24	BD5	1,24
25	BD2	1,24
26	DGND	12,24
27	BD1	1,24
28	BD4	1,24
29	BD0	1,24
30	E	1,24
31	DGND	12,24
32	B10MHZ	1,24
33	BVMA	1,24
34	RESET	1,24
35	$+5V_D$	12,24
36	TRIGIN	2,23
37	$+5V_D$	12,23
38	TRACE SEP 1	2,24
39	+15V	12,24
40	−15V	12,24

J/P4243		A5 TO A23
Pin	Line Name	Schem
1	BA7	1,22
2	DGND	12,22
3	BA6	1,22
4	BA14	1,22
5	MR	1,22
6	BA13	1,22
7	BA5	1,22
8	BA12	1,22
9	BA4	1,22
10	BA11	1,22
11	BA3	1,22
12	BA10	1,22
13	DGND	12,22
14	BA9	1,22
15	BA2	1,22
16	BA8	1,22
17	BA1	1,22
18	BA0	1,22
19	BR/W DLYD	1,22
20	BD7	1,22
21	DGND	12,22
22	BD6	1,22
23	BD3	1,22
24	BD5	1,22
25	BD2	1,22
26	DGND	12,22
27	BD1	1,22
28	BD4	1,22
29	BD0	1,22
30	E	1,22
31	DGND	12,22
32	B10MHZ	1,22
33	BVMA	1,22
34	RESET	1,22
35	NC	22
36	NC	22
37	NC	22
38	NC	22
39	NC	22
40	NC	22


A1 MAIN BOARD
A26 TELEVISION AND COUNTER/TIMER/TRIGGER BOARD
A32 WORD RECOGNIZER 1
A33 WORD RECOGNIZER 2
A5 CONTROL/READOUT/BUFFER BOARD
A23 GPIB BOARD
A22 LED BOARD
A30 EXTENDED FRONT PANEL BOARD
A3 INVERTER BOARD
A29 DMM BOARD
J104 P104 P4234 J4234
SGA GND SGB GND
COAX
J100 P100
CH2 PO GND
J103 P103
CH2 OFFSET GND
J109 P109
SSA GND
W4234
J101 P101 W4232 P4232 J4232
TSA (TO MAIN) GND TSA (FROM MAIN) GND GND TSB (TO MAIN) GND TSB (FROM MAIN) GND N.C.
J102 P102
BHO GND A AUX TRIG GND AHO GND GND B AUX TRIG GND DS
P4242 J4242 40 PINS W4242
J4241 P4241 40 PINS W4241
P4243 J4243 40 PINS W4243
J5990 P5990 W5990 J2732 P2732 P6370 J6370 W6370
WORD W DATA W CLOCK +5VW DATA RTRN
P5990A J59 WT OUT
EXTERNAL TRIG
P6300 J6300 W6300
P6301 P6302 P6303 P6304 P6305 P6306 P6307 P6308 P6309 P6310
GND D8 D9 D10 D11 D12 D13 D14 D15 Q
J5800 P5800 RAMP OUT
P6400 J6400 W6400
P6401 P6402 P6403 P6404 P6405 P6406 P6407 P6408 P6409 P6410
GND D0 D1 D2 D3 D4 D5 D6 D7 C
P6380 5 PINS J6380
P6385 6 PINS J6385
J4800 P4800 24 PINS W4800 GPIB CONNECTOR
J4540 P4540 4 PINS W4540
J4330 P4330 16 PINS W4330
J4300 P4300 2 PINS
J305 P305 2 PINS W5500
J5210 P5210 2 PINS W5210
P5290 J5290 J5291 40 PINS N.C. W5290
J303 P303 3 PINS W4244
J5090 P5090 HIGH
J4991 P4991 W4991 FRONT PANEL FUSE
J4990 P4990 W4990 LOW
J302 P302 3 PINS
P5220 J5220 3 PINS W5220

REPLACEABLE MECHANICAL PARTS

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

When ordering parts, 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.

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.

FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentations system used in the description column.

1 2 3 4 5 Name & Description

Assembly and/or component
Attaching parts for assembly and/or component

END ATTACHING PARTS

Detail part of assembly and/or component
Attaching parts for detail part

END ATTACHING PARTS

Parts of detail part
Attaching parts for parts or detail part

END ATTACHING PARTS

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.

Attaching parts must be purchased separately, unless otherwise specified.

ABBREVIATIONS

Abbreviations conform to American National Standard Y1.1.

CROSS INDEX – MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
S3629	SCHURTER AG H C/O PANEL COMPONENTS CORP	2015 SECOND STREET	BERKELEY CA 94170
TK0032	POWELL ELECTRONICS	411 FAIRCHILD DR	MT VIEW CA 94040
TK0435	LEWIS SCREW CO	4300 S RACINE AVE	CHICAGO IL 60609-3320
TK1159	IMPROVED PRODUCTS	3400 OLYMPIC STREET	SPRINGFIELD OR 97477
TK1160	MECHANICAL PRODUCTS MANUFACTURING CO	1723 1ST SO	SEATTLE WA 98134-3462
TK1163	POLYCAST INC	9898 SW TIGARD ST	TIGARD OR 97223
TK1165	STEN MFG INC	9702 85TH AVENUE N	MINNEAPOLIS MN 55369
TK1166	CIMCO INC	265 BRIGGS AVE	COSTA MESA CA 92626-4506
TK1169	DIEMAKERS INC	801 2ND ST PO BOX 278	MONROE CITY MO 63456-1441
TK1173	ACCURATE PLASTICS & ENG INC	1921 MILLER DRIVE	LONGMONT CO 80501
TK1177	BELL INDUSTRIES (DIST)	6024 SW JEAN ROAD	LAKE OSWEGO OR 97034
TK1287	ENOCH MFG CO	14242 SE 82ND DR PO BOX 98	CLACKAMAS OR 97015
TK1302	MOUNTAIN MOLDING	606 SECOND STREET	BERTHOUD CO 80513
TK1326	NORTHWEST FOURSLIDE INC	18224 SW 100TH CT	TUALATIN OR 97062
TK1328	NIDEC AMERICA CORP	682 TRANSFER RD	ST PAUL MN 55114
TK1374	TRI-TEC ENGINEERING CORP		
TK1386	PYRAMID ELECTRONICS SUPPLY INC	9757 JUANITA DRIVE NE	KIRKLAND WA 98034
TK1465	BEAVERTON PARTS MFG CO	1800 NW 216TH AVE	HILLSBORO OR 97124-6629
TK1547	MOORE ELECTRONICS INC (DIST)	19500 SW 90TH COURT PO BOX 1030	TUALATIN OR 97062
TK1591	EASTMAN PLASTICS INC	4605 SW 180TH	ALOHA OR 97007
TK1592	W AND W METAL	6521 SE CROSSWHITE WAY	PORTLAND OR 97206
TK1614	STUCKEL R J CO	1385 HOWARD ST	ELK GROVE VILLAGE IL 60007-2213
TK1622	TRIPLE L PRECISION	P O BOX 85	TIMBER OR 97144
TK1680	TECHNICAL DYNAMICS ALUMINUM CORP	9124 SW 64TH	PORTLAND OR 97206
TK1905	PUGET CORP OF OREGON	7440 S W BONITA	TIGARD OR 97223
TK1938	GALGON INDUSTRIES	37399 CENTRAL MONT PLACE	FREMONT CA 94536
TK2156	ACACIA/DEANCO	7763 SW CIRRUS RD SUITE 26	BEAVERTON OR 97005-6452
0B445	ELECTRI-CORD MFG CO INC	312 EAST MAIN ST	WESTFIELD PA 16950
0JRZ2	BADGLEY MFG CO	1620 NE ARGYLE	PORTLAND OR 97211
0JR05	TRIQUEST CORP	3000 LEWIS AND CLARK HWY	VANCOUVER WA 98661-2999
0J260	COMTEK MANUFACTURING OF OREGON (METALS)	PO BOX 4200	BEAVERTON OR 97076-4200
0J7N9	MCX INC	30608 SAN ANTONIO ST	HAYWARD CA 94544
0J9P9	GEROME MFG CO INC	PO BOX 737	NEWBURG OR 97132
0KB00	SCHRAMM PLASTIC FABRICATIORS	7885 SW HUNZIKER	TIGARD OR 97223
0KB01	STAUFFER SUPPLY	810 SE SHERMAN	PORTLAND OR 97214
00779	AMP INC	2800 FULLING MILL PO BOX 3608	HARRISBURG PA 17105

CROSS INDEX – MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
02768	ILLINOIS TOOL WORKS INC FASTEX DIVISION	195 ALGONQUIN ROAD	DES PLAINES IL 60016-6103
04811	PRECISION COIL SPRING CO	10107 ROSE ST PO BOX 5450	EL MONTE CA 91734
06915	RICHCO PLASTIC CO	5825 N TRIPP AVE	CHICAGO IL 60646-6013
07416	NELSON NAME PLATE CO	3191 CASITAS	LOS ANGELES CA 90039-2410
09922	BURNDY CORP	RICHARDS AVE	NORWALK CT 06852
12327	FREEWAY CORP	9301 ALLEN DR	CLEVELAND OH 44125-4632
18565	CHOMERICS INC	77 DRAGON COURT	WOBURN MA 01801-1039
18632	NORTON CHEMPLAST DBA NORTON PERFORMANCE PLASTICS	150 DEY RD	WAYNE NJ 07470-4670
22526	DU PONT E I DE NEMOURS AND CO INC DU PONT ELECTRONICS DEPT	515 FISHING CREEK RD	NEW CUMBERLAND PA 17070-3007
22670	G M NAMEPLATE INC	2040 15TH AVE WEST	SEATTLE WA 98119-2728
24931	SPECIALTY CONNECTOR CO INC	2100 EARLYWOOD DR PO BOX 547	FRANKLIN IN 46131
5F506	EOFF ELECTRIC CO	509 NW 10TH AVE	PORTLAND OR 97209-3201
53387	MINNESOTA MINING MFG CO	PO BOX 2963	AUSTIN TX 78769-2963
54583	TDK ELECTRONICS CORP	12 HARBOR PARK DR	PORT WASHINGTON NY 11550
61935	SCHURTER INC	1016 CLEGG COURT	PETALUMA CA 94952-1152
7X318	KASO PLASTICS INC	11015 A NE 39th	VANCOUVER WA 98662
73743	FISCHER SPECIAL MFG CO	111 INDUSTRIAL RD	COLD SPRING KY 41076-9749
78189	ILLINOIS TOOL WORKS INC SHAKEPROOF DIV	ST CHARLES ROAD	ELGIN IL 60120
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077-0001
85480	BRADY W H CO CORP H Q INDUSTRIAL PRODUCTS DIV	2221 W CAMDEN RD PO BOX 2131	MILWAUKEE WI 53209
88831	TEKSUN INC	11368 WEST OLYMPIC BLVD	LOS ANGELES CA 90064-1605
92101	SCHULZE MFG	50 INGOLD RD	BURLINGAME CA 94010-2206

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1 -1	333-2995-00			1	PANEL,FRONT:	22670	ORDER BY DESC
-2	334-6337-01			1	MARKER,IDENT:MARKED 2445B	22670	ORDER BY DESC
	334-6338-01			1	MARKER,IDENT:MARKED 2445B	22670	ORDER BY DESC
-3	366-2041-03			4	KNOB:DOVE GRAY,BAR,0.172 X 0.41 X 0.496	7X318	ORDER BY DESC
	366-2036-00			1	PUSH BUTTON:GY,0.206 SQ,1.445 H	0JR05	ORDER BY DESC
-4	333-2877-00			1	PANEL,FRONT:CRT	07416	ORDER BY DESC
-5	200-2779-00			1	COVER,TOP:TRIM	0JR05	ORDER BY DESC
-6	101-0095-01			1	TRIM,DECORATIVE:FRONT	TK1163	ORDER BY DESC
					ATTACHING PARTS		
	211-0718-00			10	SCREW,MACHINE:6-32 X 0.312,FLH,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-7	348-0740-00			2	FOOT,CABINET:BOTTOM FRONT,PLASTIC	0JR05	ORDER BY DESC
					ATTACHING PARTS		
-8	200-0740-00			2	COVER,ATTEN:RIGHT,15.87 X 2.25,BRASS	80009	200074000
					END ATTACHING PARTS		
-9	334-6341-00			1	MARKER,IDENT:MKD REAR BNC	07416	ORDER BY DESC
-10	334-4378-01			1	MARKER,IDENT:MKD PROBE POWER	07416	ORDER BY DESC
-11	334-4378-01			1	MARKER,IDENT:MKD PROBE POWER	07416	ORDER BY DESC
-12	343-0003-00			1	CLAMP,LOOP:0.25 ID,PLASTIC	06915	E4 CLEAR ROUND
					ATTACHING PARTS		
-13	211-0691-00			1	SCREW,MACHINE:6-32 X 0.625,PNH,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-14	161-0104-00			1	CABLE ASSY,PWR,:3 WIRE,98.0 L	0B445	MC6 -3 CG86
-15	348-0780-00			2	FOOT,CABINET:W/CORD WRAP,REAR,BLACK	0JR05	ORDER BY DESC
					ATTACHING PARTS		
-16	211-0722-00			2	SCREW,MACHINE:6-32 X 0.25,PNH,STL	0KB01	ORDER BY DESC
-17	212-0154-00			4	SCREW,MACHINE:8-32 X 1.125,PNH,STL	0KB01	ORDER BY DESCRI
					END ATTACHING PARTS		
-18	200-2275-04			1	COVER,REAR:DMM W/LABELS	80009	200227504
-19	337-2395-00			2	SHIELD,ELEC:HANDLE	TK1614	ORDER BY DESC
					ATTACHING PARTS		
-20	213-0138-00			4	SCREW,TPG,TF:4-24 X 0.188,TYPE B,PNH,STL	TK0435	TAPPING SCREW
					END ATTACHING PARTS		
	437-0320-00			1	CABINET ASSY:DMM OPT 1	80009	437032000
-21	348-0764-04			1	.SHLD GSKT,ELEK:0.125 X 0.188,WIRE MESH	18565	ORDER BY DESC
-22	437-0309-00			1	.CABINET,SCOPE:2465 OPT 01	0J9P9	ORDER BY DESC
-23	367-0303-04			1	.HANDLE,CARRYING:12.86 L,GRIP & INDEX	0JR05	ORDER BY DESC
					ATTACHING PARTS		
-24	212-0144-00			2	.SCREW,TPG,TF:8-16 X 0.562 L,PLASTITE	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-25	334-6339-01			1	MARKER,IDENT:MARKED 2445	22670	ORDER BY DESC

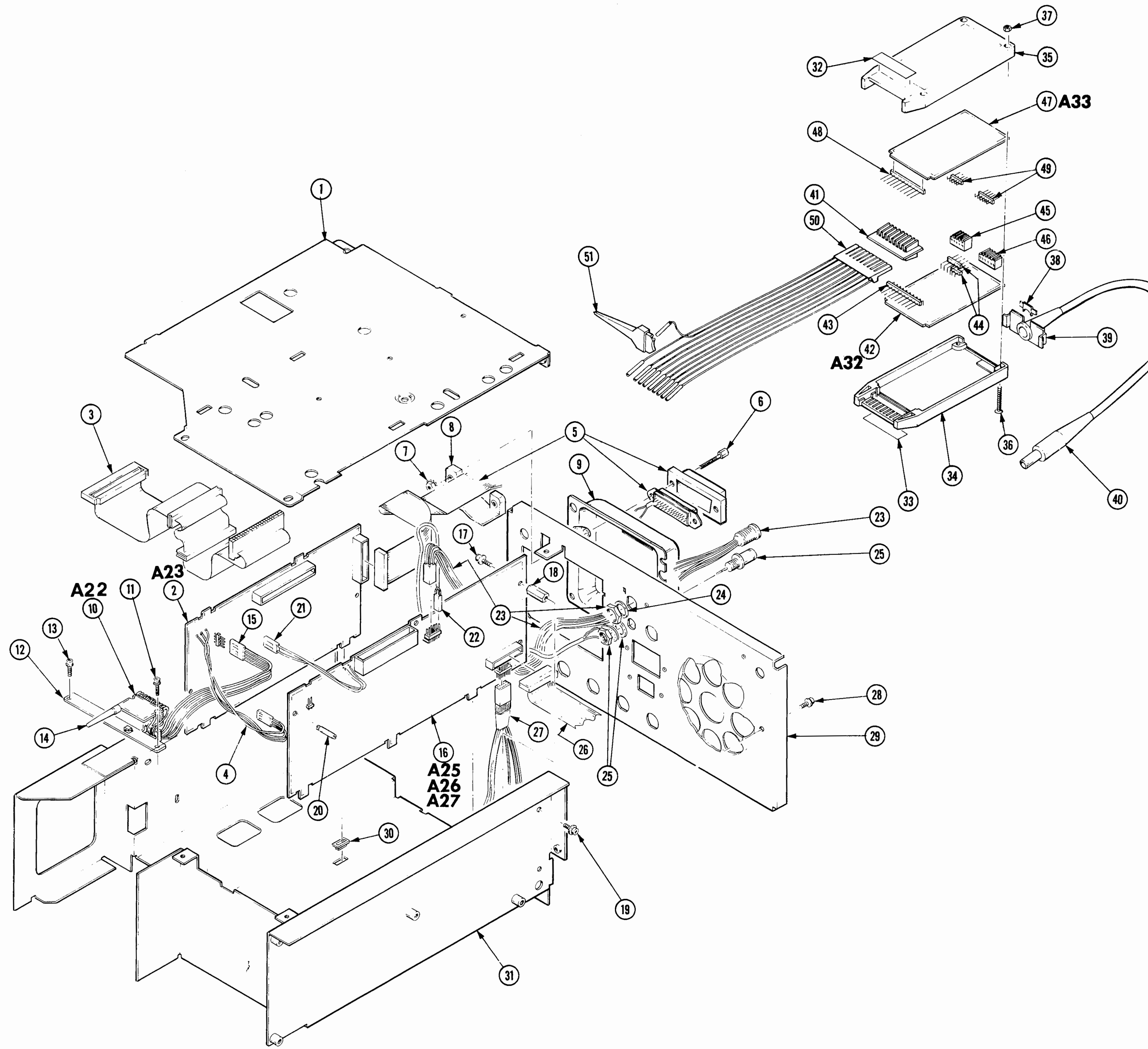
Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2 -1	407-2790-03			1	BRACKET,CKT BD:ALUMINUM	0J260	ORDER BY DESC
					ATTACHING PARTS		
-2	211-0711-00			4	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
-3	211-0747-00			1	SCREW,MACHINE:6-32 X 0.188,PNH,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-4	348-0757-00			1	GROMMET,PLASTIC:BLACK,U SHAPE,0.25 ID	TK1166	ORDER BY DESC
-5	407-2842-00			1	BRACKET,CKT BD:ALUMINUM	TK1592	ORDER BY DESC
					ATTACHING PARTS		
-6	211-0304-00			5	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-7	175-2324-00			1	CA ASSY,SP,ELEC:14,26 AWG,29.0 L	80009	175232400
-8	175-8323-00			1	CA ASSY,SP,ELEC:3,26 AWG,13.0 L,9-N	0J7N9	ORDER BY DESC
-9	175-8730-00			1	CA ASSY,SP,ELEC:2,26 AWG,7.5 L	TK1547	P/N PCA 7543AL
-10	337-3121-01			1	SHIELD,ELEC:DMM,BOTTOM	TK1905	337-3121-01
					ATTACHING PARTS		
-11	211-0720-00			5	SCR,ASSEM WSHR:6-32 X 0.50,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-12	337-3120-00			1	SHIELD,ELEC:DMM,TOP	TK1905	ORDER BY DESC
-13	-----------			1	MARKER,IDENT:MKD CAUTION		
-14	196-2924-00			1	LEAD ASSY,ELEC:2,24 AWG,5.5 L,9-1/9-2	0J7N9	ORDER BY DESC
					ATTACHING PARTS		
-15	211-0304-00			1	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9	0KB01	ORDER BY DESC
-16	210-0586-00			1	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	TK0435	ORDER BY DESC
-17	210-0046-00			1	WASHER,LOCK:0.261 ID,INTL,0.018 THK,STL	78189	1214-05-00-0541
					END ATTACHING PARTS		
-18	214-3492-00			2	HINGE HALF:DMM,ALUMINUM	TK1165	80630-000
					ATTACHING PARTS		
-19	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-20	-----------			1	CIRCUIT BD ASSY:MULTIMETER (SEE A29 REPL)		
					ATTACHING PARTS		
-21	211-0304-00			2	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-22	136-0755-00			1	SOCKET,DIP::PCB,;28 POS,2 X 14,0.1 X 0.6 CTR	09922	DILB28P-108
-23	358-0136-00			1	INSULATOR,BSHG:0.075 ID X 0.203 OD X 0.075	18632	ORDER BY DESC
-24	344-0356-00			2	CLIP,ELECTRICAL:FUSE,BRONZE,ALBALOY PL	5F506	ORDER BY DESC
					ATTACHING PARTS		
-25	211-0722-00			2	SCREW,MACHINE:6-32 X 0.25,PNH,STL	0KB01	ORDER BY DESC
-26	210-0457-00			2	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-27	426-1864-01			1	FRAME,CRT:	TK1169	ORDER BY DESC
					ATTACHING PARTS		
-28	211-0713-00			4	SCREW,MACHINE:6-32 X 1.25,FLH,100 DEG,STL	0KB01	ORDER BY DESC
-29	213-0194-00			4	THUMBSCREW:0.25-36 X 0.203,0.312 OD HD,BRS	80009	213019400
					END ATTACHING PARTS		
-30	337-2926-03			1	SHLD,IMPLOSION:4.44 X 3.67 X 0.06,CLEAR	TK1159	ORDER BY DESC
	348-0731-01			1	GASKET:CRT,POLYETHYLENE	TK1159	ORDER BY DESC
-31	343-0993-00			2	RETAINER,CRT:BLACK,PLASTIC (UPPER LEFT/LOWER RIGHT/BLACK)	TK1163	ORDER BY DESC
-32	343-0992-00			2	RETAINER,CRT:CLEAR,PLASTIC (UPPER RIGHT/LOWER LEFT/NATURAL)	TK1163	ORDER BY DESC
-33	366-2013-02			13	PUSH BUTTON:IVORY GRAY,0.186 SQ X 0.48 H	0JR05	ORDER BY DESC
-34	378-0204-00			1	REFLECTOR,LIGHT:INT SCALE ILLUMINATION	7X318	ORDER BY DESC
-35	-----------			1	CIRCUIT BD ASSY:LED (SEE A22 REPL)		
-36	386-5133-01			1	SUBPANEL,FRONT:2465 OPT 01	TK1465	386513301
					ATTACHING PARTS		
-37	213-0914-00			2	SCREW,TPG,TR:6-32 X 0.75,FLH,100 DEG,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-38	352-0765-01			1	FUSEHOLDER:3AG,PNL MT	61935	FEU 031-1768
-39					CIRCUIT BD ASSY:FR PANEL (SEE A30 REPL)		
					ATTACHING PARTS		

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2 -40	211-0718-00			4	SCREW,MACHINE:6-32 X 0.312,FLH,100 DEG,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-41	352-0691-01			1	HOLDER,CONN:POLYCARBONATE	88831	ORDER BY DESC
					ATTACHING PARTS		
-42	213-0914-00			2	SCREW,TPG,TR:6-32 X 0.75,FLH,100 DEG,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-43	348-0792-02			1	GASKET:ELECTRICAL SHIELD,37.0 L	18565	ORDER BY DESC
-44	378-0275-00			1	DEFLECTOR,AIR:ALUMINUM	TK1160	378-0275-00
					ATTACHING PARTS		
-45	211-0711-00			1	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-46	119-2102-00			1	FAN,TUBEAXIAL:12V,1.5W,3200RPM,24CFM	TK1328	119-2102-00
-47	200-2264-00			1	CAP,FUSEHOLDER:3AG FUSES	S3629	FEK 031 1666
-48	204-0833-00			1	BODY,FUSEHOLDER:3AG & 5 X 20MM FUSES	S3629	031 1653 (MODEL
-49	200-2265-00			1	CAP,FUSEHOLDER:5 X 20MM FUSES	S3629	FEK 031.1663
-50	195-3984-00			1	LEAD,ELECTRICAL:22 AWG,4.0 L,8-01	TK0032	ORDER BY DESC
					ATTACHING PARTS		
-51	210-0457-00			1	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-52	119-1536-00			1	FILTER,RFI:3A,250VAC,50/60HZ	54583	ZUB2203-00
					ATTACHING PARTS		
-53	211-0332-00			2	SCR,ASSEM WSHR:4-40 X 0.5,PNH,STL	0KB01	ORDER BY DESC
-54	210-0586-00			2	NUT,PL,ASSEM WA:4-40 X 0.25,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-55	195-3989-00			1	LEAD,ELECTRICAL:18 AWG,4.0 L,8-9	TK0032	ORDER BY DESC
-56	195-3990-00			1	LEAD,ELECTRICAL:18 AWG,4.5 L,5-4	TK0032	ORDER BY DESC
-57	195-3987-00			1	LEAD,ELECTRICAL:22 AWG,2.6 L,8-19	TK0032	ORDER BY DESC
-58					SWITCH,SLIDE:DPDT (SEE S90 IN STD. MANUAL)		
					ATTACHING PARTS		
-59	211-0304-00			2	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9	0KB01	ORDER BY DESC
-60	210-0586-00			2	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-61	200-2686-00			1	COVER,REAR:CRT	TK1938	ORDER BY DESC
					ATTACHING PARTS		
-62	211-0718-00			4	SCREW,MACHINE:6-32 X 0.312,FLH,100 DEG,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-63	195-8410-00			1	LEAD,ELECTRICAL:22 AWG,1.65 L	TK1386	ORDER BY DESC
					ATTACHING PARTS		
-64	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-65	131-1910-01			4	CONN,RCPT,ELEC:BNC,FEMALE	24931	28JR284-1
-66	195-9513-00			1	LEAD,ELECTRICAL:22 AWG,1.4 L,	TK1386	ORDER BY DESC
					ATTACHING PARTS		
-67	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,ST CD PL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-68	195-3984-00			1	LEAD,ELECTRICAL:22 AWG,4.0 L,8-01	TK0032	ORDER BY DESC
-69	195-3988-00			1	LEAD,ELECTRICAL:22 AWG,4.0 L,8-29	TK0032	ORDER BY DESC
-70	386-5048-01			1	PLATE,REAR:PWR SPLY	TK1592	386504801
					ATTACHING PARTS		
-71	211-0711-00			5	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
-72	211-0711-00			1	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-73	200-0917-01			1	COVER,CRT SKT:2.052 OD X 0.291 H,PLASTIC	0JR05	ORDER BY DESC
-74	198-4603-01			1	WIRE SET,ELEC:W/CRT SOCKET	0J7N9	ORDER BY DESC
-75	119-1478-01			1	COIL,TUBE DEFL:FXD,TRACE ROTATION	TK1177	06244
-76	337-2931-01			1	SHIELD,CRT:2445/2465	0J9P9	337-2931-01
					ATTACHING PARTS		
-77	211-0337-00			4	SCREW,MACHINE:4-40 X 0.25,PNH,SST	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-78	214-0291-00			1	CONTACT,ELEC:CRT CONNECTOR,CU BE SIL PL	04811	ORDER BY DESC
					ATTACHING PARTS		

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2 -79	211-0324-00			1	SCR,ASSEM WSHR:4-40 X 0.188,PNH,T9	0KB01	ORDER BY DESC
-80	210-0586-00			1	NUT,PL,ASSEM WA:4-40 X 0.25,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-81	348-0762-00			1	GROMMET,PLASTIC:NATURAL,ROUND,0.54 ID	0JR05	ORDER BY DESC
-82	195-6851-01			1	LEAD,ELECTRICAL:BRAIDED,1.65 L	TK1386	ORDER BY DESC
					ATTACHING PARTS		
-83	211-0324-00			1	SCR,ASSEM WSHR:4-40 X 0.188,PNH,T9	0KB01	ORDER BY DESC
-84	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-85	210-0457-00			1	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
-86	211-0324-00			1	SCR,ASSEM WSHR:4-40 X 0.188,PNH,T9	0KB01	ORDER BY DESC
-87	210-0994-00			1	WASHER,FLAT:0.125 ID X 0.25 OD X 0.022,STL	12327	ORDER BY DESC
-88	175-8010-01			1	CA ASSY,SP,ELEC:5,22 AWG,10.5 L,RIBBON	0J7N9	ORDER BY DESC
-89	-----------			1	CIRCUIT BD ASSY:DYNAMIC CENTERING (SEE A14 REPL) (STANDARD MANUAL)		
-90	361-0067-00			3	SPACER,CKT BD:0.187,NYLON	02768	215-150912-00(M
-91	334-4759-00			1	MARKER,IDENT:MKD SHIELDS INVERTER	07416	ORDER BY DESC
-92	337-3120-00			1	SHIELD,ELEC:DMM,TOP	TK1905	ORDER BY DESC
-93	343-0081-00			1	STRAP,RETAINING:0.125 DIA,NYLON	85480	CPNY-172BK
					ATTACHING PARTS		
-94	210-0457-00			1	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-95	307-1154-00			1	PASSIVE NETWORK:CRT TERMINATOR	80009	307115400
					ATTACHING PARTS		
-96	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
-97	210-0457-00			2	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-98	407-2809-00			1	BRACKET,ANGLE:RESISTOR,AL	92101	ORDER BY DESC
					ATTACHING PARTS		
-99	210-0457-00			2	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-100	343-1099-00			1	RTNR,POWER SPLY:LOW VOLTAGE,FRONT,PC	88831	ORDER BY DESC
					ATTACHING PARTS		
-101	211-0711-00			1	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-102	348-0763-00			1	GROMMET,PLASTIC:NATURAL,OVAL,1.235 ID	0JR05	ORDER BY DESC
-103	348-0763-00			1	GROMMET,PLASTIC:NATURAL,OVAL,1.235 ID	0JR05	ORDER BY DESC
-104	348-0757-00			1	GROMMET,PLASTIC:BLACK,U SHAPE,0.25 ID	TK1166	ORDER BY DESC
-105	407-3092-00			1	BRKT,CMPNT MTG:DMM	TK1165	ORDER BY DESC
					ATTACHING PARTS		
-106	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
-107	211-0730-00			1	SCR,ASSEM WSHR:6-32 X 0.375,PNH,STL,T15	0KB01	ORDER BY DESC
-108	210-0858-00			1	WASHER,FLAT:0.172 ID X 0.5 OD X 0.062,BRS	12327	ORDER BY DESC
					END ATTACHING PARTS		
-109	337-3438-00			1	SHIELD,ELEC:ANODE LEAD	0J9P9	ORDER BY DESC
					ATTACHING PARTS		
-110	211-0747-00			2	SCREW,MACHINE:6-32 X 0.188,PNH,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-111	407-3124-00			1	BRKT ASSY,HINGE:ALUMINUM	TK1165	ORDER BY DESC
					ATTACHING PARTS		
-112	211-0711-00			3	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-113	441-1618-02			1	CHASSIS,SCOPE:MAIN	0J9P9	ORDER BY DESC

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3 -1	407-2790-03			1	BRACKET,CKT BD:ALUMINUM	0J260	ORDER BY DESC
-2	-----------			1	CIRCUIT BD ASSY:GPIB (SEE A23 REPL)		
-3	-----------			1	CABLE ASSY: (SEE A23W4243 REPL)		
-4	-----------			1	CABLE ASSY: (SEE A23W4244 REPL)		
-5	-----------			1	CABLE ASSY: (SEE A23P4800 REPL)		
					ATTACHING PARTS		
-6	129-1107-00			2	SPACER,POST:0.98 L,6-32 EXT & M3.5 INT THD	TK1287	129-1107-00
-7	210-0457-00			2	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-8	337-0118-01			1	SHIELD,ELEC:GPIB	TK1591	337-0118-01
-9	200-2686-00			1	COVER,REAR:CRT	TK1938	ORDER BY DESC
-10	-----------			1	CIRCUIT BD ASSY:LED (SEE A22 REPL)		
					ATTACHING PARTS		
-11	211-0378-00			1	SCR,ASSEM WSHR:4-40 X 0.375.PNH,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-12	386-0867-00			1	PLATE,MOUNTING:LED	TK1302	ORDER BY DESC
					ATTACHING PARTS		
-13	211-0337-00			1	SCREW,MACHINE:4-40 X 0.25,PNH,SST	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-14	378-2057-00			3	LENS,LIGHT:CLEAR,PLASTIC,PIPE	0JR05	ORDER BY DESC
-15	175-7185-00			1	CA ASSY,SP,ELEC:4,26 AWG,7.5 L,RIBBON	22526	81281-001
-16	-----------			1	CIRCUIT BD ASSY:TV/CTT (SEE A25/26/27 REPL)		
					ATTACHING PARTS		
-17	211-0730-00			2	SCR,ASSEM WSHR:6-32 X 0.375,PNH,STL,T15	0KB01	ORDER BY DESC
	210-0864-00			2	WASHER,FLAT:0.188 ID X 0.375 OD X 0.05,STL	12327	ORDER BY DESC
	337-3642-00			1	SHIELD,ELEC:SMT-CTT	80009	337364200
					END ATTACHING PARTS		
					CIRCUIT BD ASSY INCLUDES:		
	214-3799-00	B050000	B050649	1	.HEAT SINK,ELEC:ALUMINUM	TK1680	214-3799-00
	214-3800-00	B050000	B050649	1	.SPRING,RETAINER:0.016 THK,SST	TK1326	214-3800-00
-18	129-1301-00			2	SPACER,POST:0.625 L X 6-32,ALUMINUM	0KB01	ORDER BY DESC
	129-1056-00			2	SPACER,POST:0.4 L,6-32 INT/EXT,STL	TK1622	ORDER BY DESC
					ATTACHING PARTS		
-19	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-20	361-1517-00			2	SPACER,CKT BD:0.625 L,NYLON	06915	MSP-10-01
-21	174-1555-00			1	CA ASSY,SP,ELEC:2,26 AWG,4.0 L	80009	174155500
	174-1373-00			1	CA ASSY,SP,ELEC:20,28 AWG,14.0 LFLAT CABLE	53387	ORDER BY DESC
-22	175-7931-01			1	CABLE ASSY,RF:50 OHM COAX,16.5 L	80009	175793101
-23	175-7932-01			1	CA ASSY,SP,ELEC:6,26 AWG,16.25 L	80009	175793201
-24	210-0902-00			1	WASHER,FLAT:0.47 ID X 0.656 OD X 0.03,STL	12327	ORDER BY DESC
-25	131-0103-00			1	CONN,RCPT,ELEC:BNC,FEMALE	00779	222541-1
-26	175-1373-00			1	CABLE ASSY,RF:50 OHM COAX,18.0 L	80009	175137300
-27	174-1542-00			1	CABLE ASSY,RF:50 OHM COAX,7.5 L	80009	174154200
	174-1543-00			1	CABLE ASSY,RF:(4) 50 OHM COAX,(1) 75 OHM	80009	174154300
-28	386-4713-02			1	PLATE,REAR:POWER SUPPLY	0J9P9	ORDER BY DESC
					ATTACHING PARTS		
-29	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-30	343-1012-00			3	RETAINER,CKT BD:POLYCARBONATE	TK1173	ORDER BY DESC
	343-0013-00			1	CLAMP,LOOP:0.375 ID,PLASTIC	06915	E6 CLEAR ROUND
-31	441-1896-00			1	CHASSIS,SCOPE:MAIN ASSY,AL,W/HARDWARE	0J9P9	ORDER BY DESC
-32	334-5200-00			1	MARKER,IDENT:MKD WORD REC PROBE	80009	334520000
-33	334-5201-02			1	MARKER,IDENT:MKD-0.5V TO 5.5V PEAK MAX	80009	334520102
-34	380-0710-00			1	HOUSING,PROBE:LOWER,PC	TK1163	380-0710-00

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3 -35	380-0711-00			1	HOUSING,PROBE:UPPER,PC	TK1163	380-0711-00
					ATTACHING PARTS		
-36	211-0451-00			4	SCREW,MACHINE:4-40 X 0.750,FLH,CD PL	0KB01	ORDER BY DESC
-37	210-0406-00			4	NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
					END ATTACHING PARTS		
-38	358-0675-00			1	STRAIN RLF,CA:UPPER	TK1163	358-0675-00
-39	358-0347-00			1	STRAIN RLF,CA:LOWER,PLASTIC	88831	ORDER BY DESC
-40	175-8853-01			1	CA ASSY,SP,ELEC:6,26 AWG,80.5 L,8-N	TK1374	ORDER BY DESC
-41	361-0758-01			1	SPACER,PROBE:ACETAL SLATE GRAY	80009	361075801
-42	-----------			1	CIRCUIT BD ASSY:WORD RECOG PROBE #1 (SEE A32 REPL)		
-43	-----------			1	TERM SET,PIN: (SEE A32J6300 REPL)		
-44	-----------			1	CONN,RCPT,ELEC: (SEE A32J6370, LOC. A & B)		
-45	-----------			1	CONN,RCPT,ELEC: (SEE A32J6380 REPL)		
-46	-----------			1	CONN,RCPT,ELEC: (SEE A32J6385 REPL)		
-47	-----------			1	CIRCUIT BD ASSY:WORD RECOG PROBE #2) (SEE A33 REPL)		
-48	-----------			1	TERM SET,PIN: (SEE A33J6400 REPL)		
-49	-----------			2	TERM SET,PIN: (SEE A33P6380/6385 REPL)		
					STANDARD ACCESSORIES		
-50	012-0747-00			1	LEAD SET,ELEC:10 WIDE,25 CML (OPTION 06/09 ONLY)	TK2156	61501
-51	206-0222-00			1	TIP,PROBE:MICROCIRCUIT TEST (OPTION 06/09 ONLY)	80009	206022200
	010-6407-02			1	PROBE,WORD RECO:P6407,W/ACCESSORIES (OPTION 06/09 ONLY)	80009	010640702
	010-6602-00			1	PROBE,TEMP:P6602,64.0 L,230 DEG C (OPTION 01 ONLY)	80009	010660200
	012-0941-00			1	LEAD SET,METER:(2)LEAD,ELEC,(2)PROBE HEAD (OPTION 01 ONLY)	80009	012094100
	016-0180-00			1	VISOR,CRT:FOLDING (OPTION 05 ONLY)	0JR05	ORDER BY DESC
	016-0720-00			1	COVER,PROT:NYLON (OPTION 01 ONLY)	0JRZ2	ORDER BY DESC
	020-0087-00			1	ACCESSORY PKG:012-0941-01,2445/2465 (OPTION 01 ONLY)	80009	020008700
	070-5365-00			1	CARD,INFO:REF,DMM OPTION (OPTION 01 ONLY)	80009	070536500
	070-6859-00			1	MANUAL,TECH:INTERFACE GUIDE,24X5B/2467B	80009	070685900
	200-2844-00			1	COVER,FRONT:2465 OPT 01 (OPTION 01 ONLY)	7X318	ORDER BY DESC
	378-0199-04			1	FILTER,LT,CRT:BLUE,4.105 X 3.415 X 0.03 THK (24X5B OPTION 05 ONLY)	0KB00	378-0199-04
	378-0199-05			1	FILTER,LT,CRT:BLUE,4.105 X 3.415 X 0.03 THK (24X5B OPTION 05 ONLY)	0KB00	378-01999-05
					OPTIONAL ACCESSORIES		
	070-6861-00			1	MANUAL,TECH:OPERATORS,2467B	80009	070686100
	070-6864-01			1	MANUAL,TECH:SERVICE,24X5B/67B,SMT	80009	070686401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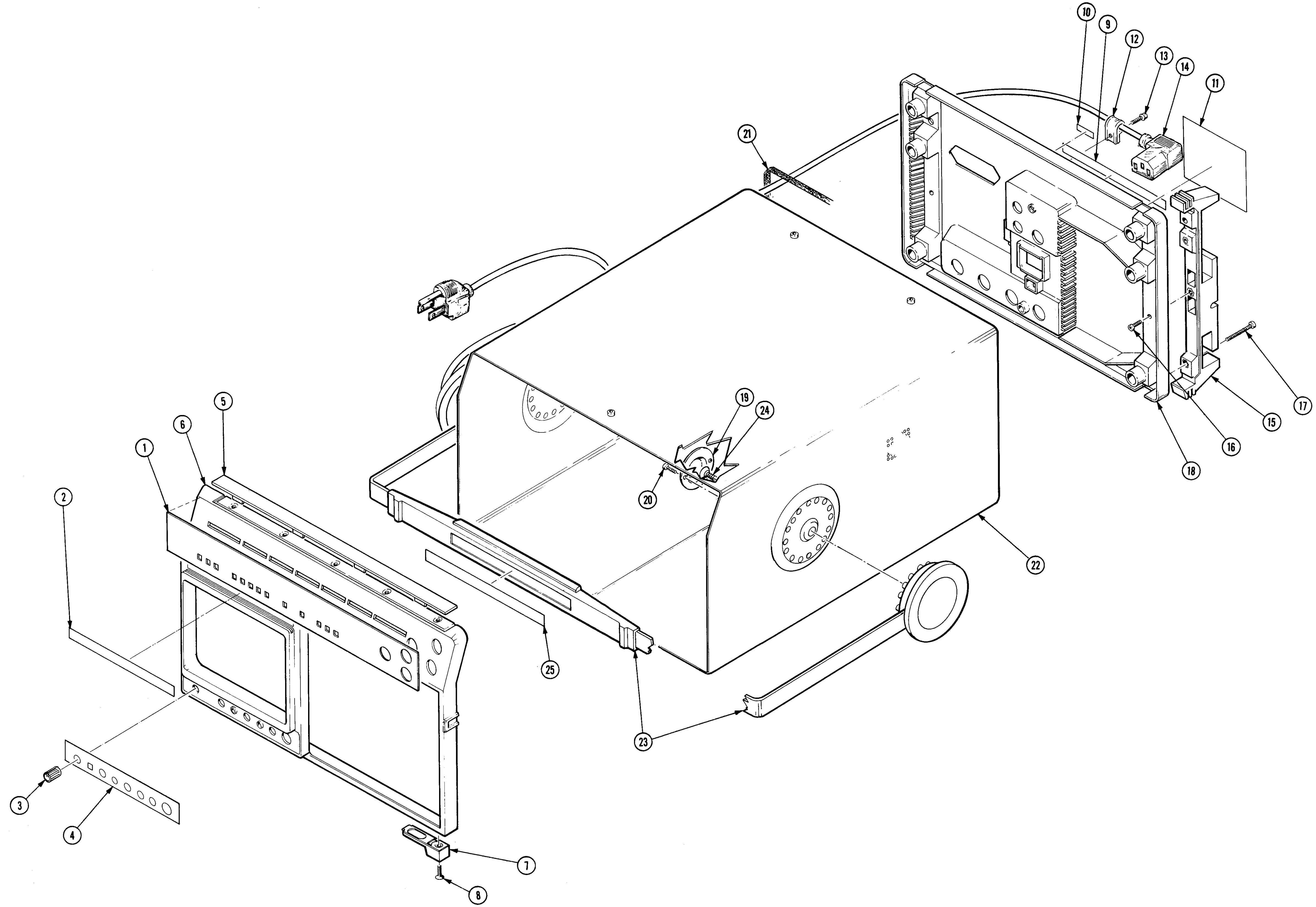
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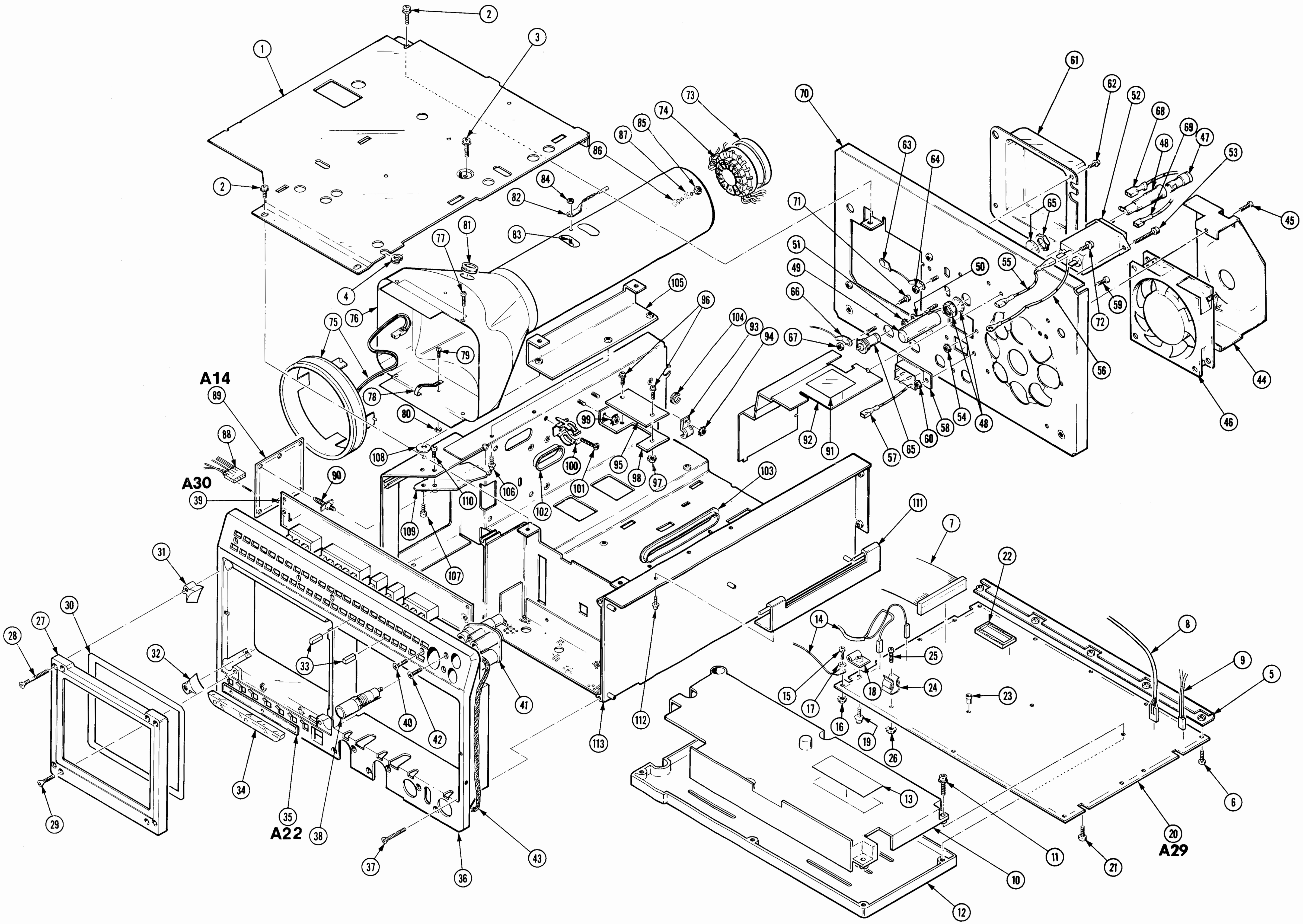
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REPLACEABLE MECHANICAL PARTS

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

When ordering parts, 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.

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.

FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentations system used in the description column.

1 2 3 4 5 Name & Description

Assembly and/or component
Attaching parts for assembly and/or component

END ATTACHING PARTS

Detail part of assembly and/or component
Attaching parts for detail part

END ATTACHING PARTS

Parts of detail part
Attaching parts for parts or detail part

END ATTACHING PARTS

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.

Attaching parts must be purchased separately, unless otherwise specified.

ABBREVIATIONS

Abbreviations conform to American National Standard Y1.1.

CROSS INDEX – MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
S3629	SCHURTER AG H C/O PANEL COMPONENTS CORP	2015 SECOND STREET	BERKELEY CA 94170
TK0032	POWELL ELECTRONICS	411 FAIRCHILD DR	MT VIEW CA 94040
TK0435	LEWIS SCREW CO	4300 S RACINE AVE	CHICAGO IL 60609-3320
TK1159	IMPROVED PRODUCTS	3400 OLYMPIC STREET	SPRINGFIELD OR 97477
TK1160	MECHANICAL PRODUCTS MANUFACTURING CO	1723 1ST SO	SEATTLE WA 98134-3462
TK1163	POLYCAST INC	9898 SW TIGARD ST	TIGARD OR 97223
TK1165	STEN MFG INC	9702 85TH AVENUE N	MINNEAPOLIS MN 55369
TK1166	CIMCO INC	265 BRIGGS AVE	COSTA MESA CA 92626-4506
TK1169	DIEMAKERS INC	801 2ND ST PO BOX 278	MONROE CITY MO 63456-1441
TK1173	ACCURATE PLASTICS & ENG INC	1921 MILLER DRIVE	LONGMONT CO 80501
TK1177	BELL INDUSTRIES (DIST)	6024 SW JEAN ROAD	LAKE OSWEGO OR 97034
TK1287	ENOCH MFG CO	14242 SE 82ND DR PO BOX 98	CLACKAMAS OR 97015
TK1302	MOUNTAIN MOLDING	606 SECOND STREET	BERTHOUD CO 80513
TK1326	NORTHWEST FOURSLIDE INC	18224 SW 100TH CT	TUALATIN OR 97062
TK1328	NIDEC AMERICA CORP	682 TRANSFER RD	ST PAUL MN 55114
TK1374	TRI-TEC ENGINEERING CORP		
TK1386	PYRAMID ELECTRONICS SUPPLY INC	9757 JUANITA DRIVE NE	KIRKLAND WA 98034
TK1465	BEAVERTON PARTS MFG CO	1800 NW 216TH AVE	HILLSBORO OR 97124-6629
TK1547	MOORE ELECTRONICS INC (DIST)	19500 SW 90TH COURT PO BOX 1030	TUALATIN OR 97062
TK1591	EASTMAN PLASTICS INC	4605 SW 180TH	ALOHA OR 97007
TK1592	W AND W METAL	6521 SE CROSSWHITE WAY	PORTLAND OR 97206
TK1614	STUCKEL R J CO	1385 HOWARD ST	ELK GROVE VILLAGE IL 60007-2213
TK1622	TRIPLE L PRECISION	P O BOX 85	TIMBER OR 97144
TK1680	TECHNICAL DYNAMICS ALUMINUM CORP	9124 SW 64TH	PORTLAND OR 97206
TK1905	PUGET CORP OF OREGON	7440 S W BONITA	TIGARD OR 97223
TK1938	GALGON INDUSTRIES	37399 CENTRAL MONT PLACE	FREMONT CA 94536
TK2156	ACACIA/DEANCO	7763 SW CIRRUS RD SUITE 26	BEAVERTON OR 97005-6452
0B445	ELECTRI-CORD MFG CO INC	312 EAST MAIN ST	WESTFIELD PA 16950
0JRZ2	BADGLEY MFG CO	1620 NE ARGYLE	PORTLAND OR 97211
0JR05	TRIQUEST CORP	3000 LEWIS AND CLARK HWY	VANCOUVER WA 98661-2999
0J260	COMTEK MANUFACTURING OF OREGON (METALS)	PO BOX 4200	BEAVERTON OR 97076-4200
0J7N9	MCX INC	30608 SAN ANTONIO ST	HAYWARD CA 94544
0J9P9	GEROME MFG CO INC	PO BOX 737	NEWBURG OR 97132
0KB00	SCHRAMM PLASTIC FABRICATIORS	7885 SW HUNZIKER	TIGARD OR 97223
0KB01	STAUFFER SUPPLY	810 SE SHERMAN	PORTLAND OR 97214
00779	AMP INC	2800 FULLING MILL PO BOX 3608	HARRISBURG PA 17105

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
02768	ILLINOIS TOOL WORKS INC FASTEX DIVISION	195 ALGONQUIN ROAD	DES PLAINES IL 60016-6103
04811	PRECISION COIL SPRING CO	10107 ROSE ST PO BOX 5450	EL MONTE CA 91734
06915	RICHCO PLASTIC CO	5825 N TRIPP AVE	CHICAGO IL 60646-6013
07416	NELSON NAME PLATE CO	3191 CASITAS	LOS ANGELES CA 90039-2410
09922	BURNDY CORP	RICHARDS AVE	NORWALK CT 06852
12327	FREEWAY CORP	9301 ALLEN DR	CLEVELAND OH 44125-4632
18565	CHOMERICS INC	77 DRAGON COURT	WOBURN MA 01801-1039
18632	NORTON CHEMPLAST DBA NORTON PERFORMANCE PLASTICS	150 DEY RD	WAYNE NJ 07470-4670
22526	DU PONT E I DE NEMOURS AND CO INC DU PONT ELECTRONICS DEPT	515 FISHING CREEK RD	NEW CUMBERLAND PA 17070-3007
22670	G M NAMEPLATE INC	2040 15TH AVE WEST	SEATTLE WA 98119-2728
24931	SPECIALTY CONNECTOR CO INC	2100 EARLYWOOD DR PO BOX 547	FRANKLIN IN 46131
5F506	EOFF ELECTRIC CO	509 NW 10TH AVE	PORTLAND OR 97209-3201
53387	MINNESOTA MINING MFG CO	PO BOX 2963	AUSTIN TX 78769-2963
54583	TDK ELECTRONICS CORP	12 HARBOR PARK DR	PORT WASHINGTON NY 11550
61935	SCHURTER INC	1016 CLEGG COURT	PETALUMA CA 94952-1152
7X318	KASO PLASTICS INC	11015 A NE 39th	VANCOUVER WA 98662
73743	FISCHER SPECIAL MFG CO	111 INDUSTRIAL RD	COLD SPRING KY 41076-9749
78189	ILLINOIS TOOL WORKS INC SHAKEPROOF DIV	ST CHARLES ROAD	ELGIN IL 60120
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077-0001
85480	BRADY W H CO CORP H Q INDUSTRIAL PRODUCTS DIV	2221 W CAMDEN RD PO BOX 2131	MILWAUKEE WI 53209
88831	TEKSUN INC	11368 WEST OLYMPIC BLVD	LOS ANGELES CA 90064-1605
92101	SCHULZE MFG	50 INGOLD RD	BURLINGAME CA 94010-2206

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1 -1	333-2995-00			1	PANEL,FRONT:	22670	ORDER BY DESC
-2	334-6643-01			1	MARKER,IDENT:MARKED 2455B	22670	ORDER BY DESC
	334-6644-01			1	MARKER,IDENT:MARKED 2455B	22670	ORDER BY DESC
-3	366-2041-03			4	KNOB:DOVE GRAY,BAR,0.172 X 0.41 X 0.496	7X318	ORDER BY DESC
	366-2036-00			1	PUSH BUTTON:GY,0.206 SQ,1.445 H	0JR05	ORDER BY DESC
-4	333-2877-00			1	PANEL,FRONT:CRT	07416	ORDER BY DESC
-5	200-2779-00			1	COVER,TOP:TRIM	0JR05	ORDER BY DESC
-6	101-0095-01			1	TRIM,DECORATIVE:FRONT	TK1163	ORDER BY DESC
					ATTACHING PARTS		
	211-0718-00			10	SCREW,MACHINE:6-32 X 0.312,FLH,100 DEG,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-7	348-0740-00			2	FOOT,CABINET:BOTTOM FRONT,PLASTIC	0JR05	ORDER BY DESC
					ATTACHING PARTS		
-8	200-0740-00			2	COVER,ATTEN:RIGHT,15.87 X 2.25,BRASS	80009	200074000
					END ATTACHING PARTS		
-9	334-6341-00			1	MARKER,IDENT:MKD REAR BNC	07416	ORDER BY DESC
-10	334-4378-01			1	MARKER,IDENT:MKD PROBE POWER	07416	ORDER BY DESC
-11	334-4378-01			1	MARKER,IDENT:MKD PROBE POWER	07416	ORDER BY DESC
-12	343-0003-00			1	CLAMP,LOOP:0.25 ID,PLASTIC	06915	E4 CLEAR ROUND
					ATTACHING PARTS		
-13	211-0691-00			1	SCREW,MACHINE:6-32 X 0.625,PNH,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-14	161-0104-00			1	CABLE ASSY,PWR,:3 WIRE,98.0 L	0B445	MC6 -3 CG86
-15	348-0780-00			2	FOOT,CABINET:W/CORD WRAP,REAR,BLACK	0JR05	ORDER BY DESC
					ATTACHING PARTS		
-16	211-0722-00			2	SCREW,MACHINE:6-32 X 0.25,PNH,STL	0KB01	ORDER BY DESC
-17	212-0154-00			4	SCREW,MACHINE:8-32 X 1.125,PNH,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-18	200-2275-04			1	COVER,REAR:DMM W/LABELS	80009	200227504
-19	337-2395-00			2	SHIELD,ELEC:HANDLE	TK1614	ORDER BY DESC
					ATTACHING PARTS		
-20	213-0138-00			4	SCREW,TPG,TF:4-24 X 0.188,TYPE B,PNH,STL	TK0435	TAPPING SCREW
					END ATTACHING PARTS		
	437-0320-00			1	CABINET ASSY:DMM OPT 1	80009	437032000
-21	348-0764-04			1	.SHLD GSKT,ELEK:0.125 X 0.188,WIRE MESH	18565	ORDER BY DESC
-22	437-0309-00			1	.CABINET,SCOPE:2465 OPT 01	0J9P9	ORDER BY DESC
-23	367-0303-04			1	.HANDLE,CARRYING:12.86 L,GRIP & INDEX	0JR05	ORDER BY DESC
					ATTACHING PARTS		
-24	212-0144-00			2	.SCREW,TPG,TF:8-16 X 0.562 L,PLASTITE	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-25	334-6645-01			1	MARKER,IDENT:MARKED 2455B	22670	ORDER BY DESC

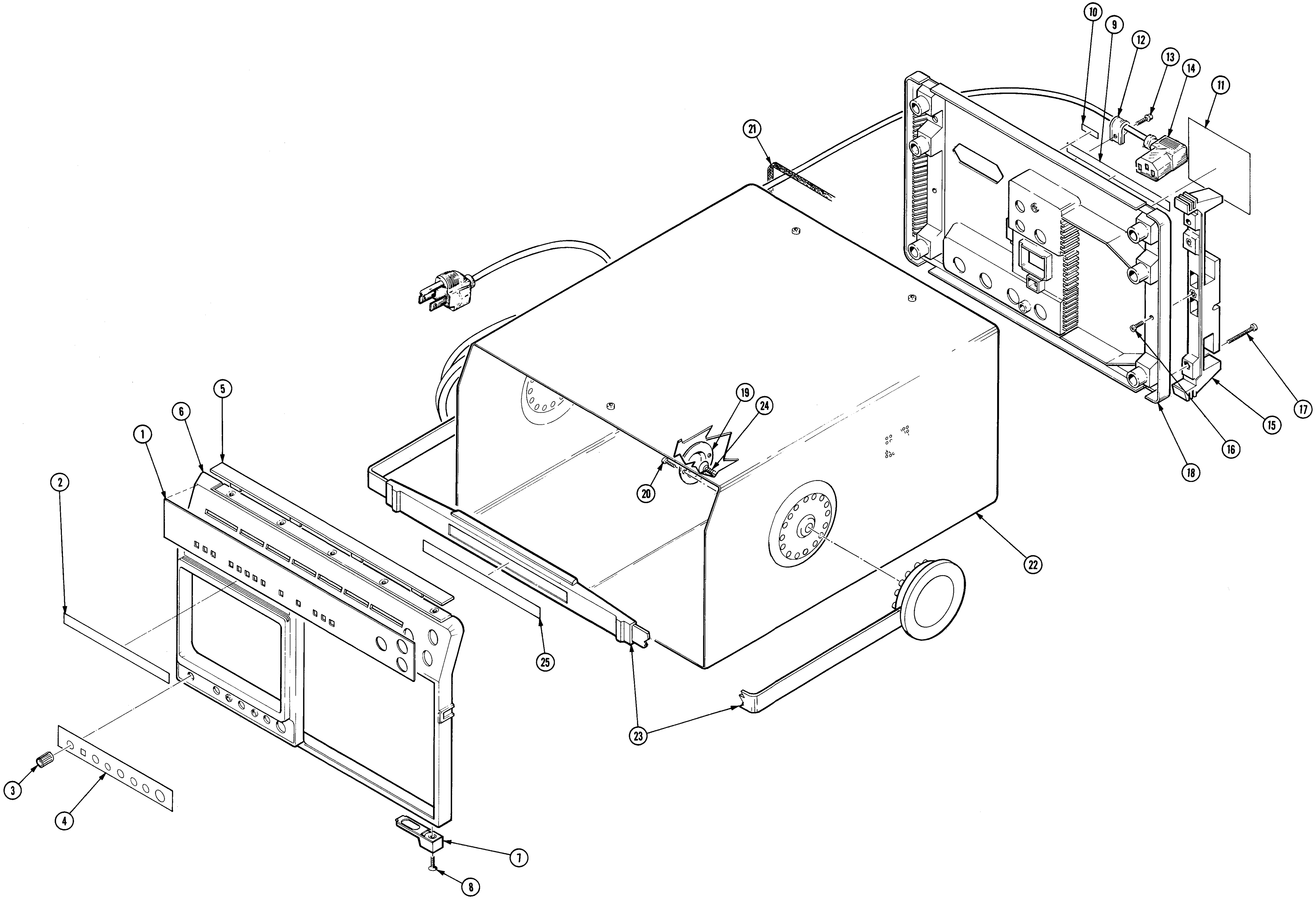
Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2 -1	407-2790-03			1	BRACKET,CKT BD:ALUMINUM	0J260	ORDER BY DESC
					ATTACHING PARTS		
-2	211-0711-00			4	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
-3	211-0747-00			1	SCREW,MACHINE:6-32 X 0.188,PNH,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-4	348-0757-00			1	GROMMET,PLASTIC:BLACK,U SHAPE,0.25 ID	TK1166	ORDER BY DESC
-5	407-2842-00			1	BRACKET,CKT BD:ALUMINUM	TK1592	ORDER BY DESC
					ATTACHING PARTS		
-6	211-0304-00			5	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-7	175-2324-00			1	CA ASSY,SP,ELEC:14,26 AWG,29.0 L	80009	175232400
-8	175-8323-00			1	CA ASSY,SP,ELEC:3,26 AWG,13.0 L,9-N	0J7N9	ORDER BY DESC
-9	175-8730-00			1	CA ASSY,SP,ELEC:2,26 AWG,7.5 L	TK1547	P/N PCA 7543AL
-10	337-3121-01			1	SHIELD,ELEC:DMM,BOTTOM	TK1905	337-3121-01
					ATTACHING PARTS		
-11	211-0720-00			5	SCR,ASSEM WSHR:6-32 X 0.50,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-12	337-3120-00			1	SHIELD,ELEC:DMM,TOP	TK1905	ORDER BY DESC
-13	-----------			1	MARKER,IDENT:MKD CAUTION		
-14	196-2924-00			1	LEAD ASSY,ELEC:2,24 AWG,5.5 L,9-1/9-2	0J7N9	ORDER BY DESC
					ATTACHING PARTS		
-15	211-0304-00			1	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9	0KB01	ORDER BY DESC
-16	210-0586-00			1	NUT,PL,ASSEM WA:4-40 X 0.25,STL	TK0435	ORDER BY DESC
-17	210-0046-00			1	WASHER,LOCK:0.261 ID,INTL,0.018 THK,STL	78189	1214-05-00-0541
					END ATTACHING PARTS		
-18	214-3492-00			2	HINGE HALF:DMM,ALUMINUM	TK1165	80630-000
					ATTACHING PARTS		
-19	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-20	-----------			1	CIRCUIT BD ASSY:MULTIMETER (SEE A29 REPL)		
					ATTACHING PARTS		
-21	211-0304-00			2	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-22	136-0755-00			1	SOCKET,DIP::PCB,;28 POS,2 X 14,0.1 X 0.6 CTR	09922	DILB28P-108
-23	358-0136-00			1	INSULATOR,BSHG:0.075 ID X 0.203 OD X 0.075	18632	ORDER BY DESC
-24	344-0356-00			2	CLIP,ELECTRICAL:FUSE,BRONZE	5F506	ORDER BY DESC
					ATTACHING PARTS		
-25	211-0722-00			2	SCREW,MACHINE:6-32 X 0.25,PNH,STL	0KB01	ORDER BY DESC
-26	210-0457-00			2	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-27	426-1864-01			1	FRAME,CRT:	TK1169	ORDER BY DESC
					ATTACHING PARTS		
-28	211-0713-00			4	SCREW,MACHINE:6-32 X 1.25,FLH,100 DEG,STL	0KB01	ORDER BY DESC
-29	213-0194-00			4	THUMBSCREW:0.25-36 X 0.203,0.312 OD HD,BRS	80009	213019400
					END ATTACHING PARTS		
-30	337-2926-03			1	SHLD,IMPLOSION:4.44 X 3.67 X 0.06,CLEAR	TK1159	ORDER BY DESC
	348-0731-01			1	GASKET:CRT,POLYETHYLENE	TK1159	ORDER BY DESC
-31	343-0993-00			2	RETAINER,CRT:BLACK,PLASTIC (UPPER LEFT/LOWER RIGHT/BLACK)	TK1163	ORDER BY DESC
-32	343-0992-00			2	RETAINER,CRT:CLEAR,PLASTIC (UPPER RIGHT/LOWER LEFT/NATURAL)	TK1163	ORDER BY DESC
-33	366-2013-02			13	PUSH BUTTON:IVORY GRAY,0.186 SQ X 0.48 H	0JR05	ORDER BY DESC
-34	378-0204-00			1	REFLECTOR,LIGHT:INT SCALE ILLUMINATION	7X318	ORDER BY DESC
-35	-----------			1	CIRCUIT BD ASSY:LED (SEE A22 REPL)		
-36	386-5133-01			1	SUBPANEL,FRONT:2465 OPT 01	TK1465	386513301
					ATTACHING PARTS		
-37	213-0914-00			2	SCREW,TPG,TR:6-32 X 0.75,FLH,100 DEG,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-38	352-0765-01			1	FUSEHOLDER:3AG,PNL MT	61935	FEU 031-1768
-39	-----------			1	CIRCUIT BD ASSY:FR PANEL (SEE A30 REPL)		
					ATTACHING PARTS		

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2 -40	211-0718-00			4	SCREW,MACHINE:6-32 X 0.312,FLH,100 DEG,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-41	352-0691-01			1	HOLDER,CONN:POLYCARBONATE	88831	ORDER BY DESC
					ATTACHING PARTS		
-42	213-0914-00			2	SCREW,TPG,TR:6-32 X 0.75,FLH,100 DEG,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-43	348-0792-02			1	GASKET:ELECTRICAL SHIELD,37.0 L	18565	ORDER BY DESC
-44	378-0275-00			1	DEFLECTOR,AIR:ALUMINUM	TK1160	378-0275-00
					ATTACHING PARTS		
-45	211-0711-00			1	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-46	119-2102-00			1	FAN,TUBEAXIAL:12V,1.5W,3200RPM,24CFM	TK1328	119-2102-00
-47	200-2264-00			1	CAP,FUSEHOLDER:3AG FUSES	S3629	FEK 031 1666
-48	204-0833-00			1	BODY,FUSEHOLDER:3AG & 5 X 20MM FUSES	S3629	031 1653 (MODEL
-49	200-2265-00			1	CAP,FUSEHOLDER:5 X 20MM FUSES	S3629	FEK 031.1663
-50	195-3984-00			1	LEAD,ELECTRICAL:22 AWG,4.0 L,8-01	TK0032	ORDER BY DESC
					ATTACHING PARTS		
-51	210-0457-00			1	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-52	119-1536-00			1	FILTER,RFI:3A,250VAC,50/60HZ	54583	ZUB2203-00
					ATTACHING PARTS		
-53	211-0332-00			2	SCR,ASSEM WSHR:4-40 X 0.5,PNH,STL,T9	0KB01	ORDER BY DESC
-54	210-0586-00			2	NUT,PL,ASSEM WA:4-40 X 0.25,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-55	195-3989-00			1	LEAD,ELECTRICAL:18 AWG,4.0 L,8-9	TK0032	ORDER BY DESC
-56	195-3990-00			1	LEAD,ELECTRICAL:18 AWG,4.5 L,5-4	TK0032	ORDER BY DESC
-57	195-3987-00			1	LEAD,ELECTRICAL:22 AWG,2.6 L,8-19	TK0032	ORDER BY DESC
-58					SWITCH,SLIDE:DPDT (SEE S90 IN STD. MANUAL)		
					ATTACHING PARTS		
-59	211-0304-00			2	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9	0KB01	ORDER BY DESC
-60	210-0586-00			2	NUT,PL,ASSEM WA:4-40 X 0.25,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-61	200-2686-00			1	COVER,REAR:CRT	TK1938	ORDER BY DESC
					ATTACHING PARTS		
-62	211-0718-00			4	SCREW,MACHINE:6-32 X 0.312,FLH,100 DEG,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-63	195-8410-00			1	LEAD,ELECTRICAL:22 AWG,1.65 L	TK1386	ORDER BY DESC
					ATTACHING PARTS		
-64	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-65	131-1910-01			4	CONN,RCPT,ELEC:BNC,FEMALE	24931	28JR284-1
-66	195-9513-00			1	LEAD,ELECTRICAL:22 AWG,1.4 L,	TK1386	ORDER BY DESC
					ATTACHING PARTS		
-67	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-68	195-3984-00			1	LEAD,ELECTRICAL:22 AWG,4.0 L,8-01	TK0032	ORDER BY DESC
-69	195-3988-00			1	LEAD,ELECTRICAL:22 AWG,4.0 L,8-29	TK0032	ORDER BY DESC
-70	386-5048-01			1	PLATE,REAR:PWR SPLY	TK1592	386504801
					ATTACHING PARTS		
-71	211-0711-00			5	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
-72	211-0711-00			1	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-73	200-0917-01			1	COVER,CRT SKT:2.052 OD X 0.291 H,PLASTIC	0JR05	ORDER BY DESC
-74	198-4603-01			1	WIRE SET,ELEC:W/CRT SOCKET	0J7N9	ORDER BY DESC
-75	119-1478-01			1	COIL,TUBE DEFL:FXD,TRACE ROTATION	TK1177	06244
-76	337-2931-01			1	SHIELD,CRT:2445/2465	0J9P9	337-2931-01
					ATTACHING PARTS		
-77	211-0337-00			4	SCREW,MACHINE:4-40 X 0.25,PNH,SST	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-78	214-0291-00			1	CONTACT,ELEC:CRT CONNECTOR,CU BE	04811	ORDER BY DESC
					ATTACHING PARTS		

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2 -79	211-0324-00			1	SCR,ASSEM WSHR:4-40 X 0.188,PNH,T9	0KB01	ORDER BY DESC
-80	210-0586-00			1	NUT,PL,ASSEM WA:4-40 X 0.25,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-81	348-0762-00			1	GROMMET,PLASTIC:NATURAL,ROUND,0.54 ID	0JR05	ORDER BY DESC
-82	195-6851-01			1	LEAD,ELECTRICAL:BRAIDED,1.65 L	TK1386	ORDER BY DESC
					ATTACHING PARTS		
-83	211-0324-00			1	SCR,ASSEM WSHR:4-40 X 0.188,PNH,T9	0KB01	ORDER BY DESC
-84	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-85	210-0457-00			1	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
-86	211-0324-00			1	SCR,ASSEM WSHR:4-40 X 0.188,PNH,T9	0KB01	ORDER BY DESC
-87	210-0994-00			1	WASHER,FLAT:0.125 ID X 0.25 OD X 0.022,STL	12327	ORDER BY DESC
-88	175-8010-01			1	CA ASSY,SP,ELEC:5,22 AWG,10.5 L,RIBBON	0J7N9	ORDER BY DESC
-89					CIRCUIT BD ASSY:DYNAMIC CENTERING (SEE A14 REPL) (STANDARD MANUAL)		
-90	361-0067-00			3	SPACER,CKT BD:0.187,NYLON	02768	215-150912-00(M
-91	334-4759-00			1	MARKER,IDENT:MKD SHIELDS INVERTER	07416	ORDER BY DESC
-92	337-3120-00			1	SHIELD,ELEC:DMM,TOP	TK1905	ORDER BY DESC
-93	343-0081-00			1	STRAP,RETAINING:0.125 DIA,NYLON	85480	CPNY-172BK
					ATTACHING PARTS		
-94	210-0457-00			1	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-95	307-1154-00			1	PASSIVE NETWORK:CRT TERMINATOR	80009	307115400
					ATTACHING PARTS		
-96	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
-97	210-0457-00			2	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-98	407-2809-00			1	BRACKET,ANGLE:RESISTOR,AL	92101	ORDER BY DESC
					ATTACHING PARTS		
-99	210-0457-00			2	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-100	343-1099-00			1	RTNR,POWER SPLY:LOW VOLTAGE,FRONT,PC	88831	ORDER BY DESC
					ATTACHING PARTS		
-101	211-0711-00			1	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-102	348-0763-00			1	GROMMET,PLASTIC:NATURAL,OVAL,1.235 ID	0JR05	ORDER BY DESC
-103	348-0763-00			1	GROMMET,PLASTIC:NATURAL,OVAL,1.235 ID	0JR05	ORDER BY DESC
-104	348-0757-00			1	GROMMET,PLASTIC:BLACK,U SHAPE,0.25 ID	TK1166	ORDER BY DESC
-105	407-3092-00			1	BRKT,CMPNT MTG:DMM	TK1165	ORDER BY DESC
					ATTACHING PARTS		
-106	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
-107	211-0730-00			1	SCR,ASSEM WSHR:6-32 X 0.375,PNH,STL,T15	0KB01	ORDER BY DESC
-108	210-0858-00			1	WASHER,FLAT:0.172 ID X 0.5 OD X 0.062,BRS	12327	ORDER BY DESC
					END ATTACHING PARTS		
-109	337-3438-00			1	SHIELD,ELEC:ANODE LEAD	0J9P9	ORDER BY DESC
					ATTACHING PARTS		
-110	211-0747-00			2	SCREW,MACHINE:6-32 X 0.188,PNH,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-111	407-3124-00			1	BRKT ASSY,HINGE:ALUMINUM	TK1165	ORDER BY DESC
					ATTACHING PARTS		
-112	211-0711-00			3	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-113	441-1618-02			1	CHASSIS,SCOPE:MAIN	0J9P9	ORDER BY DESC

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3 -1	407-2790-03			1	BRACKET,CKT BD:ALUMINUM	0J260	ORDER BY DESC
-2	-----------			1	CIRCUIT BD ASSY:GPIB (SEE A23 REPL)		
-3	-----------			1	CABLE ASSY: (SEE A23W4243 REPL)		
-4	-----------			1	CABLE ASSY: (SEE A23W4244 REPL)		
-5	-----------			1	CABLE ASSY: (SEE A23P4800 REPL)		
					ATTACHING PARTS		
-6	129-1107-00			2	SPACER,POST:0.98 L,6-32 EXT & M3.5 INT THD	TK1287	129-1107-00
-7	210-0457-00			2	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-8	337-0118-01			1	SHIELD,ELEC:GPIB	TK1591	337-0118-01
-9	200-2686-00			1	COVER,REAR:CRT	TK1938	ORDER BY DESC
-10	-----------				CIRCUIT BD ASSY:LED (SEE A22 REPL)		
					ATTACHING PARTS		
-11	211-0378-00			1	SCR,ASSEM WSHR:4-40 X 0.375.PNH,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-12	386-0867-00			1	PLATE,MOUNTING:LED	TK1302	ORDER BY DESC
					ATTACHING PARTS		
-13	211-0337-00			1	SCREW,MACHINE:4-40 X 0.25,PNH,SST	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-14	378-2057-00			3	LENS,LIGHT:CLEAR,PLASTIC,PIPE	0JR05	ORDER BY DESC
-15	175-7185-00			1	CA ASSY,SP,ELEC:4,26 AWG,7.5 L,RIBBON	22526	81281-001
-16	-----------			1	CIRCUIT BD ASSY:TV/CTT (SEE A25/26/27 REPL)		
					ATTACHING PARTS		
-17	211-0730-00			2	SCR,ASSEM WSHR:6-32 X 0.375,PNH,STL,T15	0KB01	ORDER BY DESC
	210-0864-00				WASHER,FLAT:0.188 ID X 0.375 OD X 0.05,STL	12327	ORDER BY DESC
	337-3642-00			2	SHIELD,ELEC:SMT-CTT	80009	337364200
				1	END ATTACHING PARTS		
					CIRCUIT BD ASSY INCLUDES:		
	214-3799-00			1	.HEAT SINK,ELEC:ALUMINUM	TK1680	214-3799-00
	214-3800-00			1	.SPRING,RETAINER:0.016 THK,SST	TK1326	214-3800-00
-18	129-1301-00			2	SPACER,POST:0.625 L X 6-32,ALUMINUM	0KB01	ORDER BY DESC
	129-1056-00			2	SPACER,POST:0.4 L,6-32 INT/EXT,STL	TK1622	ORDER BY DESC
					ATTACHING PARTS		
-19	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-20	361-1517-00			2	SPACER,CKT BD:0.625 L,NYLON	06915	MSP-10-01
-21	174-1555-00			1	CA ASSY,SP,ELEC:2,26 AWG,4.0 L	80009	174155500
	174-1373-00			1	CA ASSY,SP,ELEC:20,28 AWG,14.0 L	53387	ORDER BY DESC
-22	175-7931-01			1	CABLE ASSY,RF:50 OHM COAX,16.5 L	80009	175793101
-23	175-7932-01			1	CA ASSY,SP,ELEC:6,26 AWG,16.25 L	80009	175793201
-24	210-0902-00			1	WASHER,FLAT:0.47 ID X 0.656 OD X 0.03,STL	12327	ORDER BY DESC
-25	131-0103-00			1	CONN,RCPT,ELEC:BNC,FEMALE	00779	222541-1
-26	175-1373-00			1	CABLE ASSY,RF:50 OHM COAX,18.0 L	80009	175137300
-27	174-1542-00			1	CABLE ASSY,RF:50 OHM COAX,7.5 L	80009	174154200
	174-1543-00			1	CABLE ASSY,RF:(4) 50 OHM,(1) 75 OHM	80009	174154300
-28	386-4713-02			1	PLATE,REAR:POWER SUPPLY	0J9P9	ORDER BY DESC
					ATTACHING PARTS		
-29	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-30	343-1012-00			3	RETAINER,CKT BD:POLYCARBONATE	TK1173	ORDER BY DESC
	343-0013-00			1	CLAMP,LOOP:0.375 ID,PLASTIC	06915	E6 CLEAR ROUND
-31	441-1896-00			1	CHASSIS,SCOPE:MAIN ASSY,AL,W/HARDWARE	0J9P9	ORDER BY DESC
-32	334-5200-00			1	MARKER,IDENT:MKD WORD RECOG PROBE	80009	334520000
-33	334-5201-02			1	MARKER,IDENT:MKD-0.5V TO 5.5V PEAK MAX	80009	334520102
-34	380-0710-00			1	HOUSING,PROBE:LOWER,PC	TK1163	380-0710-00

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3 -35	380-0711-00			1	HOUSING,PROBE:UPPER,PC	TK1163	380-0711-00
					ATTACHING PARTS		
-36	211-0451-00			4	SCREW,MACHINE:4-40 X 0.750,FLH	0KB01	ORDER BY DESC
-37	210-0406-00			4	NUT,PLAIN,HEX:4-40 X 0.188,BRS	73743	12161-50
					END ATTACHING PARTS		
-38	358-0675-00			1	STRAIN RLF,CA:UPPER	TK1163	358-0675-00
-39	358-0347-00			1	STRAIN RLF,CA:LOWER,PLASTIC	88831	ORDER BY DESC
-40	175-8853-01			1	CA ASSY,SP,ELEC:6,26 AWG,80.5 L,8-N	TK1374	ORDER BY DESC
-41	361-0758-01			1	SPACER,PROBE:ACETAL SLATE GRAY	80009	361075801
-42	-----------			1	CIRCUIT BD ASSY:WORD RECOG PROBE #1 (SEE A32 REPL)		
-43	-----------			1	TERM SET,PIN: (SEE A32J6300 REPL)		
-44	-----------			1	CONN,RCPT,ELEC: (SEE A32J6370, LOC. A & B)		
-45	-----------			1	CONN,RCPT,ELEC: (SEE A32J6380 REPL)		
-46	-----------			1	CONN,RCPT,ELEC: (SEE A32J6385 REPL)		
-47	-----------			1	CIRCUIT BD ASSY:WORD RECOG PROBE #2) (SEE A33 REPL)		
-48	-----------			1	TERM SET,PIN: (SEE A33J6400 REPL)		
-49	-----------			2	TERM SET,PIN: (SEE A33P6380/6385 REPL)		
					STANDARD ACCESSORIES		
-50	012-0747-00			1	LEAD SET,ELEC:10 WIDE,25 CML (OPTION 06/09 ONLY)	TK2156	61501
-51	206-0222-00			1	TIP,PROBE:MICROCIRCUIT TEST (OPTION 06/09 ONLY)	80009	206022200
	010-6407-02			1	PROBE,WORD RECO:P6407,W/ACCESSORIES (OPTION 06/09 ONLY)	80009	010640702
	010-6602-00			1	PROBE,TEMP:P6602,64.0 L,230 DEG C (OPTION 01 ONLY)	80009	010660200
	012-0941-00			1	LEAD SET,METER:(2)LEAD,ELEC,(2)PROBE HEAD (OPTION 01 ONLY)	80009	012094100
	016-0180-00			1	VISOR,CRT:FOLDING (OPTION 05 ONLY)	0JR05	ORDER BY DESC
	016-0720-00			1	COVER,PROT:NYLON (OPTION 01 ONLY)	0JRZ2	ORDER BY DESC
	020-0087-00			1	ACCESSORY PKG:012-0941-01 (OPTION 01 ONLY)	80009	020008700
	070-5365-00			1	CARD,INFO:REF,DMM OPTION (OPTION 01 ONLY)	80009	070536500
	070-6859-00			1	MANUAL,TECH:INTERFACE GUIDE,24X5B/2467B	80009	070685900
	200-2844-00			1	COVER,FRONT:2465 OPT 01 (OPTION 01 ONLY)	7X318	ORDER BY DESC
	378-0199-04			1	FILTER,LT,CRT:BLUE,4.105 X 3.415 X 0.03 THK (24X5B OPTION 05 ONLY)	0KB00	378-0199-04
	378-0199-05			1	FILTER,LT,CRT:BLUE,4.105 X 3.415 X (24X5B OPTION 05 ONLY)	0KB00	378-01999-05
					OPTIONAL ACCESSORIES		
	070-6861-00			1	MANUAL,TECH:OPERATORS,2467B	80009	070686100
	070-6864-01			1	MANUAL,TECH:SERVICE,24X5B/67B,SMT	80009	070686401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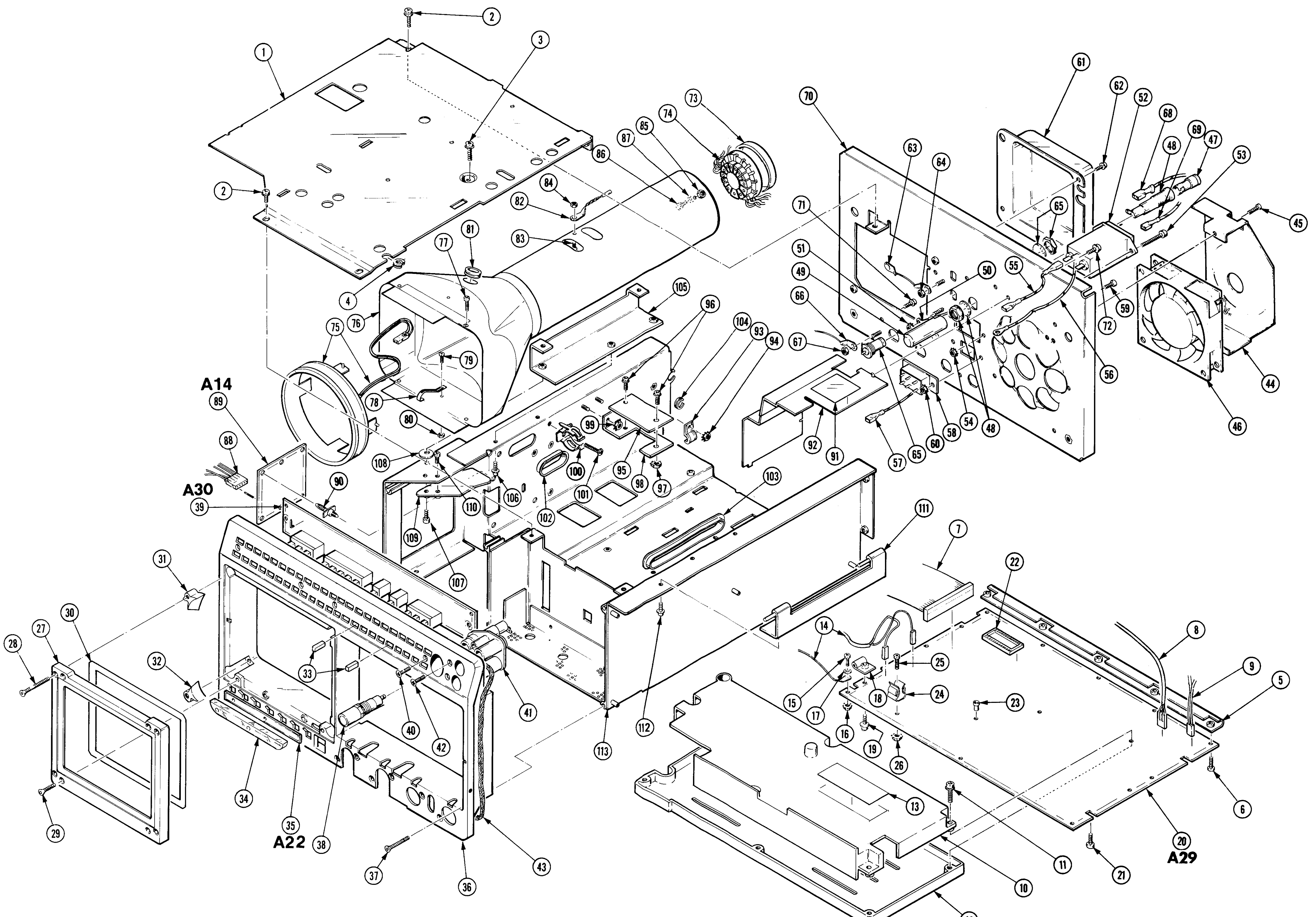
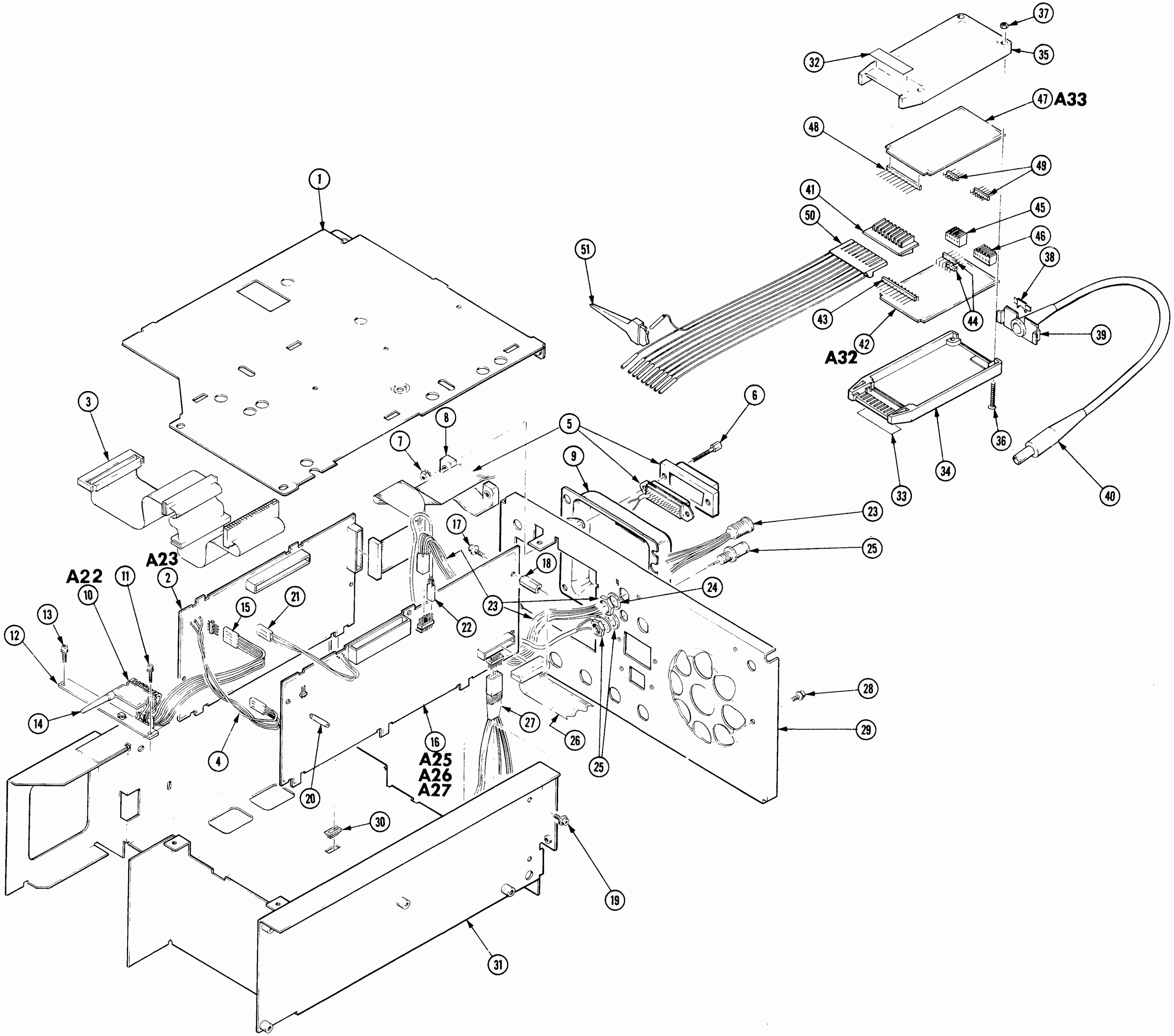


2455B ILLUSTRATIONS
24X5B/2467B OPTIONS SERVICE



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REPLACEABLE MECHANICAL PARTS

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

When ordering parts, 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.

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.

FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentations system used in the description column.

1 2 3 4 5 Name & Description

Assembly and/or component
Attaching parts for assembly and/or component

END ATTACHING PARTS

Detail part of assembly and/or component
Attaching parts for detail part

END ATTACHING PARTS

Parts of detail part
Attaching parts for parts or detail part

END ATTACHING PARTS

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.

Attaching parts must be purchased separately, unless otherwise specified.

ABBREVIATIONS

Abbreviations conform to American National Standard Y1.1.

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
S3629	SCHURTER AG H C/O PANEL COMPONENTS CORP	2015 SECOND STREET	BERKELEY CA 94170
TK0032	POWELL ELECTRONICS	411 FAIRCHILD DR	MT VIEW CA 94040
TK0435	LEWIS SCREW CO	4300 S RACINE AVE	CHICAGO IL 60609-3320
TK1159	IMPROVED PRODUCTS	3400 OLYMPIC STREET	SPRINGFIELD OR 97477
TK1160	MECHANICAL PRODUCTS MANUFACTURING CO	1723 1ST SO	SEATTLE WA 98134-3462
TK1163	POLYCAST INC	9898 SW TIGARD ST	TIGARD OR 97223
TK1165	STEN MFG INC	9702 85TH AVENUE N	MINNEAPOLIS MN 55369
TK1166	CIMCO INC	265 BRIGGS AVE	COSTA MESA CA 92626-4506
TK1169	DIEMAKERS INC	801 2ND ST PO BOX 278	MONROE CITY MO 63456-1441
TK1173	ACCURATE PLASTICS & ENG INC	1921 MILLER DRIVE	LONGMONT CO 80501
TK1177	BELL INDUSTRIES (DIST)	6024 SW JEAN ROAD	LAKE OSWEGO OR 97034
TK1287	ENOCH MFG CO	14242 SE 82ND DR PO BOX 98	CLACKAMAS OR 97015
TK1302	MOUNTAIN MOLDING	606 SECOND STREET	BERTHOUD CO 80513
TK1326	NORTHWEST FOURSLIDE INC	18224 SW 100TH CT	TUALATIN OR 97062
TK1328	NIDEC AMERICA CORP	682 TRANSFER RD	ST PAUL MN 55114
TK1374	TRI-TEC ENGINEERING CORP		
TK1386	PYRAMID ELECTRONICS SUPPLY INC	9757 JUANITA DRIVE NE	KIRKLAND WA 98034
TK1465	BEAVERTON PARTS MFG CO	1800 NW 216TH AVE	HILLSBORO OR 97124-6629
TK1547	MOORE ELECTRONICS INC (DIST)	19500 SW 90TH COURT PO BOX 1030	TUALATIN OR 97062
TK1591	EASTMAN PLASTICS INC	4605 SW 180TH	ALOHA OR 97007
TK1592	W AND W METAL	6521 SE CROSSWHITE WAY	PORTLAND OR 97206
TK1614	STUCKEL R J CO	1385 HOWARD ST	ELK GROVE VILLAGE IL 60007-2213
TK1622	TRIPLE L PRECISION	P O BOX 85	TIMBER OR 97144
TK1680	TECHNICAL DYNAMICS ALUMINUM CORP	9124 SW 64TH	PORTLAND OR 97206
TK1905	PUGET CORP OF OREGON	7440 S W BONITA	TIGARD OR 97223
TK1938	GALGON INDUSTRIES	37399 CENTRAL MONT PLACE	FREMONT CA 94536
TK2156	ACACIA/DEANCO	7763 SW CIRRUS RD SUITE 26	BEAVERTON OR 97005-6452
0B445	ELECTRI-CORD MFG CO INC	312 EAST MAIN ST	WESTFIELD PA 16950
0JRZ2	BADGLEY MFG CO	1620 NE ARGYLE	PORTLAND OR 97211
0JR05	TRIQUEST CORP	3000 LEWIS AND CLARK HWY	VANCOUVER WA 98661-2999
0J260	COMTEK MANUFACTURING OF OREGON (METALS)	PO BOX 4200	BEAVERTON OR 97076-4200
0J7N9	MCX INC	30608 SAN ANTONIO ST	HAYWARD CA 94544
0J9P9	GEROME MFG CO INC	PO BOX 737	NEWBURG OR 97132
0KB00	SCHRAMM PLASTIC FABRICATIORS	7885 SW HUNZIKER	TIGARD OR 97223
0KB01	STAUFFER SUPPLY	810 SE SHERMAN	PORTLAND OR 97214
00779	AMP INC	2800 FULLING MILL PO BOX 3608	HARRISBURG PA 17105

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
02768	ILLINOIS TOOL WORKS INC FASTEX DIVISION	195 ALGONQUIN ROAD	DES PLAINES IL 60016-6103
04811	PRECISION COIL SPRING CO	10107 ROSE ST PO BOX 5450	EL MONTE CA 91734
06915	RICHCO PLASTIC CO	5825 N TRIPP AVE	CHICAGO IL 60646-6013
07416	NELSON NAME PLATE CO	3191 CASITAS	LOS ANGELES CA 90039-2410
09922	BURNDY CORP	RICHARDS AVE	NORWALK CT 06852
12327	FREEWAY CORP	9301 ALLEN DR	CLEVELAND OH 44125-4632
18565	CHOMERICS INC	77 DRAGON COURT	WOBURN MA 01801-1039
18632	NORTON CHEMPLAST DBA NORTON PERFORMANCE PLASTICS	150 DEY RD	WAYNE NJ 07470-4670
22526	DU PONT E I DE NEMOURS AND CO INC DU PONT ELECTRONICS DEPT	515 FISHING CREEK RD	NEW CUMBERLAND PA 17070-3007
22670	G M NAMEPLATE INC	2040 15TH AVE WEST	SEATTLE WA 98119-2728
24931	SPECIALTY CONNECTOR CO INC	2100 EARLYWOOD DR PO BOX 547	FRANKLIN IN 46131
5F506	EOFF ELECTRIC CO	509 NW 10TH AVE	PORTLAND OR 97209-3201
53387	MINNESOTA MINING MFG CO	PO BOX 2963	AUSTIN TX 78769-2963
54583	TDK ELECTRONICS CORP	12 HARBOR PARK DR	PORT WASHINGTON NY 11550
61935	SCHURTER INC	1016 CLEGG COURT	PETALUMA CA 94952-1152
7X318	KASO PLASTICS INC	11015 A NE 39th	VANCOUVER WA 98662
73743	FISCHER SPECIAL MFG CO	111 INDUSTRIAL RD	COLD SPRING KY 41076-9749
78189	ILLINOIS TOOL WORKS INC SHAKEPROOF DIV	ST CHARLES ROAD	ELGIN IL 60120
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077-0001
85480	BRADY W H CO CORP H Q INDUSTRIAL PRODUCTS DIV	2221 W CAMDEN RD PO BOX 2131	MILWAUKEE WI 53209
88831	TEKSUN INC	11368 WEST OLYMPIC BLVD	LOS ANGELES CA 90064-1605
92101	SCHULZE MFG	50 INGOLD RD	BURLINGAME CA 94010-2206

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1 -1	333-2995-00			1	PANEL,FRONT:2465 OPT 01	22670	ORDER BY DESC
-2	334-6336-02			1	MARKER,IDENT:MARKED TEKTRONIX	22670	ORDER BY DESC
	334-6342-02			1	MARKER,IDENT:MARKED TEKTRONIX 2465B	22670	ORDER BY DESC
	334-6343-02			1	MARKER,IDENT:MARKED TEKTRONIX 2465B	22670	ORDER BY DESC
	334-6348-02			1	MARKER,IDENT:MARKED TEKTRONIX 2465BDV	22670	ORDER BY DESC
	334-6350-02			1	MARKER,IDENT:MARKED TEKTRONIX 2465BCT	22670	ORDER BY DESC
-3	366-2041-03			4	KNOB:DOVE GRAY,BAR,0.172 X 0.41 X 0.496	7X318	ORDER BY DESC
	366-2036-00			1	PUSH BUTTON:GY,0.206 SQ,1.445 H	0JR05	ORDER BY DESC
-4	333-2877-00			1	PANEL,FRONT:CRT	07416	ORDER BY DESC
-5	200-2779-00			1	COVER,TOP:TRIM	0JR05	ORDER BY DESC
-6	101-0095-01			1	TRIM,DECORATIVE:FRONT	TK1163	ORDER BY DESC
					ATTACHING PARTS		
	211-0718-00			10	SCREW,MACHINE:6-32 X 0.312,FLH,100 DEG,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-7	348-0740-00			2	FOOT,CABINET:BOTTOM FRONT,PLASTIC	0JR05	ORDER BY DESC
					ATTACHING PARTS		
-8	200-0740-00			2	COVER,ATTEN:RIGHT,15.87 X 2.25,BRASS	80009	200074000
					END ATTACHING PARTS		
-9	334-6341-00			1	MARKER,IDENT:MKD REAR BNC	07416	ORDER BY DESC
-10	334-4378-01			1	MARKER,IDENT:MKD PROBE POWER	07416	ORDER BY DESC
-11	334-4378-01			1	MARKER,IDENT:MKD PROBE POWER	07416	ORDER BY DESC
-12	343-0003-00			1	CLAMP,LOOP:0.25 ID,PLASTIC	06915	E4 CLEAR ROUND
					ATTACHING PARTS		
-13	211-0691-00			1	SCREW,MACHINE:6-32 X 0.625,PNH,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-14	161-0104-00			1	CABLE ASSY,PWR,:3 WIRE,98.0 L	0B445	MC6 -3 CG86
-15	348-0780-00			2	FOOT,CABINET:W/CORD WRAP,REAR,BLACK	0JR05	ORDER BY DESC
					ATTACHING PARTS		
-16	211-0722-00			2	SCREW,MACHINE:6-32 X 0.25,PNH,STL	0KB01	ORDER BY DESC
-17	212-0154-00			4	SCREW,MACHINE:8-32 X 1.125,PNH,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-18	200-2275-04			1	COVER,REAR:DMM W/LABELS	80009	200227504
-19	337-2395-00			2	SHIELD,ELEC:HANDLE	TK1614	ORDER BY DESC
					ATTACHING PARTS		
-20	213-0138-00			4	SCREW,TPG,TF:4-24 X 0.188,TYPE B,PNH,STL	TK0435	TAPPING SCREW
					END ATTACHING PARTS		
	437-0320-00			1	CABINET ASSY:DMM OPT 1	80009	437032000
-21	348-0764-04			1	.SHLD GSKT,ELEK:0.125 X 0.188,WIRE MESH	18565	ORDER BY DESC
-22	437-0309-00			1	.CABINET,SCOPE:2465 OPT 01	0J9P9	ORDER BY DESC
-23	367-0303-04			1	.HANDLE,CARRYING:12.86 L,GRIP & INDEX	0JR05	ORDER BY DESC
					ATTACHING PARTS		
-24	212-0144-00			2	.SCREW,TPG,TF:8-16 X 0.562 L,PLASTITE	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-25	334-6340-01			1	MARKER,IDENT:MARKED 2465B	22670	ORDER BY DESC
	334-6347-01			1	MARKER,IDENT:MARKED 2465BDMS	22670	ORDER BY DESC
	334-6349-01			1	MARKER,IDENT:MARKED 2465BDVS	22670	ORDER BY DESC
	334-6350-02			1	MARKER,IDENT:MARKED TEKTRONIX 2465BCT	22670	ORDER BY DESC
	334-6351-01			1	MARKER,IDENT:MARKED 2465BCTS	22670	ORDER BY DESC

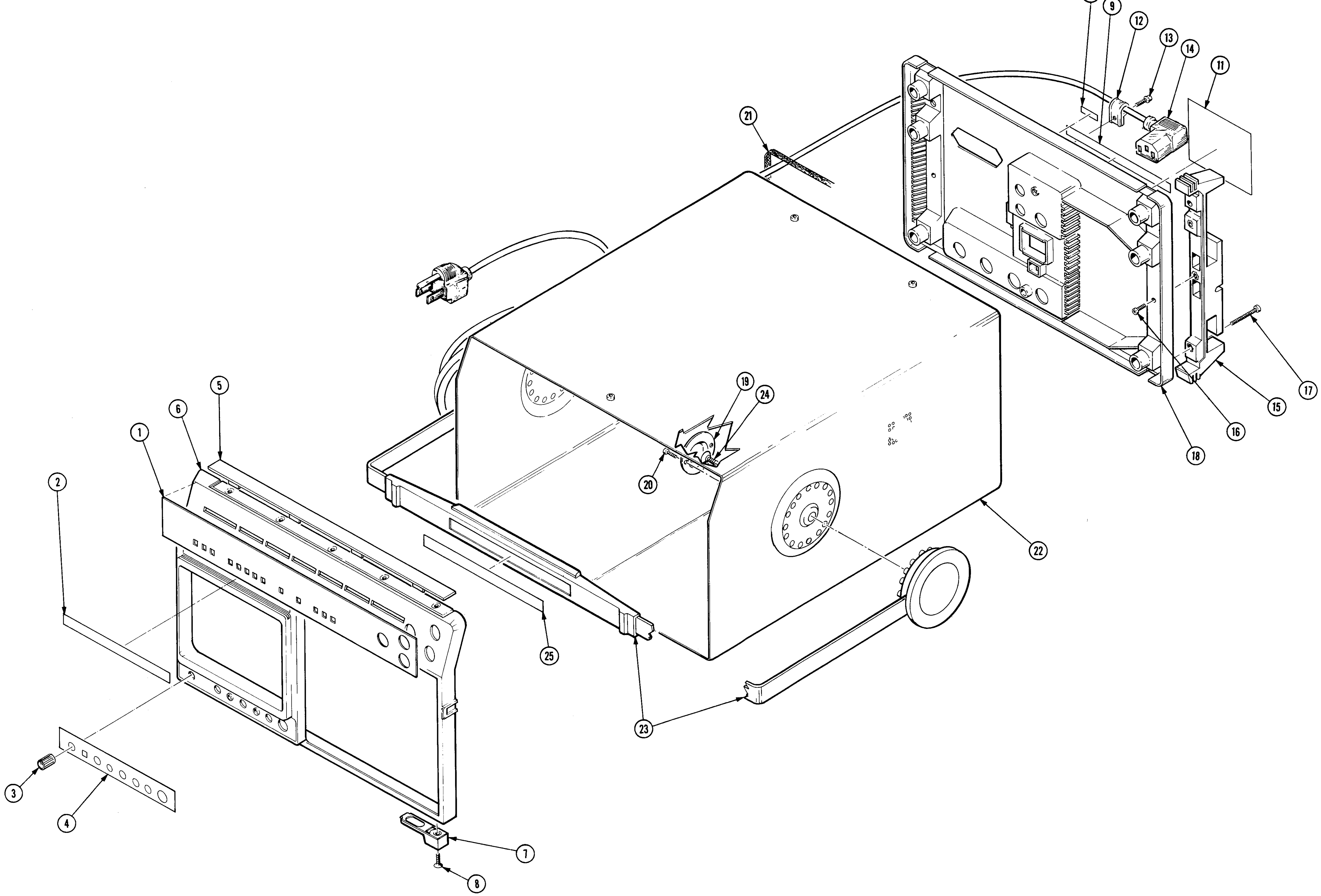
Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2 -1	407-2790-03			1	BRACKET,CKT BD:ALUMINUM	0J260	ORDER BY DESC
					ATTACHING PARTS		
-2	211-0711-00			4	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
-3	211-0747-00			1	SCREW,MACHINE:6-32 X 0.188,PNH,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-4	348-0757-00			1	GROMMET,PLASTIC:BLACK,U SHAPE,0.25 ID	TK1166	ORDER BY DESC
-5	407-2842-00			1	BRACKET,CKT BD:ALUMINUM	TK1592	ORDER BY DESC
					ATTACHING PARTS		
-6	211-0304-00			5	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-7	175-2324-00			1	CA ASSY,SP,ELEC:14,26 AWG,29.0 L	80009	175232400
-8	175-8323-00			1	CA ASSY,SP,ELEC:3,26 AWG,13.0 L,9-N	0J7N9	ORDER BY DESC
-9	175-8730-00			1	CA ASSY,SP,ELEC:2,26 AWG,7.5 L	TK1547	P/N PCA 7543AL
-10	337-3121-01			1	SHIELD,ELEC:DMM,BOTTOM	TK1905	337-3121-01
					ATTACHING PARTS		
-11	211-0720-00			5	SCR,ASSEM WSHR:6-32 X 0.50,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-12	337-3120-00			1	SHIELD,ELEC:DMM,TOP	TK1905	ORDER BY DESC
-13	-----------			1	MARKER,IDENT:MKD CAUTION		
-14	196-2924-00			1	LEAD ASSY,ELEC:2,24 AWG,5.5 L,9-1/9-2	0J7N9	ORDER BY DESC
					ATTACHING PARTS		
-15	211-0304-00			1	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9	0KB01	ORDER BY DESC
-16	210-0586-00			1	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	TK0435	ORDER BY DESC
-17	210-0046-00			1	WASHER,LOCK:0.261 ID,INTL,0.018 THK,STL	78189	1214-05-00-0541
					END ATTACHING PARTS		
-18	214-3492-00			2	HINGE HALF:DMM,ALUMINUM	TK1165	80630-000
					ATTACHING PARTS		
-19	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-20	-----------			1	CIRCUIT BD ASSY:MULTIMETER (SEE A29 REPL)		
					ATTACHING PARTS		
-21	211-0304-00			2	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-22	136-0755-00			1	SOCKET,DIP::PCB,;28 POS,2 X 14,0.1 X 0.6	09922	DILB28P-108
-23	358-0136-00			1	INSULATOR,BSHG:0.075 ID X 0.203 OD X 0.075	18632	ORDER BY DESC
-24	344-0356-00			2	CLIP,ELECTRICAL:FUSE,BRONZE	5F506	ORDER BY DESC
					ATTACHING PARTS		
-25	211-0722-00			2	SCREW,MACHINE:6-32 X 0.25,PNH,STL	0KB01	ORDER BY DESC
-26	210-0457-00			2	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-27	426-1864-01			1	FRAME,CRT:2430	TK1169	ORDER BY DESC
					ATTACHING PARTS		
-28	211-0713-00			4	SCREW,MACHINE:6-32 X 1.25,FLH,100 DEG,STL	0KB01	ORDER BY DESC
-29	213-0194-00			4	THUMBSCREW:0.25-36 X 0.203,0.312 OD HD,BRS	80009	213019400
					END ATTACHING PARTS		
-30	337-2926-03			1	SHLD,IMPLOSION:4.44 X 3.67 X 0.06,CLEAR	TK1159	ORDER BY DESC
	348-0731-01			1	GASKET:CRT,POLYETHYLENE	TK1159	ORDER BY DESC
-31	343-0993-00			2	RETAINER,CRT:BLACK,PLASTIC	TK1163	ORDER BY DESC
					(UPPER LEFT/LOWER RIGHT/BLACK)		
-32	343-0992-00			2	RETAINER,CRT:CLEAR,PLASTIC	TK1163	ORDER BY DESC
					(UPPER RIGHT/LOWER LEFT/NATURAL)		
-33	366-2013-02			13	PUSH BUTTON:IVORY GRAY,0.186 SQ X 0.48 H	0JR05	ORDER BY DESC
-34	378-0204-00			1	REFLECTOR,LIGHT:INT SCALE ILLUMINATION	7X318	ORDER BY DESC
-35	-----------			1	CIRCUIT BD ASSY:LED (SEE A22 REPL)		
-36	386-5133-01			1	SUBPANEL,FRONT:2465 OPT 01	TK1465	386513301
					ATTACHING PARTS		
-37	213-0914-00			2	SCREW,TPG,TR:6-32 X 0.75,FLH,100 DEG,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-38	352-0765-01			1	FUSEHOLDER:3AG,PNL MT	61935	FEU 031-1768
-39	-----------			1	CIRCUIT BD ASSY:FR PANEL (SEE A30 REPL)		
					ATTACHING PARTS		

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2 -40	211-0718-00			4	SCREW,MACHINE:6-32 X 0.312,FLH,100 DEG,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-41	352-0691-01			1	HOLDER,CONN:POLYCARBONATE	88831	ORDER BY DESC
					ATTACHING PARTS		
-42	213-0914-00			2	SCREW,TPG,TR:6-32 X 0.75,FLH,100 DEG,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-43	348-0792-02			1	GASKET:ELECTRICAL SHIELD,37.0 L	18565	ORDER BY DESC
-44	378-0275-00			1	DEFLECTOR,AIR:ALUMINUM	TK1160	378-0275-00
					ATTACHING PARTS		
-45	211-0711-00			1	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-46	119-2102-00			1	FAN,TUBEAXIAL:12V,1.5W,3200RPM,24CFM	TK1328	119-2102-00
-47	200-2264-00			1	CAP,FUSEHOLDER:3AG FUSES	S3629	FEK 031 1666
-48	204-0833-00			1	BODY,FUSEHOLDER:3AG & 5 X 20MM FUSES	S3629	031 1653 (MODEL
-49	200-2265-00			1	CAP,FUSEHOLDER:5 X 20MM FUSES	S3629	FEK 031.1663
-50	195-3984-00			1	LEAD,ELECTRICAL:22 AWG,4.0 L,8-01	TK0032	ORDER BY DESC
					ATTACHING PARTS		
-51	210-0457-00			1	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-52	119-1536-00			1	FILTER,RFI:3A,250VAC,50/60HZ	54583	ZUB2203-00
					ATTACHING PARTS		
-53	211-0332-00			2	SCR,ASSEM WSHR:4-40 X 0.5,PNH,STL,T9	0KB01	ORDER BY DESC
-54	210-0586-00			2	NUT,PL,ASSEM WA:4-40 X 0.25,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-55	195-3989-00			1	LEAD,ELECTRICAL:18 AWG,4.0 L,8-9	TK0032	ORDER BY DESC
-56	195-3990-00			1	LEAD,ELECTRICAL:18 AWG,4.5 L,5-4	TK0032	ORDER BY DESC
-57	195-3987-00			1	LEAD,ELECTRICAL:22 AWG,2.6 L,8-19	TK0032	ORDER BY DESC
-58					SWITCH,SLIDE:DPDT (SEE S90 IN STD. MANUAL)		
					ATTACHING PARTS		
-59	211-0304-00			2	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9	0KB01	ORDER BY DESC
-60	210-0586-00			2	NUT,PL,ASSEM WA:4-40 X 0.25,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-61	200-2686-00			1	COVER,REAR:CRT	TK1938	ORDER BY DESC
					ATTACHING PARTS		
-62	211-0718-00			4	SCREW,MACHINE:6-32 X 0.312,FLH,100 DEG,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-63	195-8410-00			1	LEAD,ELECTRICAL:22 AWG,1.65 L	TK1386	ORDER BY DESC
					ATTACHING PARTS		
-64	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-65	131-1910-01			4	CONN,RCPT,ELEC:BNC,FEMALE	24931	28JR284-1
-66	195-9513-00			1	LEAD,ELECTRICAL:22 AWG,1.4 L,	TK1386	ORDER BY DESC
					ATTACHING PARTS		
-67	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-68	195-3984-00			1	LEAD,ELECTRICAL:22 AWG,4.0 L,8-01	TK0032	ORDER BY DESC
-69	195-3988-00			1	LEAD,ELECTRICAL:22 AWG,4.0 L,8-29	TK0032	ORDER BY DESC
-70	386-5048-01			1	PLATE,REAR:PWR SPLY	TK1592	386504801
					ATTACHING PARTS		
-71	211-0711-00			5	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
-72	211-0711-00			1	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-73	200-0917-01			1	COVER,CRT SKT:2.052 OD X 0.291 H,PLASTIC	0JR05	ORDER BY DESC
-74	198-4603-01			1	WIRE SET,ELEC:W/CRT SOCKET	0J7N9	ORDER BY DESC
-75	119-1478-01			1	COIL,TUBE DEFL:FXD,TRACE ROTATION	TK1177	06244
-76	337-2931-01			1	SHIELD,CRT:2445/2465	0J9P9	337-2931-01
					ATTACHING PARTS		
-77	211-0337-00			4	SCREW,MACHINE:4-40 X 0.25,PNH,SST	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-78	214-0291-00			1	CONTACT,ELEC:CRT CONNECTOR,CU BE	04811	ORDER BY DESC
					ATTACHING PARTS		

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2 -79	211-0324-00			1	SCR,ASSEM WSHR:4-40 X 0.188,PNH,T9	0KB01	ORDER BY DESC
-80	210-0586-00			1	NUT,PL,ASSEM WA:4-40 X 0.25,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-81	348-0762-00			1	GROMMET,PLASTIC:NATURAL,ROUND,0.54 ID	0JR05	ORDER BY DESC
-82	195-6851-01			1	LEAD,ELECTRICAL:BRAIDED,1.65 L	TK1386	ORDER BY DESC
					ATTACHING PARTS		
-83	211-0324-00			1	SCR,ASSEM WSHR:4-40 X 0.188,PNH,T9	0KB01	ORDER BY DESC
-84	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-85	210-0457-00			1	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
-86	211-0324-00			1	SCR,ASSEM WSHR:4-40 X 0.188,PNH,T9	0KB01	ORDER BY DESC
-87	210-0994-00			1	WASHER,FLAT:0.125 ID X 0.25 OD X 0.022,STL	12327	ORDER BY DESC
-88	175-8010-01			1	CA ASSY,SP,ELEC:5,22 AWG,10.5 L,RIBBON	0J7N9	ORDER BY DESC
-89					CIRCUIT BD ASSY:DYNAMIC CENTERING (SEE A14 REPL) (STANDARD MANUAL)		
-90	361-0067-00			3	SPACER,CKT BD:0.187,NYLON	02768	215-150912-00(M
-91	334-4759-00			1	MARKER,IDENT:MKD SHIELDS INVERTER	07416	ORDER BY DESC
-92	337-3120-00			1	SHIELD,ELEC:DMM,TOP	TK1905	ORDER BY DESC
-93	343-0081-00			1	STRAP,RETAINING:0.125 DIA,NYLON	85480	CPNY-172BK
					ATTACHING PARTS		
-94	210-0457-00			1	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-95	307-1154-00			1	PASSIVE NETWORK:CRT TERMINATOR	80009	307115400
					ATTACHING PARTS		
-96	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
-97	210-0457-00			2	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-98	407-2809-00			1	BRACKET,ANGLE:RESISTOR,AL	92101	ORDER BY DESC
					ATTACHING PARTS		
-99	210-0457-00			2	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-100	343-1099-00			1	RTNR,POWER SPLY:LOW VOLTAGE,FRONT,PC	88831	ORDER BY DESC
					ATTACHING PARTS		
-101	211-0711-00			1	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-102	348-0763-00			1	GROMMET,PLASTIC:NATURAL,OVAL,1.235 ID	0JR05	ORDER BY DESC
-103	348-0763-00			1	GROMMET,PLASTIC:NATURAL,OVAL,1.235 ID	0JR05	ORDER BY DESC
-104	348-0757-00			1	GROMMET,PLASTIC:BLACK,U SHAPE,0.25 ID	TK1166	ORDER BY DESC
-105	407-3092-00			1	BRKT,CMPNT MTG:DMM	TK1165	ORDER BY DESC
					ATTACHING PARTS		
-106	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
-107	211-0730-00			1	SCR,ASSEM WSHR:6-32 X 0.375,PNH,STL,T15	0KB01	ORDER BY DESC
-108	210-0858-00			1	WASHER,FLAT:0.172 ID X 0.5 OD X 0.062,BRS	12327	ORDER BY DESC
					END ATTACHING PARTS		
-109	337-3438-00			1	SHIELD,ELEC:ANODE LEAD	0J9P9	ORDER BY DESC
					ATTACHING PARTS		
-110	211-0747-00			2	SCREW,MACHINE:6-32 X 0.188,PNH,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-111	407-3124-00			1	BRKT ASSY,HINGE:ALUMINUM	TK1165	ORDER BY DESC
					ATTACHING PARTS		
-112	211-0711-00			3	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-113	441-1618-02			1	CHASSIS,SCOPE:MAIN	0J9P9	ORDER BY DESC

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Serial No. Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3 -1	407-2790-03			1	BRACKET,CKT BD:ALUMINUM	0J260	ORDER BY DESC
-2	-----------			1	CIRCUIT BD ASSY:GPIB (SEE A23 REPL)		
-3	-----------			1	CABLE ASSY: (SEE A23W4243 REPL)		
-4	-----------			1	CABLE ASSY: (SEE A23W4244 REPL)		
-5	-----------			1	CABLE ASSY: (SEE A23P4800 REPL)		
					ATTACHING PARTS		
-6	129-1107-00			2	SPACER,POST:0.98 L,6-32 EXT & M3.5 INT THD	TK1287	129-1107-00
-7	210-0457-00			2	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-8	337-0118-01			1	SHIELD,ELEC:GPIB	TK1591	337-0118-01
-9	200-2686-00			1	COVER,REAR:CRT	TK1938	ORDER BY DESC
-10	-----------			1	CIRCUIT BD ASSY:LED (SEE A22 REPL)		
					ATTACHING PARTS		
-11	211-0378-00			1	SCR,ASSEM WSHR:4-40 X 0.375.PNH,STL,CD PL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-12	386-0867-00			1	PLATE,MOUNTING:LED	TK1302	ORDER BY DESC
					ATTACHING PARTS		
-13	211-0337-00			1	SCREW,MACHINE:4-40 X 0.25,PNH,SST	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-14	378-2057-00			3	LENS,LIGHT:CLEAR,PLASTIC,PIPE	0JR05	ORDER BY DESC
-15	175-7185-00			1	CA ASSY,SP,ELEC:4,26 AWG,7.5 L,RIBBON	22526	81281-001
-16	-----------			1	CIRCUIT BD ASSY:TV/CTT (SEE A25/26/27 REPL)		
					ATTACHING PARTS		
-17	211-0730-00			2	SCR,ASSEM WSHR:6-32 X 0.375,PNH,STL,T15	0KB01	ORDER BY DESC
	210-0864-00			2	WASHER,FLAT:0.188 ID X 0.375 OD X 0.05,STL	12327	ORDER BY DESC
	337-3642-00			1	SHIELD,ELEC:SMT-CTT	80009	337364200
					END ATTACHING PARTS		
					CIRCUIT BD ASSY INCLUDES:		
	214-3799-00	B050000	B050650	1	.HEAT SINK,ELEC:ALUMINUM	TK1680	214-3799-00
	214-3800-00	B050000	B050650	1	.SPRING,RETAINER:0.016 THK,SST	TK1326	214-3800-00
-18	129-1301-00			2	SPACER,POST:0.625 L X 6-32,ALUMINUM	0KB01	ORDER BY DESC
	129-1056-00			2	SPACER,POST:0.4 L,6-32 INT/EXT,STL	TK1622	ORDER BY DESC
					ATTACHING PARTS		
-19	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-20	361-1517-00			2	SPACER,CKT BD:0.625 L,NYLON	06915	MSP-10-01
-21	174-1555-00			1	CA ASSY,SP,ELEC:2,26 AWG,4.0 L	80009	174155500
	174-1373-00			1	CA ASSY,SP,ELEC:20,28 AWG,14.0 L	53387	ORDER BY DESC
-22	175-7931-01			1	CABLE ASSY,RF:50 OHM COAX,16.5 L	80009	175793101
-23	175-7932-01			1	CA ASSY,SP,ELEC:6,26 AWG,16.25 L	80009	175793201
-24	210-0902-00			1	WASHER,FLAT:0.47 ID X 0.656 OD X 0.03,STL	12327	ORDER BY DESC
-25	131-0103-00			1	CONN,RCPT,ELEC:BNC,FEMALE	00779	222541-1
-26	175-1373-00			1	CABLE ASSY,RF:50 OHM COAX,18.0 L	80009	175137300
-27	174-1542-00			1	CABLE ASSY,RF:50 OHM COAX,7.5 L	80009	174154200
	174-1543-00			1	CABLE ASSY,RF:(4) 50 OHM,(1) 75 OHM	80009	174154300
-28	386-4713-02			1	PLATE,REAR:POWER SUPPLY	0J9P9	ORDER BY DESC
					ATTACHING PARTS		
-29	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-30	343-1012-00			3	RETAINER,CKT BD:POLYCARBONATE	TK1173	ORDER BY DESC
	343-0013-00			1	CLAMP,LOOP:0.375 ID,PLASTIC	06915	E6 CLEAR ROUND
-31	441-1896-00			1	CHASSIS,SCOPE:MAIN ASSY,AL,W/HARDWARE	0J9P9	ORDER BY DESC
-32	334-5200-00			1	MARKER,IDENT:MKD WORD REC PROBE	80009	334520000
-33	334-5201-02			1	MARKER,IDENT:MKD-0.5V TO 5.5V PEAK	80009	334520102
-34	380-0710-00			1	HOUSING,PROBE:LOWER,PC	TK1163	380-0710-00

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3 -35	380-0711-00			1	HOUSING,PROBE:UPPER,PC	TK1163	380-0711-00
					ATTACHING PARTS		
-36	211-0451-00			4	SCREW,MACHINE:4-40 X 0.750,FLH	0KB01	ORDER BY DESC
-37	210-0406-00			4	NUT,PLAIN,HEX:4-40 X 0.188,BRS	73743	12161-50
					END ATTACHING PARTS		
-38	358-0675-00			1	STRAIN RLF,CA:UPPER	TK1163	358-0675-00
-39	358-0347-00			1	STRAIN RLF,CA:LOWER,PLASTIC	88831	ORDER BY DESC
-40	175-8853-01			1	CA ASSY,SP,ELEC:6,26 AWG,80.5 L,8-N	TK1374	ORDER BY DESC
-41	361-0758-01			1	SPACER,PROBE:ACETAL SLATE GRAY	80009	361075801
-42	-----------			1	CIRCUIT BD ASSY:WORD RECOG PROBE #1 (SEE A32 REPL)		
-43	-----------			1	TERM SET,PIN: (SEE A32J6300 REPL)		
-44	-----------			1	CONN,RCPT,ELEC: (SEE A32J6370, LOC. A & B)		
-45	-----------			1	CONN,RCPT,ELEC: (SEE A32J6380 REPL)		
-46	-----------			1	CONN,RCPT,ELEC: (SEE A32J6385 REPL)		
-47	-----------			1	CIRCUIT BD ASSY:WORD RECOG PROBE #2) (SEE A33 REPL)		
-48	-----------			1	TERM SET,PIN: (SEE A33J6400 REPL)		
-49	-----------			2	TERM SET,PIN: (SEE A33P6380/6385 REPL)		
					STANDARD ACCESSORIES		
-50	012-0747-00			1	LEAD SET,ELEC:10 WIDE,25 CML (OPTION 06/09 ONLY)	TK2156	61501
-51	206-0222-00			1	TIP,PROBE:MICROCIRCUIT TEST (OPTION 06/09 ONLY)	80009	206022200
	010-6407-02			1	PROBE,WORD RECO:P6407,W/ACCESSORIES (OPTION 06/09 ONLY)	80009	010640702
	010-6602-00			1	PROBE,TEMP:P6602,64.0 L,230 DEG C (OPTION 01 ONLY)	80009	010660200
	012-0941-00			1	LEAD SET,METER:(2)LEAD,ELEC,(2)PROBE HEAD (OPTION 01 ONLY)	80009	012094100
	016-0180-00			1	VISOR,CRT:FOLDING (OPTION 05 ONLY)	0JR05	ORDER BY DESC
	016-0720-00			1	COVER,PROT:NYLON (OPTION 01 ONLY)	0JRZ2	ORDER BY DESC
	020-0087-00			1	ACCESSORY PKG:012-0941-01,2445/2465 (OPTION 01 ONLY)	80009	020008700
	070-5365-00			1	CARD,INFO:REF,DMM OPTION (OPTION 01 ONLY)	80009	070536500
	070-6859-00			1	MANUAL,TECH:INTERFACE GUIDE,24X5B/2467B	80009	070685900
	200-2844-00			1	COVER,FRONT:2465 OPT 01 (OPTION 01 ONLY)	7X318	ORDER BY DESC
	378-0199-04			1	FILTER,LT,CRT:BLUE,4.105 X 3.415 X 0.03 THK (24X5B OPTION 05 ONLY)	0KB00	378-0199-04
	378-0199-05			1	FILTER,LT,CRT:BLUE,4.105 X 3.415 X 0.03 THK (24X5B OPTION 05 ONLY)	0KB00	378-01999-05
					OPTIONAL ACCESSORIES		
	070-6861-00			1	MANUAL,TECH:OPERATORS,2467B	80009	070686100
	070-6864-01			1	MANUAL,TECH:SERVICE,24X5B/67B,SMT	80009	070686401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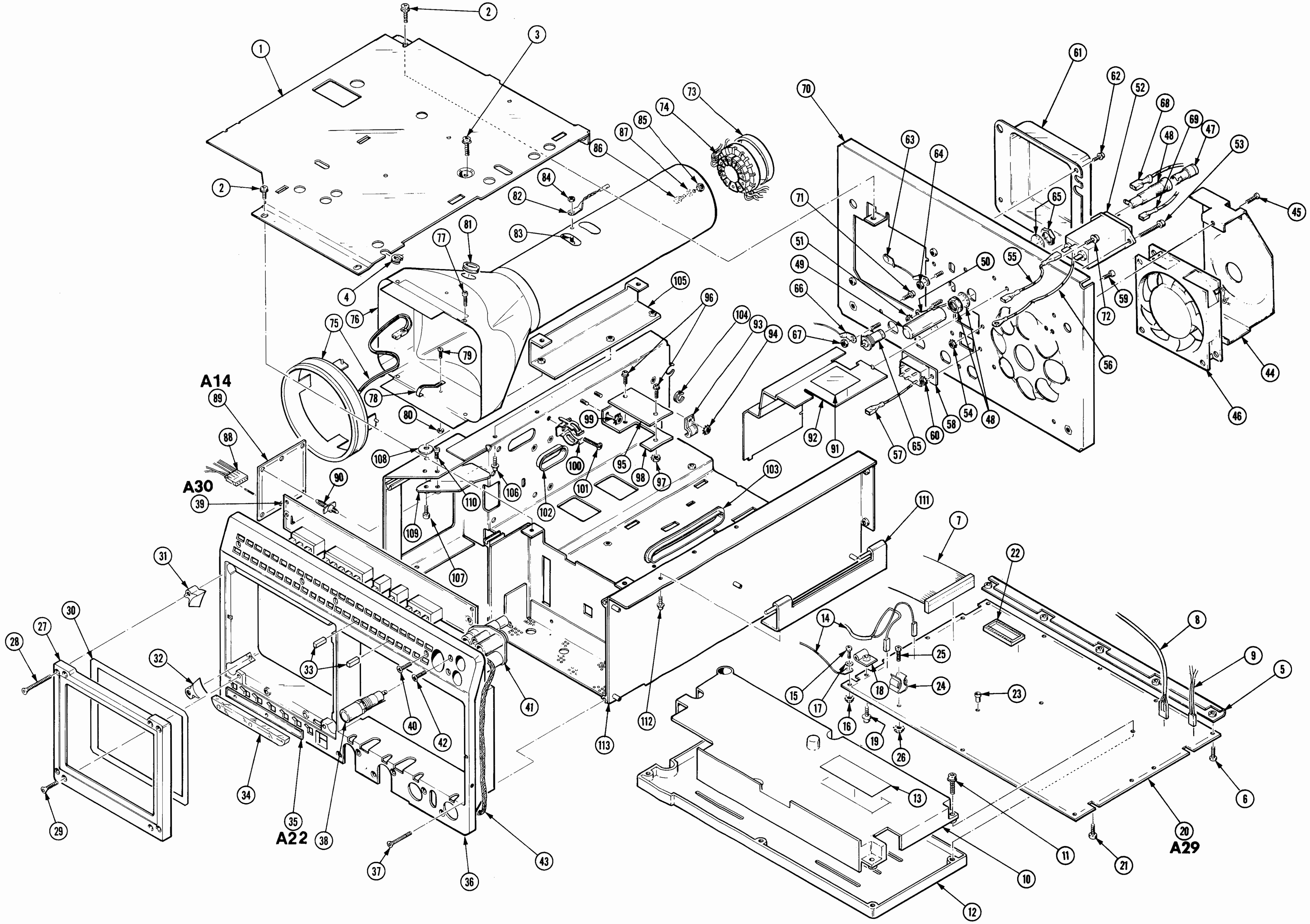
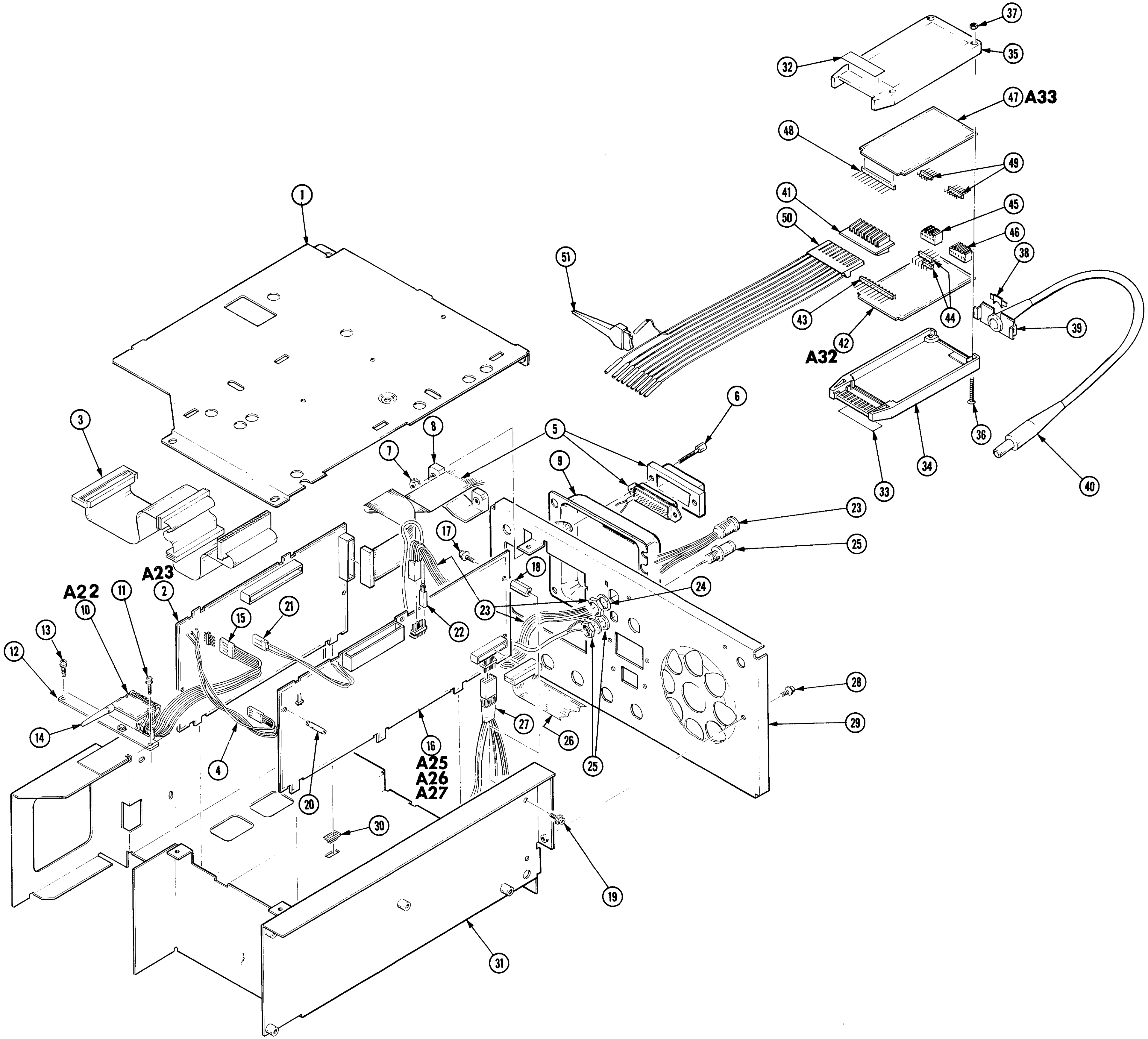


2465B ILLUSTRATIONS
24X5B/2467B OPTIONS SERVICE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REPLACEABLE MECHANICAL PARTS

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

When ordering parts, 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.

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.

FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentations system used in the description column.

1 2 3 4 5 Name & Description

Assembly and/or component
Attaching parts for assembly and/or component

END ATTACHING PARTS

Detail part of assembly and/or component
Attaching parts for detail part

END ATTACHING PARTS

Parts of detail part
Attaching parts for parts or detail part

END ATTACHING PARTS

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.

Attaching parts must be purchased separately, unless otherwise specified.

ABBREVIATIONS

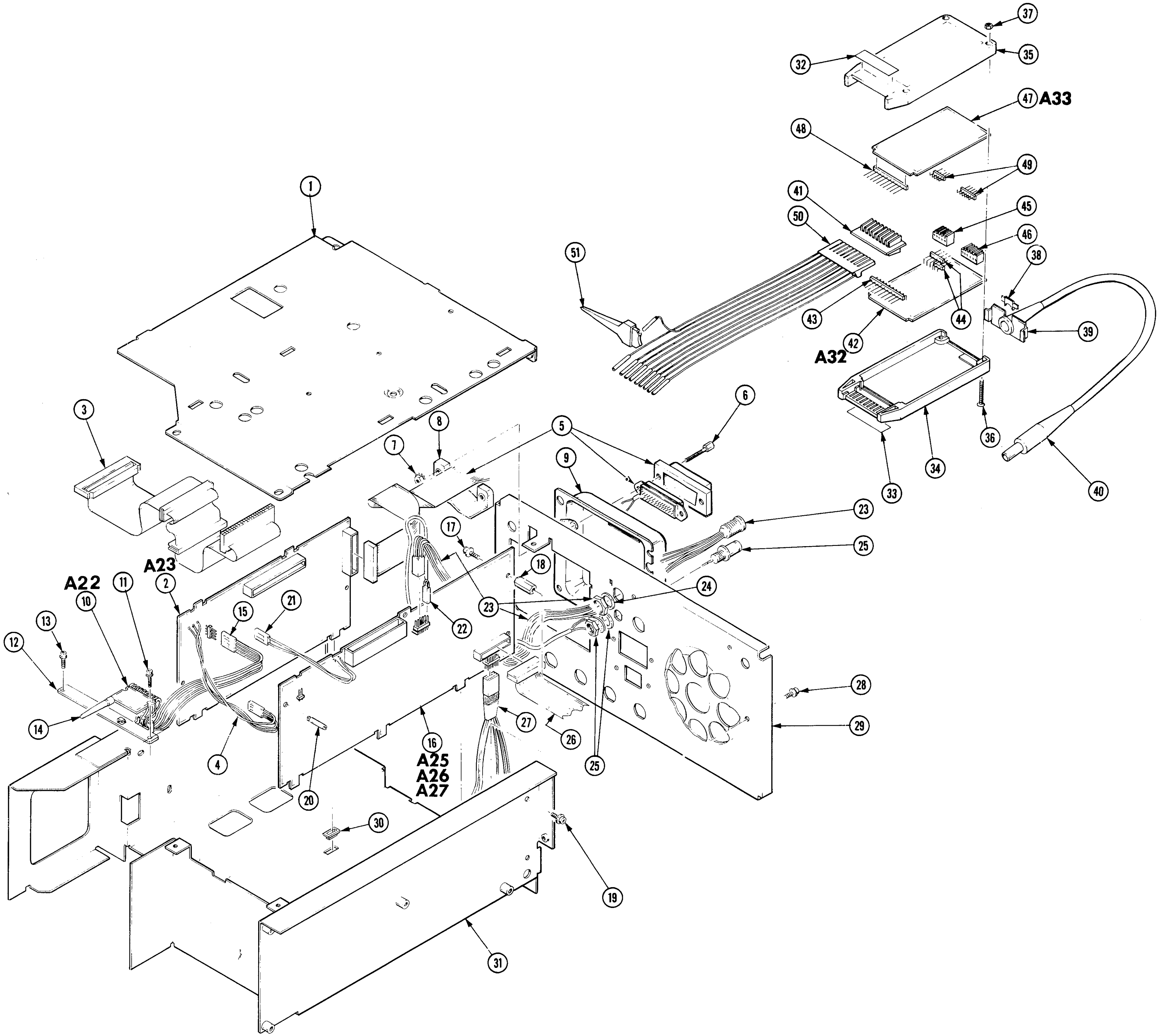
Abbreviations conform to American National Standard Y1.1.

CROSS INDEX – MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
TK0435	LEWIS SCREW CO	4300 S RACINE AVE	CHICAGO IL 60609-3320
TK1163	POLYCAST INC	9898 SW TIGARD ST	TIGARD OR 97223
TK1173	ACCURATE PLASTICS & ENG INC	1921 MILLER DRIVE	LONGMONT CO 80501
TK1287	ENOCH MFG CO	14242 SE 82ND DR PO BOX 98	CLACKAMAS OR 97015
TK1302	MOUNTAIN MOLDING	606 SECOND STREET	BERTHOUD CO 80513
TK1326	NORTHWEST FOURSLIDE INC	18224 SW 100TH CT	TUALATIN OR 97062
TK1374	TRI-TEC ENGINEERING CORP		
TK1591	EASTMAN PLASTICS INC	4605 SW 180TH	ALOHA OR 97007
TK1622	TRIPLE L PRECISION	P O BOX 85	TIMBER OR 97144
TK1680	TECHNICAL DYNAMICS ALUMINUM CORP	9124 SW 64TH	PORTLAND OR 97206
TK1938	GALGON INDUSTRIES	37399 CENTRAL MONT PLACE	FREMONT CA 94536
TK2156	ACACIA/DEANCO	7763 SW CIRRUS RD SUITE 26	BEAVERTON OR 97005-6452
0JR05	TRIQUEST CORP	3000 LEWIS AND CLARK HWY	VANCOUVER WA 98661-2999
0J260	COMTEK MANUFACTURING OF OREGON (METALS)	PO BOX 4200	BEAVERTON OR 97076-4200
0J9P9	GEROME MFG CO INC	PO BOX 737	NEWBURG OR 97132
0KB00	SCHRAMM PLASTIC FABRICATIORS	7885 SW HUNZIKER	TIGARD OR 97223
0KB01	STAUFFER SUPPLY	810 SE SHERMAN	PORTLAND OR 97214
00779	AMP INC	2800 FULLING MILL PO BOX 3608	HARRISBURG PA 17105
06915	RICHCO PLASTIC CO	5825 N TRIPP AVE	CHICAGO IL 60646-6013
12327	FREEWAY CORP	9301 ALLEN DR	CLEVELAND OH 44125-4632
22526	DU PONT E I DE NEMOURS AND CO INC DU PONT ELECTRONICS DEPT	515 FISHING CREEK RD	NEW CUMBERLAND PA 17070-3007
53387	MINNESOTA MINING MFG CO	PO BOX 2963	AUSTIN TX 78769-2963
73743	FISCHER SPECIAL MFG CO	111 INDUSTRIAL RD	COLD SPRING KY 41076-9749
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077-0001
88831	TEKSUN INC	11368 WEST OLYMPIC BLVD	LOS ANGELES CA 90064-1605

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1 -1	407-2790-03			1	BRACKET,CKT BD:ALUMINUM	0J260	ORDER BY DESC
-2	-----------			1	CIRCUIT BD ASSY:GPIB (SEE A23 REPL)		
-3	-----------			1	CABLE ASSY: (SEE A23W4243 REPL)		
-4	-----------			1	CABLE ASSY: (SEE A23W4244 REPL)		
-5	-----------			1	CABLE ASSY: (SEE A23P4800 REPL)		
					ATTACHING PARTS		
-6	129-1107-00			2	SPACER,POST:0.98 L,6-32 EXT & M3.5 INT THD	TK1287	129-1107-00
-7	210-0457-00			2	NUT,PL,ASSEM WA:6-32 X 0.312,STL	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-8	337-0118-01			1	SHIELD,ELEC:GPIB	TK1591	337-0118-01
-9	200-2686-00			1	COVER,REAR:CRT	TK1938	ORDER BY DESC
-10	-----------			1	CIRCUIT BD ASSY:LED (SEE A22 REPL)		
					ATTACHING PARTS		
-11	211-0378-00			1	SCR,ASSEM WSHR:4-40 X 0.375.PNH,STL	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-12	386-0867-00			1	PLATE,MOUNTING:LED	TK1302	ORDER BY DESC
					ATTACHING PARTS		
-13	211-0337-00			1	SCREW,MACHINE:4-40 X 0.25,PNH,SST	TK0435	ORDER BY DESC
					END ATTACHING PARTS		
-14	378-2057-00			3	LENS,LIGHT:CLEAR,PLASTIC,PIPE	0JR05	ORDER BY DESC
-15	175-7185-00			1	CA ASSY,SP,ELEC:4,26 AWG,7.5 L,RIBBON	22526	81281-001
-16	-----------			1	CIRCUIT BD ASSY:TV/CTT (SEE A25/26/27 REPL)		
					ATTACHING PARTS		
-17	211-0730-00			2	SCR,ASSEM WSHR:6-32 X 0.375,PNH,STL,T15	0KB01	ORDER BY DESC
	210-0864-00			2	WASHER,FLAT:0.188 ID X 0.375 OD X 0.05,STL	12327	ORDER BY DESC
	337-3642-00			1	SHIELD,ELEC:SMT-CTT	80009	337364200
					END ATTACHING PARTS		
					CIRCUIT BD ASSY INCLUDES:		
	214-3799-00	B050000	B050100	1	.HEAT SINK,ELEC:ALUMINUM	TK1680	214-3799-00
	214-3800-00	B050000	B050100	1	.SPRING,RETAINER:0.016 THK,SST	TK1326	214-3800-00
-18	129-1301-00			1	SPACER,POST:0.625 L X 6-32,ALUMINUM	0KB01	ORDER BY DESC
	129-1056-00			2	SPACER,POST:0.4 L,6-32 INT/EXT,STL	TK1622	ORDER BY DESC
					ATTACHING PARTS		
-19	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-20	361-1517-00			2	SPACER,CKT BD:0.625 L,NYLON	06915	MSP-10-01
-21	174-1555-00			1	CA ASSY,SP,ELEC:2,26 AWG,4.0 L	80009	174155500
	174-1373-00			1	CA ASSY,SP,ELEC:20,28 AWG,14.0 L	53387	ORDER BY DESC
-22	175-7931-01			1	CABLE ASSY,RF:50 OHM COAX,16.5 L	80009	175793101
-23	175-7932-01			1	CA ASSY,SP,ELEC:6,26 AWG,16.25 L	80009	175793201
-24	210-0902-00			1	WASHER,FLAT:0.47 ID X 0.656 OD X 0.03,STL	12327	ORDER BY DESC
-25	131-0103-00			1	CONN,RCPT,ELEC:BNC,FEMALE	00779	222541-1
-26	175-1373-00			1	CABLE ASSY,RF:50 OHM COAX,18.0 L	80009	175137300
-27	174-1542-00			1	CABLE ASSY,RF:50 OHM COAX,7.5 L	80009	174154200
	174-1543-00			1	CABLE ASSY,RF:(4) 50 OHM,(1) 75 OHM	80009	174154300
-28	386-4713-02			1	PLATE,REAR:POWER SUPPLY	0J9P9	ORDER BY DESC
					ATTACHING PARTS		
-29	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,T15	0KB01	ORDER BY DESC
					END ATTACHING PARTS		
-30	343-1012-00			3	RETAINER,CKT BD:POLYCARBONATE	TK1173	ORDER BY DESC
	343-0013-00			1	CLAMP,LOOP:0.375 ID,PLASTIC	06915	E6 CLEAR ROUND
-31	441-1896-00			1	CHASSIS,SCOPE:MAIN ASSY,AL,W/HARDWARE	0J9P9	ORDER BY DESC
-32	334-5200-00			1	MARKER,IDENT:MKD WORD REC PROBE	80009	334520000
-33	334-5201-02			1	MARKER,IDENT:MKD-0.5V TO 5.5V PEAK MAX	80009	334520102

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1 -34	380-0710-00			1	HOUSING,PROBE:LOWER,PC	TK1163	380-0710-00
-35	380-0711-00			1	HOUSING,PROBE:UPPER,PC	TK1163	380-0711-00
					ATTACHING PARTS		
-36	211-0451-00			4	SCREW,MACHINE:4-40 X 0.750,FLH	0KB01	ORDER BY DESC
-37	210-0406-00			4	NUT,PLAIN,HEX:4-40 X 0.188,BRS	73743	12161-50
					END ATTACHING PARTS		
-38	358-0675-00			1	STRAIN RLF,CA:UPPER	TK1163	358-0675-00
-39	358-0347-00			1	STRAIN RLF,CA:LOWER,PLASTIC	88831	ORDER BY DESC
-40	175-8853-01			1	CA ASSY,SP,ELEC:6,26 AWG,80.5 L,8-N	TK1374	ORDER BY DESC
-41	361-0758-01			1	SPACER,PROBE:ACETAL SLATE GRAY	80009	361075801
-42	-----------			1	CIRCUIT BD ASSY:WORD RECOG PROBE #1 (SEE A32 REPL)		
-43	-----------			1	TERM SET,PIN: (SEE A32J6300 REPL)		
-44	-----------			1	CONN,RCPT,ELEC: (SEE A32J6370, LOC. A & B)		
-45	-----------			1	CONN,RCPT,ELEC: (SEE A32J6380 REPL)		
-46	-----------			1	CONN,RCPT,ELEC: (SEE A32J6385 REPL)		
-47	-----------			1	CIRCUIT BD ASSY:WORD RECOG PROBE #2) (SEE A33 REPL)		
-48	-----------			1	TERM SET,PIN: (SEE A33J6400 REPL)		
-49	-----------			2	TERM SET,PIN: (SEE A33P6380/6385 REPL)		
					STANDARD ACCESSORIES		
-50	012-0747-00			1	LEAD SET,ELEC:10 WIDE,25 CML (OPTION 06/09 ONLY)	TK2156	61501
-51	206-0222-00			1	TIP,PROBE:MICROCIRCUIT TEST (OPTION 06/09 ONLY)	80009	206022200
	010-6407-02			1	PROBE,WORD RECO:P6407,W/ACCESSORIES (OPTION 06/09 ONLY)	80009	010640702
	016-0180-00			1	VISOR,CRT:FOLDING (OPTION 05 ONLY)	0JR05	ORDER BY DESC
	070-6859-00			1	MANUAL,TECH:INTERFACE GUIDE,24X5B/2467B	80009	070685900
	378-0270-01			1	FILTER,LT,CRT:3.0 X 3.670,BLUE ACRYLIC (2467B OPTION 05 ONLY)	0KB00	ORDER BY DESC
	378-0270-02			1	FILTER,LT,CRT:3.0 X 3.67,BLUE ACRYLIC (2467B OPTION 05 ONLY)	0KB00	ORDER BY DESC
					OPTIONAL ACCESSORIES		
	070-6864-02			1	MANUAL,TECH:SERVICE OPT 24X5/67B/67BHD	80009	070686402
	070-6861-00	B050000	B050624	1	MANUAL,TECH:OPERATORS,2467B	80009	070686100
	070-6861-01	B050625		1	MANUAL,TECH:OPERATORS,2467B OPTIONS (OPTION 05 ONLY)	80009	070686101
	070-6861-00	B050000	B050499	1	MANUAL,TECH:OPERATORS,2467B	80009	070686100
	070-6861-01	B050500		1	MANUAL,TECH:OPERATORS,2467B OPTIONS (OPTION 5H ONLY)	80009	070686101


A33
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MANUAL CHANGE INFORMATION

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.

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MANUAL CHANGE INFORMATION

Date: 02-OCT-91 Change Reference: M70855

Product: 24X5B/2467B Options Service Manual Part No.: 070-6864-02

DESCRIPTION Product Group38

EFFECTIVE FOR SERIAL NUMBERS: 2445B, B050368 AND ABOVE
2465B, B050368 AND ABOVE
2467B, B050368 AND ABOVE

Change Replaceable Electrical Parts to:

A26CR5526	152-5018-00	SEMICOND DVC,DI:SI,SW,SER,PR,70V
A26CR5590		
A26CR5623		
A26CR5721		
A26CR5735		
A26CR5867		
A26CR5870		
A26CR5872		
A26CR5874		
A26CR5876		
A26CR5878		
A26CR6181		
A26CR5522	152-5062-00	SEMICOND DVC,DI:DUAL,COMMON ANODE,70V
A26CR5653		
A26CR5825		
A26CR5930		
A26CR5970		
A26CR5990		
A26CR5995		
A26CR6010		
A26CR6020		
A26CR6162		
A26CR6190		
A26CR6211		
A26CR6373		

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MANUAL CHANGE INFORMATION

Date: 30-SEP-91 Change Reference: M74688

Product: 24X5B/2467B Options Service Manual Part No.: 070-6864-02

DESCRIPTION Product Group 38

EFFECTIVE SERIAL NUMBERS: 2445B B061272 and above
EFFECTIVE SERIAL NUMBERS: 2455B B050211 and above
EFFECTIVE SERIAL NUMBERS: 2465B B057021 and above
EFFECTIVE SERIAL NUMBERS: 2467B B051293 and above
EFFECTIVE SERIAL NUMBERS: 2467BHD B051293 and above

CHANGE REPLACEABLE ELECTRICAL PARTS LIST TO:

A25	671-1795-04	CIRCUIT BD ASSY:HDTV/CTT,389-0940-XX WIRED, (2467B/5H/BHD)
A26	671-0982-09	CIRCUIT BD ASSY:CTT/TV,389-0279-XX,WIRED, (2445B/55B/65/67B)
A27	671-1341-07	CIRCUIT BD ASSY:CTT,389-0279-XX,WIRED, (OPT 06,09,2465BCT/BDM/BDV)
A26Q6292	151-5001-00	TRANSISTOR,NPN,SI,SOT-23
A26R6020	321-5037-00	RES,FXD,FILM:39.2K OHM,1%,0.125W

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MANUAL CHANGE INFORMATION

Date: 29-JUL-92 Change Reference: M73460

Product: 24X5B/2467B Options Service Manual Part No.: 070-6864-02

DESCRIPTION

Product Group 38

EFFECTIVE SERIAL NUMBERS: 2445B, Opt 10 B062753 and above
EFFECTIVE SERIAL NUMBERS: 2465B, Opt 10 B060091 and above
EFFECTIVE SERIAL NUMBERS: 2467B, Opt 10 B052145 and above

REPLACEABLE ELECTRICAL PARTS LIST CHANGES

REMOVE:

A23	671−0981−02	CIRCUIT BD ASSY:GPIB OPTION 10
A23U4811	156−2473−00	IC,MEMORY:CMOS,SRAM;8K X 200NS,10UA

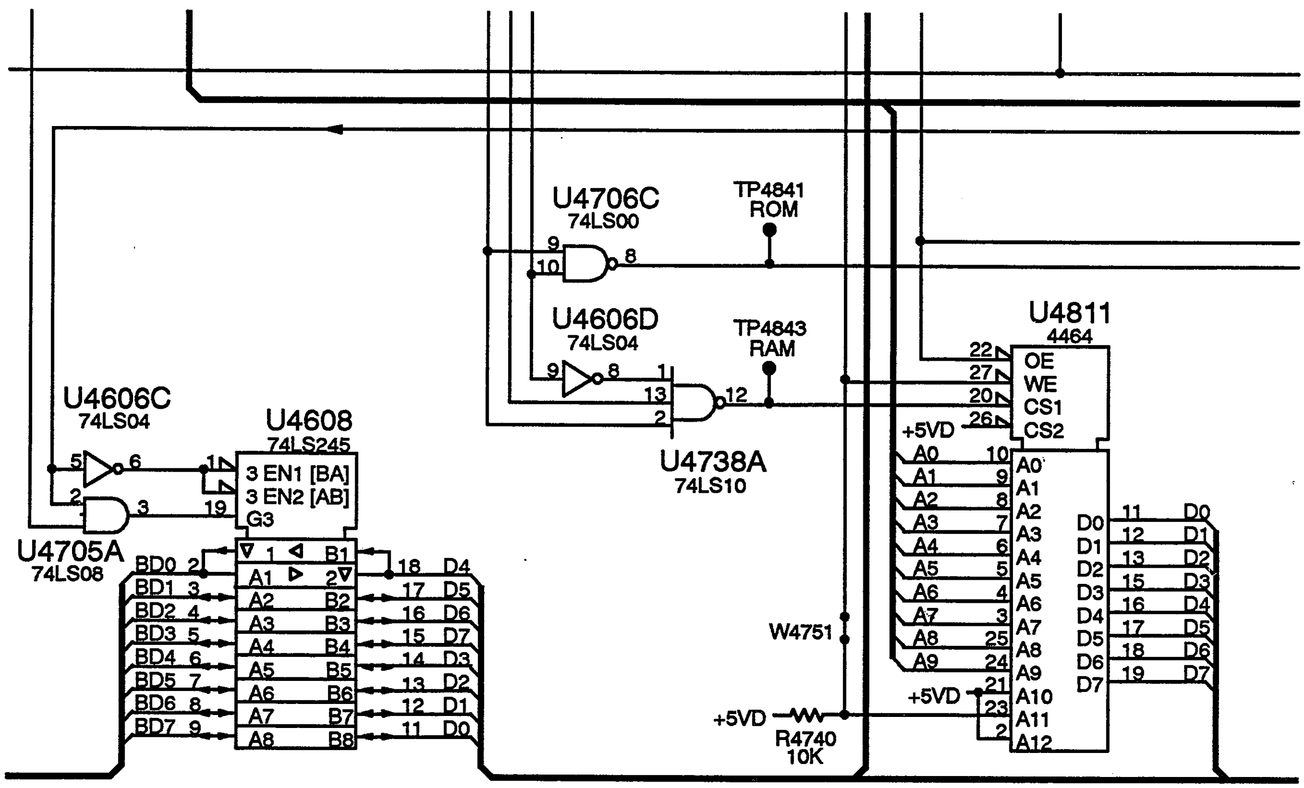
ADD:

A23	671−0981−03	CIRCUIT BD ASSY:GPIB OPTION 10
A23U4811	156−2016−00	IC,MEMORY:NMOS,SRAM;2K X 100NS
A23W4751	131−0566−00	BUS,CONDUCTOR:DUMMY RES

Product: 24X5B/2467B Opt. 10 **Date:** 29-JULY-92 **Change Reference:** M73460

Schematic Diagram

GPIB BOARD 22



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MANUAL CHANGE INFORMATION

Date: 24-SEP-91 Change Reference: M69567

Product: 24X5B/2467B Options Service Manual Part No.: 070-6864-02

DESCRIPTION

Product Group 38

EFFECTIVE SERIAL NUMBERS: 2445B Opt 10 B053177 and above
EFFECTIVE SERIAL NUMBERS: 2455B Opt 10 B050147 and above
EFFECTIVE SERIAL NUMBERS: 2465B Opt 10 B054324 and above
EFFECTIVE SERIAL NUMBERS: 2467B Opt 10 B050737 and above
EFFECTIVE SERIAL NUMBERS: 2467BHD Opt 10 B050737 and above

REPLACEABLE ELECTRICAL PARTS LIST CHANGES

CHANGE TO:		
A23	671-0981-02	CIRCUIT BD ASSY:GPIB OPTION 10
A23C4745	281-0909-00	CAP,FXD,CER DI:0.022UF,20%,50V
A23C4747	290-0943-02	CAP,FXD,ELCTLC:47UF,20%,25V
A23R4734	313-1103-00	RES,FXD,FILM:10K OHM,5%,0.2W
A23R4735	313-1102-00	RES,FXD,FILM:1K OHM,5%,0.2W
A23R4740	313-1103-00	RES,FXD,FILM:10K OHM,5%,0.2W
A23W4750	131-1817-01	BUS,CONDUCTOR:22 AWG
REMOVE:		
A23Q4745	151-0736-01	TRANSISTOR:NPN,SI,T0-92
A23R4513	313-1101-00	RES,FXD,FILM:100 OHM,5%,0.2W
A23R4732	313-1103-00	RES,FXD,FILM:10K OHM,5%,0.2W
A23R4743	313-1152-00	RES,FXD,FILM:1.5K OHM,5%,0.2W
A23U4735	156-0382-00	IC,DIGITAL:LSTTL,GATES;QUAD 2-INPUT NAND
A23U4801	156-0865-00	IC,DIGITAL:LSTTL,FLIP FLOP;OCTAL D-TYPE
ADD:		
A23C4513	281-0764-00	CAP,FXD,CER DI:82PF,5%,100V
A23C4840	281-0909-00	CAP,FXD,CER DI:0.022UF,20%,50V
A23CR4745	152-0141-02	SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35
A23R4515	313-1681-00	RES,FXD,FILM:680 OHM,5%,0.2W
A23R4752	313-1103-00	RES,FXD,FILM:10K OHM,5%,0.2W
A23R4753	313-1103-00	RES,FXD,FILM:10K OHM,5%,0.2W