Errata

Title & Document Type: **8552A Spectrum Analyzer IF Section Operating and Service Manual**

Manual Part Number: **08552-90023**

Revision Date: **May 1970**

About this Manual

We've added this manual to the Agilent website in an effort to help you support your product. This manual provides the best information we could find. It may be incomplete or contain dated information, and the scan quality may not be ideal. If we find a better copy in the future, we will add it to the Agilent website.

HP References in this Manual

This manual may contain references to HP or Hewlett-Packard. Please note that Hewlett-Packard's former test and measurement, life sciences, and chemical analysis businesses are now part of Agilent Technologies. The HP XXXX referred to in this document is now the Agilent XXXX. For example, model number HP8648A is now model number Agilent 8648A. We have made no changes to this manual copy.

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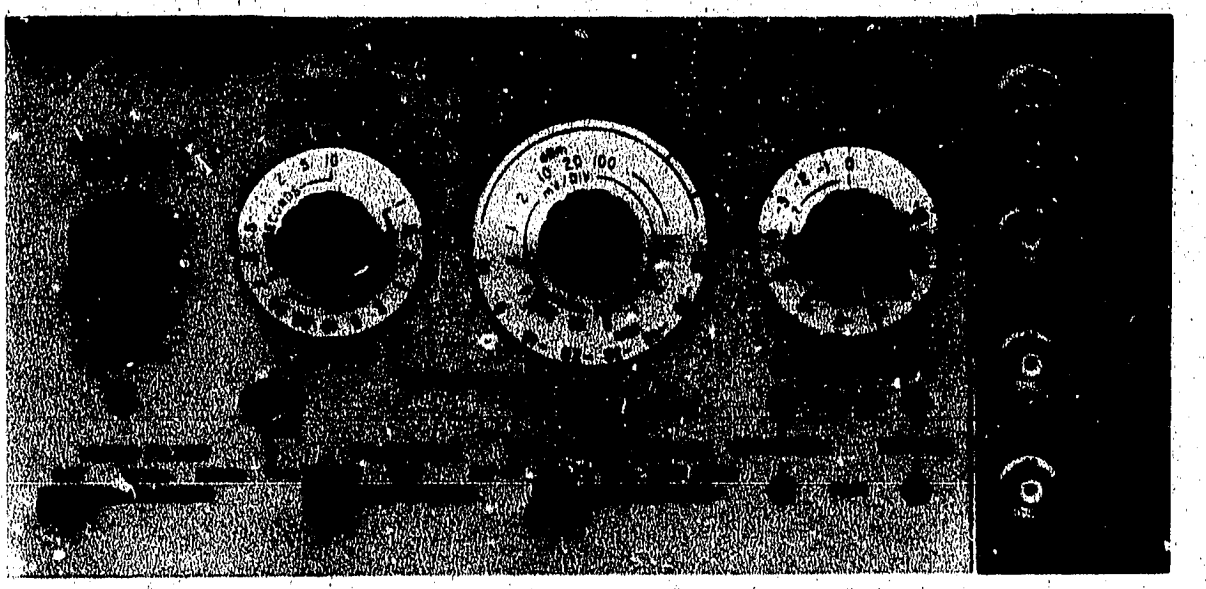
Search for the model number of this product, and the resulting product page will guide you to any available information. Our service centers may be able to perform calibration if no repair parts are needed, but no other support from Agilent is available.

Agilent Technologies

OPERATING AND SERVICE MANUAL

SPECTRUM ANALYZER IF SECTION

8552A



HEWLETT PACKARD

CERTIFICATION

Hewlett-Packard Company certifies that this product met its published specifications at the time of shipment from the factory. Hewlett-Packard further certifies that its calibration measurements are traceable to the United States National Bureau of Standards, to the extent allowed by the Bureau's calibration facility, and to the calibration facilities of other International Standards Organization members.

WARRANTY

This Hewlett-Packard instrument product is warranted against defects in material and workmanship for a period of one year from date of shipment. During the warranty period, Hewlett-Packard Company will, at its option, either repair or replace products which prove to be defective.

For warranty service or repair, this product must be returned to a service facility designated by HP. Buyer shall prepay shipping charges to HP and HP shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to HP from another country.

HP warrants that its software and firmware designated by HP for use with an instrument will execute its programming instructions when properly installed on that instrument. HP does not warrant that the operation of the instrument, or software, or firmware will be uninterrupted or error free.

LIMITATION OF WARRANTY

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

NO OTHER WARRANTY IS EXPRESSED OR IMPLIED. HP SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

EXCLUSIVE REMEDIES

THE REMEDIES PROVIDED HEREIN ARE BUYER'S SOLE AND EXCLUSIVE REMEDIES. HP SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER BASED ON CONTRACT, TORT, OR ANY OTHER LEGAL THEORY.

ASSISTANCE

Product maintenance agreements and other customer assistance agreements are available for Hewlett-Packard products.

For any assistance, contact your nearest Hewlett-Packard Sales and Service Office. Addresses are provided at the back of this manual.

8552A
SPECTRUM ANALYZER
IF SECTION

SERIAL PREFIXES

This manual applies directly to HP Model 8552A IF Section having Serial Prefix numbers listed below:

Serial Prefixes:

809-, 821 , 825-, 837-, 841-, 844-
851-, 852-, 903-, 905-, 943-, 945-, 952-.

OTHER PREFIXES

For Serial Prefixes not listed, a "Manual Changes" sheet is included with this manual.

1400 Fountain Grove Parkway, Santa Rosa, California, 95404, U.S.A.

HP Part No. 08552-90023

Printed: May 1970

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FOREWORD

A complete set of manuals for a spectrum analyzer consists of the IF Section manual(s), the RF Section manual(s), and the Display Section Manual(s). The various manuals for the analyzer are listed and described below:

1. **8552A Spectrum Analyzer IF Section Operating and Service Manual.** (08552-90023)
   Includes operating and service information for the 8552A Spectrum Analyzer IF Section.

2. **8553B Spectrum Analyzer RF Section Operating and Service Manual.** (08553-90013)
   Includes operating and service information for the 8553B Spectrum Analyzer RF Section.

3. **8554L/8552A Spectrum Analyzer Operating Manual.** (08554-90016)
   Shows how to operate the instrument and provides some application information.

4. **8554L/8552A Spectrum Analyzer Calibration and Adjustment Manual.** (08554-90009)
   Contains performance tests, calibration procedures and adjustment instructions.

5. **8554L/8552A Spectrum Analyzer Service Manual.** (08554-90010)
   Contains schematics, theory, troubleshooting information and other data required to service and maintain the instrument.

6. **DISPLAY SECTION OPERATING AND SERVICE MANUALS:**

   a. **140A Oscilloscope Operating and Service Manual.**
   Includes operating and service information for the 140A Oscilloscope Mainframe.

   b. **140S Display Section Operating and Service Manual.**
   Includes operating and service information for the 140S Display Section.

   c. **140T Display Section Operating and Service Manual.**
   Includes operating and service information for the 140T Display Section.

   d. **141A Oscilloscope Operating and Service Manual.**
   Includes operating and service information for the 141A Oscilloscope Mainframe.

   e. **141S Display Section Operating and Service Manual.**
   Includes operating and service information for the 141S Display Section.

   f. **141T Display Section Operating and Service Manual.**
   Includes operating and service information for the 140T Display Section.

   g. **143A Oscilloscope Operating and Service Manual.**
   Includes operating and service information for the 143A Oscilloscope Mainframe.

NOTE: **Spectrum Analyzer Application Notes are available upon request.**

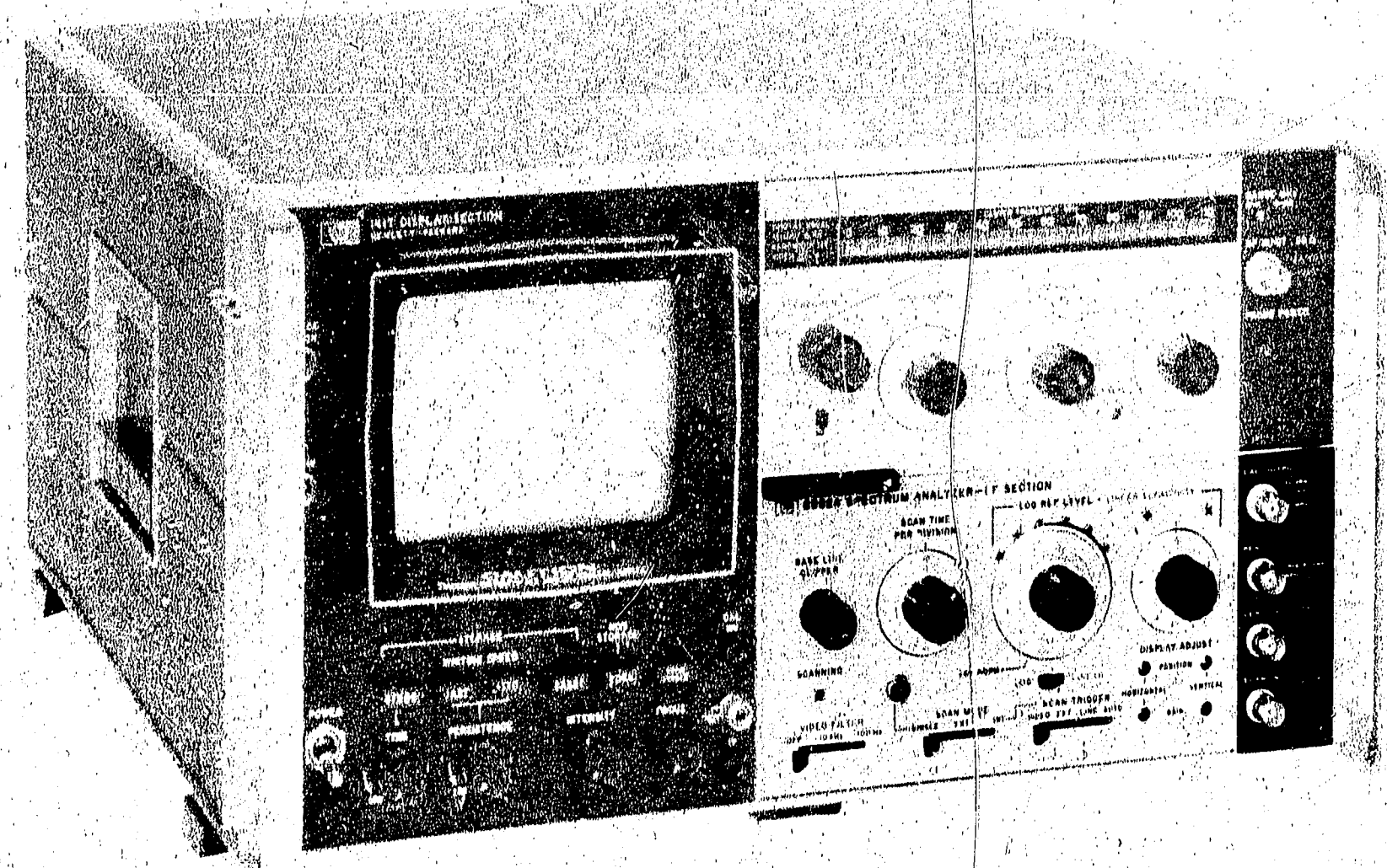


Figure 1-1. Model 8552A Spectrum Analyzer IF Section with Model 8553B Spectrum Analyzer RF Section and 141T Display Section.

SECTION I
GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. This manual contains pertinent information required to install, operate, test, adjust and service the Hewlett-Packard Model 8552A Spectrum Analyzer IF Section. This section covers instrument identification, description, options, accessories, specifications and other basic information.

1-3. Figure 1-1 shows the Hewlett-Packard Model 8552A Spectrum Analyzer IF Section with the Model 8553B Spectrum Analyzer RF Section and the Model 141T Display Section.

1-4. The various sections in this manual provide information as follows:

SECTION II, INSTALLATION, provides information relative to inspection, power requirements, mounting, packing and shipping, etc.

SECTION III, OPERATION, provides information relative to operating the equipment.

SECTION IV, PERFORMANCE TESTS, provides information required to ascertain that the instrument is performing in accordance with published specifications.

SECTION V, ADJUSTMENTS, provides information required to properly adjust and align the instrument.

SECTION VI, PARTS LIST, provides ordering information for all replaceable parts and assemblies.

SECTION VII, MANUAL CHANGES, normally will contain no relevant information in the original issue of a manual. This section is reserved to provide back-dated and up-dated information in manual revisions or reprints.

SECTION VIII, SERVICE, includes information for servicing the instrument.

1-5. INSTRUMENTS COVERED BY MANUAL.

1-6. Hewlett-Packard instruments carry an eight digit serial number (see Figure 1-2) on the back panel. When the serial number prefix on the instrument serial number plate of your instrument is the same as one of the prefix numbers on the inside title page of this manual, the manual applies directly to the instrument. When the instrument serial number prefix is not listed on the inside title page of initial issue, manual change sheets and manual up-dating information is provided. Later editions or revisions to the manual will contain the required change information in Section VII.

1-7. DESCRIPTION.

1-8. The HP Model 8552A Spectrum Analyzer IF Section is shown in Figure 1-1 with the Model 8553B Spectrum Analyzer RF Section and the Model 141T Display Section. The 8552A Specifications are contained in Table 1-1.

1-9. Each analyzer is a highly sensitive superheterodyne receiver with spectrum scanning capabilities determined by the RF Section. Output video from the receiver circuits is applied to the CRT in the display section; thus, a signal or group of signals can be analyzed in the frequency domain. Input signals are plotted on the CRT as a function of amplitude versus frequency. The amplitude (y-axis) of the CRT is calibrated in absolute units of power (dBm) or voltage (μV/mV); accordingly, absolute and relative measurements of both amplitude and frequency can be made.

1-10. The controls of each instrument are arranged for easy operation. For wide spectrum analysis the operator can use a wide preset scan; the width depends on the RF Section used. For a more detailed study, the spectrum width can be progressively narrowed, again depending on the RF Section. The scanning capabilities of each IF Section and RF Section combination can be eliminated altogether to use the instrument as a fixed frequency receiver. The RF Section's widest bandwidth is automatically selected for preset scan operation; for variable scan and fixed frequency operation, narrower bandwidths can be selected by the operator.

1-11. OPTIONAL EQUIPMENT.

1-12. The IF/RF Section combinations can be used with any 140 series oscilloscope. The 140 Display Sections are equipped with a fixed-presistence/non-storage CRT whereas the 141 Display Sections are equipped with a variable-presistence storage CRT. Overlays are available for the standard 140A and 141A Display Section to provide LOG and LINEAR graticule scales.

1-13. IF Section's bearing serial numbers 945-01889 and below must be modified to provide interface compatibility with the HP Model 8443A Tracking Generator/Counter. The required modification kit part number is HP 08552-6060. After modification, the unit is designated as 8552A-TG-1.

1-14. IF Section's bearing serial numbers above 945-01889 require no modification to be compatible with the 8443A Tracking Generator/Counter.

1-15. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

1-16. The 8552A Spectrum Analyzer IF Section must be mated with an RF Section such as the 8553B or 8554L and one of the 140 series oscilloscopes before the units can perform their functions as analyzers.

1-17. EQUIPMENT AVAILABLE.

1-18. Table 1-2 lists the test equipment and test equipment accessories required to check, adjust and repair the 8552A Spectrum Analyzer IF Section.

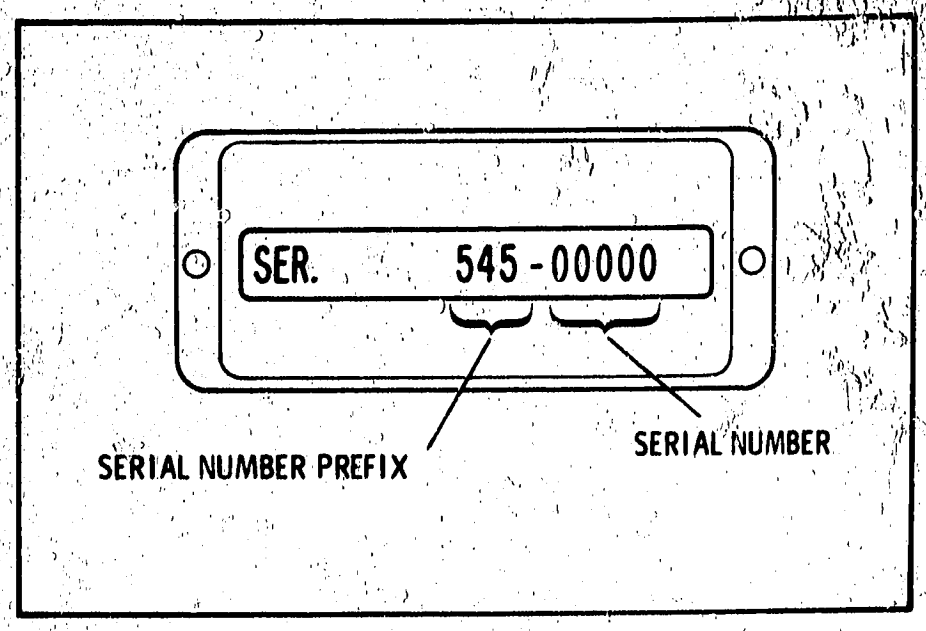


Figure 1-2. Instrument Identification

1-19. WARRANTY.

1-20. The 8552A Spectrum Analyzer IF Section is warranted and certified as indicated on the inner front cover. For further information, contact the nearest Hewlett-Packard Sales and Service Office; addresses are provided at the back of this manual.

Table 1-1. 8552A Specifications

GENERAL SPECIFICATIONS

Scan Time: 16 internal scan rates from 0.1 ms/div to 10 sec/div in a 1,2,5 sequence.

Scan Time Accuracy:
0.1 ms/div to 20 ms/div: ±10%
50 ms/div to 10 sec/div: ±20%

Scan Characteristics
Scan Mode:
Int: Analyzer repetitively scanned by internally generated ramp; synchronization selected by Scan Trigger.
Single: Single scan actuated by front panel pushbutton.
Ext: Scan determined by 0 to +8 volt external signal; scan input impedance >10 kΩ. Blanking: −1.5V external blanking signal required.

Scan Trigger: For Int scan mode, select between:
Auto: Scan free runs.
Line: Scan synchronized with power line frequency.
Ext: Scan synchronized with >2 volt (20 volt max.) trigger signal polarity selected by internally located switch in Model 8552A IF Section.
Video: Scan internally synchronized to envelope of RF input signal (signal amplitude of 1.5 major divisions peak-to-peak required on display section CRT).

Penlift Characteristics:
Penlift output 0—14 volts (0
Output available in Int and Single Scan modes and Auto, Line, and Video scan trigger.

Power Requirements: 115 or 230 volts ±10%, 50 to 60 Hz, normally less than 225 watts (varies with plug-in units used).

Weight:
Model 8552A IF Section: Net 9 lb (4,1 kg).
Shipping, 14 lb (6,4 kg).

Table 1-1. 8552A Specifications (cont'd)

AMPLITUDE SPECIFICATIONS

Absolute Amplitude Calibration Range:
Log: From −130 to +10 dBm, 10 dB/div on a 70 dB display.
Linear: from 0.1 μV/div to 100 mV/div in a 1,2 sequence on an 8-division display.

Calibrator Output:
Amplitude: −30 dBm, ±0.3 dB
Frequency: 30 MHz, ±0.3 MHz

Amplitude Accuracy:

	Log	Linear
Switching between bandwidths: (20°C)	±0.5 dB	±5.8%
Amplitude Display:	±0.25 dB/dB but not more than ±1.5 dB over full 70 dB display range.	±2.8% of full 8 division deflection

FREQUENCY SPECIFICATIONS

Resolution:
Bandwidth: IF bandwidths of 50 Hz and 0.1 to 300 kHz provided in a 1,3 sequence.
Bandwidth Accuracy: Individual IF bandwidths' 3 dB points calibrated to ±20% (10 kHz bandwidth ±5%).

Bandwidth Selectivity: 60 dB/3 dB IF bandwidth ratio <20:1 for IF bandwidths from 1 kHz to 300 kHz. 60 dB/3 dB bandwidth ratio <25:1 for 50, 100 and 300 Hz IF bandwidths.

Table 1-2. Test Equipment and Test Accessories

Item	Minimum Specifications or Required Features	Suggested Model	(Note 1)
Frequency Comb Generator	Frequency markers spaced 1, 10, 100 MHz apart; usable to 120 MHz Frequency Accuracy: ±0.01% Output Amplitude: >−40 dBm	HP 8406A Generator	P
HF Signal Generator	Frequency Range: 1—50 MHz Output Amplitude: −20 dBm Output Amplitude Accuracy: ± 1% Frequency Accuracy: ±1% Output Impedance: 50 ohms	HP 606B HF Signal Generator	A
VHF Signal Generator	Frequency Range: 40—310 MHz Frequency Accuracy: ±1% Output Amplitude: >−20 dBm Output Impedance: 50 ohms	HP 608E/F VHF Signal Generator	P,A,T
Sweep Oscillator	Frequency Range: 1—110 MHz Output Flatness: ±0.25 dB over full band Output Impedance: 50 ohms External VTO: must be capable for use as a tracking oscillator; +3 dBm, 201—310 MHz input from VTO to obtain 1—110 MHz output. Output Amplitude: at least 0 dBm	HP 8601A Generator/Sweeper	A

NOTE 1, USE: Performance = P, Adjustment = A, Troubleshooting = T

Table 1-2. Test Equipment and Test Accessories (cont'd)

Item	Minimum Specifications or Required Features	Suggested Model	(Note 1)
Oscillator Synchronizer	Frequency Range: 50 kHz—310 MHz Input Signal Level: 50 kHz—20 MHz; 0.1—2V rms into 50 ohms, 10—310 MHz 180—400 mV rms into 50 ohms Frequency Reference Stability: short term, 5×10^{-8} / minute Frequency Control Output: frequency control voltage directly compatible with HP 606B and HP 608F signal generators; output voltage range, —2 to —32 Vdc (maximum)	HP 8708A Synchronizer	A
Crystal Detector	Frequency Range: 1—50 MHz Sensitivity: >0.04 mV/μW Frequency Response: ±0.2 dB Polarity: Negative	HP 423A Crystal Detector	A
Audio Oscillator	Frequency Range: 10 kHz Output Amplitude: 2 Vrms Frequency Accuracy: ±2% Output Impedance: 600 ohms	HP 200 C D Audio Oscillator	P, A
Power Supply	Output Voltage: Variable, 0—30 Vdc Output Current: 0—400 mA Meter Resolution: <5 mV	HP 6217A Power Supply	A
Amplifier	Frequency Range: 40—60 MHz Amplifier Gain: 20 and 40 dB Input and Output Impedance: 50 ohms	HP 8447A Dual Amplifier	A
Frequency Counter	Frequency Range: 100 kHz—310 MHz Accuracy: ±0.001% Sensitivity: 100 mV rms Readout Digits: 7 digits	HP 5245L Frequency Counter with HP 5252A Plug-in	P, A, T
Tunable RF Voltmeter	Bandwidth: 1 kHz Frequency Range: 1—310 MHz Sensitivity: 10 mV—1 Vrms Input Impedance: ⩾0.1 megohms	HP 8405A Vector Voltmeter	P, A, T
Digital Voltmeter	Voltage Accuracy: ±0.2% Range Selection: Manual or Automatic Voltage Range: 1—1000 Vdc full scale Input Impedance: 10 megohms Polarity: Automatic indication	HP 3440A Digital Voltmeter with HP 3443A Plug-in	A, T
Oscilloscope	Frequency Range: dc to 50 MHz Time Base: 1 μs/div to 10 ms/div Time Base Accuracy: ±3% Dual Channel, Alternate Operation Ac or Dc Coupling External Sweep Mode Voltage Accuracy: ±3% Sensitivity: 0.005 V/div	HP 180A with HP 1801A Vertical Amplifier and HP 1821A Horizontal Amplifier HP 10004A 10:1 Divider Probes (2)	A, T

NOTE 1, USE: Performance = P, Adjustment = A, Troubleshooting = T.

Table 1-2. Test Equipment and Test Accessories (cont'd)

Item	Minimum Specifications or Required Features	Suggested Model	(Note 1)
Ohmmeter	Resistance Range: 1 ohm—100 megohm Accuracy: ±10% of Reading	411A	T
50-ohm Tee	Type N female connectors on two ports, with the third port able to accept HP 8405A probe tips.	HP 11536A 50-Ohm Tee	P, A
12 dB Variable Attenuator	Frequency Range: DC—10 MHz Flatness: ±0.3 dB	HP 355C	A
Variable Attenuator	0—60 dB in 10 dB steps	HP 355D	A
50-Ohm Termination	Frequency Range: DC—310 MHz VSWR: 1.1 Power Rating: 0.5 Watts Connector: Type N Male	HP 908A Coaxial Termination	P, A
Variable Voltage Transformer	Range: 102—127 Vac Voltmeter Range: 103—127 Vac ±1 volt	General Radio W5MT3A or Superior Electric UC1M	A
BNC Tee	Two BNC Female Connectors; one Male BNC Connector	UG-274B/U HP 1250-0781	P, A, T
Adapter	BNC Male to Type N Female	UG-349A/U HP 1250-0077	A
Adapter	BNC Male to Binding Post	HP 10110A	A
Adapter (two)	BNC Female to Type N Male	UG-201A/U HP 1250-0780	P, A
Voltage Probe	Dual Banana Plug-to-Probe Tip and Clip (Ground) Lead	HP 10025A Straight-Thru Voltage Probe	P, A, T
Cable Assy (3)	Male BNC Connectors, 48 inches long	HP 10503A	P, A, T
Cable Assy	BNC Male to Dual Banana Plug, 45 inches long	HP 11001A	P, A, T
Cable Assy	Dual Banana Plug to Clip Leads, 45 inches long	HP 11002A	P, A, T
Cable Assy	Dual Banana Plug to Dual Banana Plug, 44 inches long	HP 11000A	P, A, T
Cable Assy	BNC Male to one end only; 44 " long. (Attach Test Clips to Shield and Center Conductor.)	HP 10501A	P, A, T
Tuning Tool, Slot	Nonmetallic, 6-inch shaft	Gowanda PC9668	A, T

NOTE 1 , USE: Performance = P, Adjustment = A, Troubleshooting = T.

Table 1-2. Test Equipment and Test Accessories (cont'd)

Item	Minimum Specifications or Required Features	Suggested Model	(Note 1)
Screwdrivers	Pozidriv #1 (small) Stanley #5531	HP 8710-0899	A, T
Tuning tool, Slot	Nonmetallic, 2.5-inch shaft	HP 8710-0095	A, T
Capacitor	8200 pF (approx.), see Paragraph 5-38	HP 0140-0184	A, T
Adapter	Type N Female Connector to Type N Female Connector	UG-29B/U HP 1250-0777	P, A, T
Adapter	Type N Female to BNC Female Adapter	FXR 21850	P, A, T
Adapter	Type BNC Plug-to-Plug Adapter	UG-491B/U HP 1250-0216	P, A, T
Service Kit	Contents: 140/141 Display Section to Spectrum Analyzer Plug-in Extender Assembly (HP 11592-60015) IF to RF Unit Interconnection Extender Cable Assembly (HP 11592-60014) Selectro Female to BNC Male Test Cable, Three each, 36" long (HP 11592-60001) Selectro Male to Selectro Female Test Cable, Two each, 8" long (HP 11592-60003) Selectro Female to Selectro Female Cable, Two each, 8" long (HP 11592-60002) Extender Board Assembly, 15 pins, 30 conductors, for Plug-in Circuit Boards (HP 11592-60011) Fastener Assembly, 8553 Circuit Board Extender, Two each (HP 11592-20001 and HP 1390-0170) Selector Jack-to-Jack Adapter (HP 1250-0827) Wrench, open-end, 15/64" (HP 8710-0946) BNC Jack-to-OSM Plug Adapter (HP 1250-1200) OSM Plug-to-Plug Adapter (HP 1250-1158) Cable Assembly, R and P Connector (HP 11592-60013)	HP 11592A Service Kit	A, T

NOTE 1, USE: Performance = P, Adjustment = A, Troubleshooting = T.

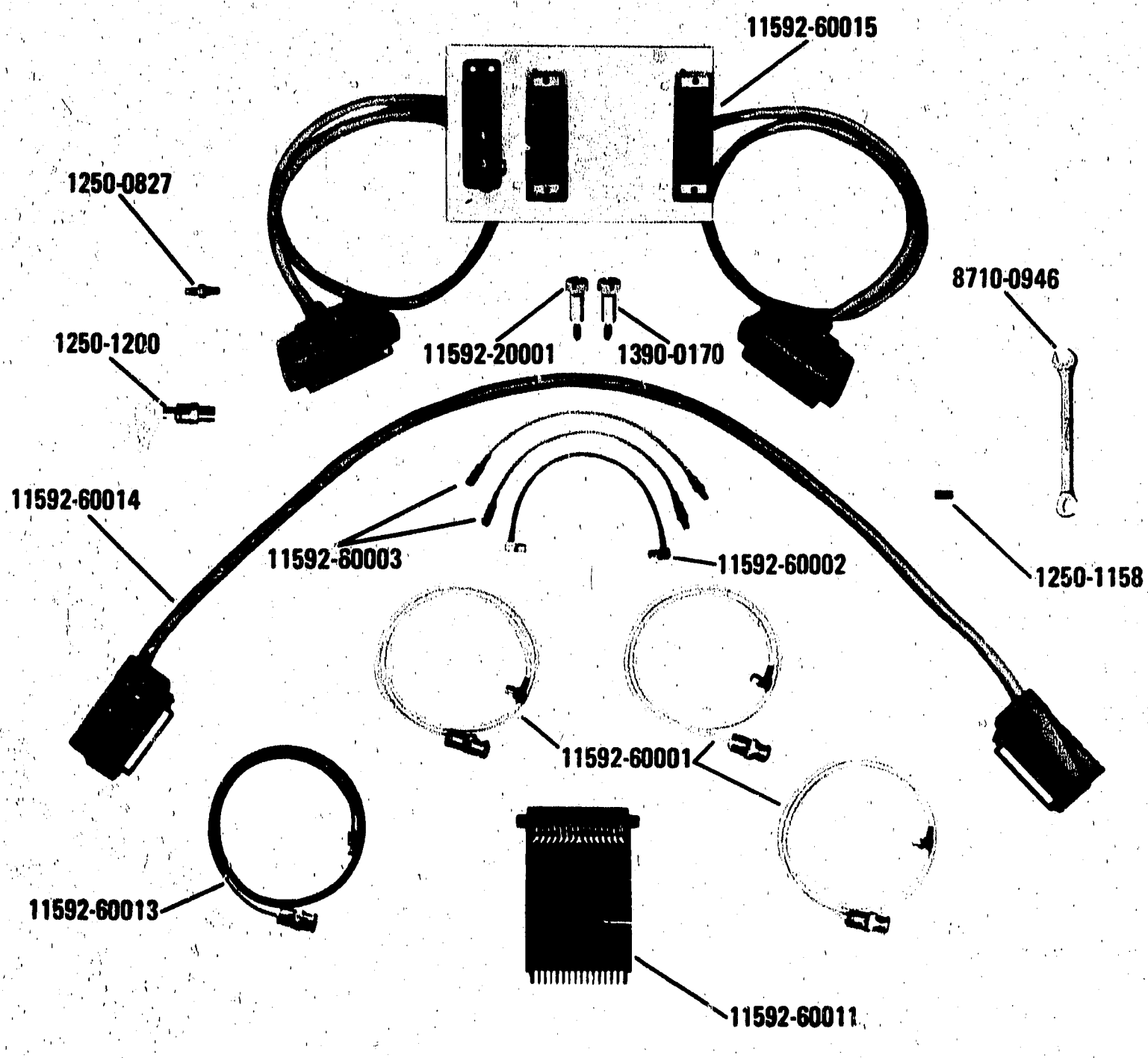


Figure 1-3. HP 11592A Service Kit Required for Maintenance

SECTION II
INSTALLATION

2-1. SHIPPING INFORMATION.

2-2. Because of individual customer requirements, shipping configurations are flexible. Initial inspection is based on the premise that the RF and IF sections are installed in the display section; thus, the instrument is physically and functionally complete for test. Since the RF and IF sections are usually received separately the plug-ins must be mechanically fitted together, electrically connected, and inserted in an oscilloscope mainframe of the 140-series.

2-3. INITIAL INSPECTION.

2-4. Mechanical Check.

2-5. If shipping carton is damaged, ask that agent of carrier be present when instrument is unpacked. Inspect instrument for mechanical damage such as scratches, dents, broken knobs, or other defects. Also, check cushioning material for signs of severe stress.

2-6. Performance Checkout.

2-7. As soon as possible after receipt, the instrument should be performance-tested in accordance with the Performance Test, Section IV.

2-8. CLAIMS FOR DAMAGE.

2-9. If the Spectrum Analyzer IF Section is mechanically damaged or fails to meet the specified performance tests, immediately notify the carrier and the nearest Hewlett-Packard Sales and Service Office. (A current list of sales and service offices appears at the back of this manual.) Retain shipping carton and padding material for inspection by the carrier. Any Hewlett-Packard Sales and Service Office will arrange for instrument repair or replacement without waiting for a claim settlement with the carrier.

2-10. POWER REQUIREMENTS.

2-11. Source Power.

2-12. The Spectrum Analyzer can be operated from a 50- to 60-hertz input line that supplies either 115-volt or 230-volt (±10% in each case) power. Consumed power varies with the plug-ins used but is normally less than 225 watts. Line power enters the display section mainframe and is distributed to the RF and IF sections via internal connectors.

2-13. Preliminary Power Settings.

2-14. The 115/230 power selector switch at rear of display section must be set to agree with the available line voltage — that is, if the line voltage is 115 volts, the slide switch must be positioned so that 115 is clearly visible. (The instrument is internally fused for 115-volt operation; if 230-volt power is used, refer to fuse replacement procedures in the display section manual.

2-15. Power Cable.

2-16. To protect operating personnel, the National Electrical Manufacturers' Association (NEMA) recommends that instrument panel and cabinet be grounded. The analyzer is equipped with a three-conductor power cable; the third conductor is the ground conductor and, when the cable is plugged into an appropriate receptacle, the instrument is grounded. To preserve the protection feature when operating the instrument from a two-contact outlet, use a three-prong to two-prong adapter and connect the green lead on the adapter to ground.

2-17. CONNECTIONS.

2-18. Since the RF and IF Sections are usually shipped separately, the plug-ins must be mechanically fitted together, electrically connected, and then inserted into the display section mainframe. To make these connections refer to the RF Section Manual.

2-19. INSTALLATION CHECKOUT.

2-20. After installing the IF/RF Sections in the Display Section, the installation procedures given in Section II of the RF Section manual should be performed.

OPERATION

PERFORMANCE

CHECK

SECTION III
OPERATION

3-1. INTRODUCTION.

3-2. This section provides operating instructions for the HP 8552A Spectrum Analyzer IF Section. Front and rear panel controls and connectors are described in Figure 3-1. Operation adjustments for the IF Section are given in the appropriate RF Section Manuals.

3-3. The IF Section processes the 50 MHz signal from the RF Section for display on the CRT. Control functions on the IF Section include scan time, scan mode, scan trigger, video filter, horizontal and vertical gain adjustments, and the log reference level-linear sensitivity control. The bandwidth control on the RF Section controls the bandwidth of the IF Section.

3-4. CONTROLS AND CONNECTORS.

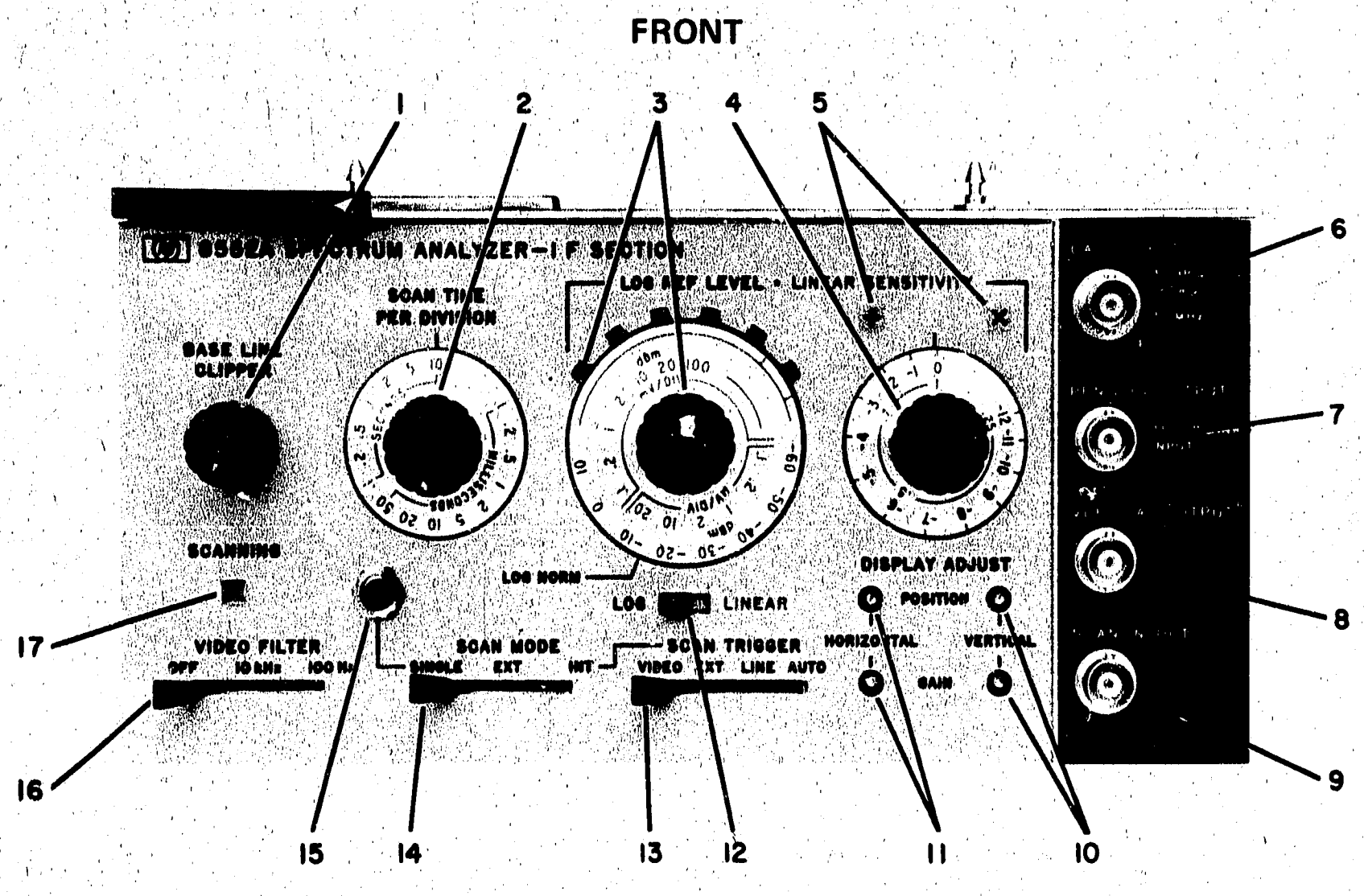
3-5. The front and rear panel controls and connectors are identified in Figure 3-1. Identification is keyed to corresponding numbers indicated in the figure.

3-6. OPERATIONAL ADJUSTMENTS.

3-7. During checkout at the factory, the IF Section is adjusted for proper operation. Upon receipt of the instrument the operator should perform the front panel adjustments given in the RF Section manual to ensure that the RF and IF Sections are calibrated properly.

3-8. GENERAL OPERATING INSTRUCTIONS.

3-9. Refer to the RF Section manuals for specific operating instructions.



REAR

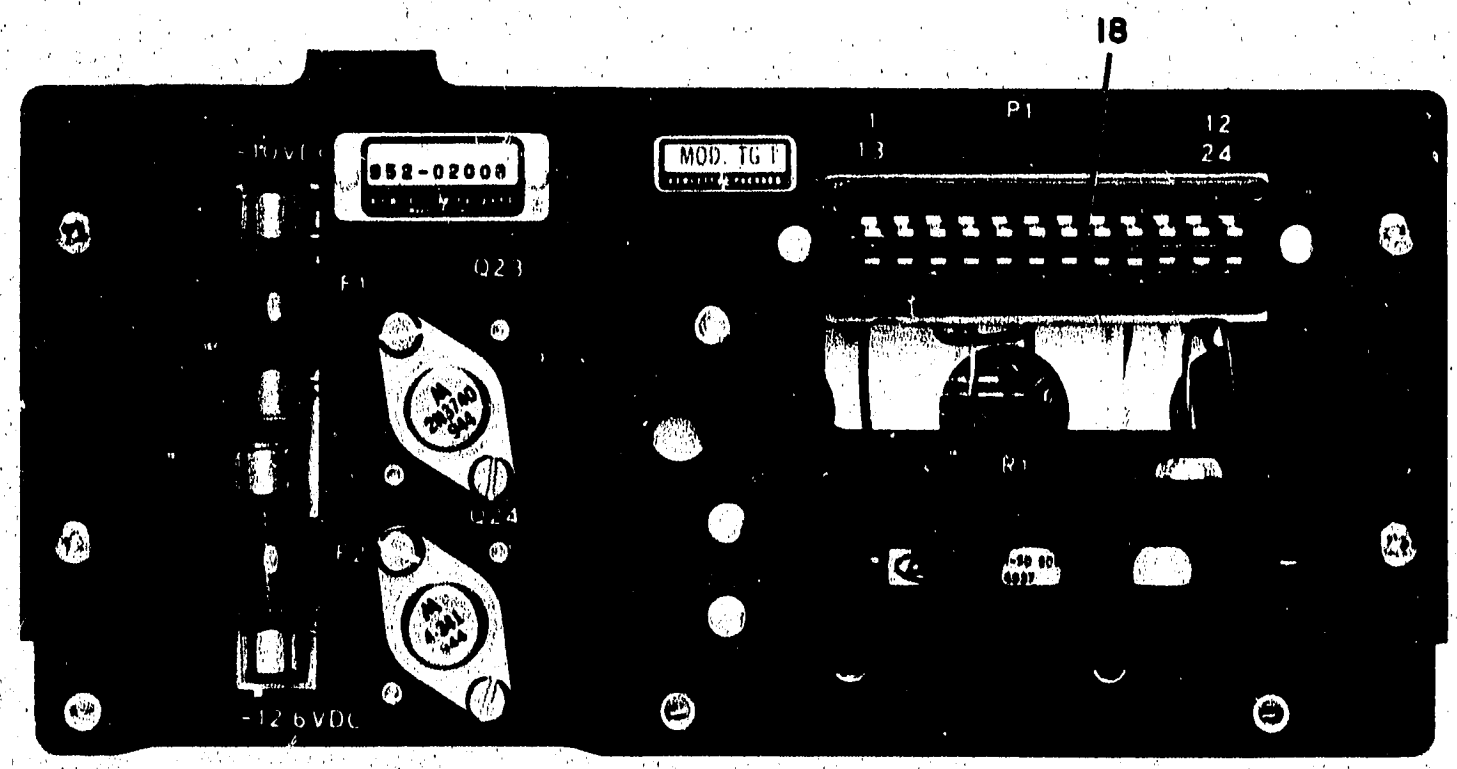


Figure 3-1. 8552A Spectrum Analyzer IF Section Controls and Connectors

FRONT AND REAR PANEL CONTROLS AND CONNECTORS

1. Blanks lower part of trace to prevent overexposure of photographs. Blanking function also prevents blooming with a variable-persistence storage display section.

2. Controls scan time.

3. Assuming that dB graduation (black numerals) matches position of lighted index lamp, LOG REF graticule line indicates power level when LOG/LINEAR (12) is set to LOG. With LOG/LINEAR set to LINEAR, indicates per division multiplier for calibrated voltage amplitude for whatever voltage graduation (blue numerals) matches position of lighted index lamp.

4. Indicates 1-dB increments for logarithmic amplification; indicates multiplication factors up to unity for linear amplification.

5. Plus "+" lights when logarithmic amplification (12) is selected; times "x" lights when linear amplification (12) is selected. With "+" lighted, LOG REF line is sum (black numerals) of LOG REF LEVEL controls. With "x" lighted, per division absolute voltage amplitude is product (blue numerals) of LINEAR SENSITIVITY controls.

6. Provides a 30-MHz signal at −30 dBm for amplitude calibration of spectrum analyzer.

7. Provides penlift operation to HP 7005, 7035, 7004, 7034 and all new TTL compatible HP recorders. Provides a blanking input for external scan mode operation. Provides an input for external trigger operation.

8. Detected video output proportional to vertical deflection on CRT.

9. For receiving an external scan ramp or output coupling for the internally-generated scan ramp. Input or output function determined by INT/EXT positions of SCAN MODE switch.

10. Adjusts vertical position and gain of trace.

11. Adjusts horizontal position and gain of trace.

12. Selects logarithmic or linear display mode.

13. Selects scan trigger mode.

14. Selects scan ramp mode. Ramp is internally generated for SINGLE/INT positions but it must be externally supplied for EXT position (refer to Item 9).

15. Press to initiate or stop scan with SCAN MODE switch set to SINGLE.

16. May select 100 Hz, 10 kHz or OFF position of low-pass filter for detected video.

17. Lights for duration of each scan.

18. Connects to display section.

Figure 3-1. 8552A Spectrum Analyzer IF Section Controls and Connectors (cont'd)

SECTION IV
PERFORMANCE TESTS

4-1. INTRODUCTION.

4-2. Perform tests in procedural order and with the test equipment called for, or with its equivalent. Specifications of test equipment and accessories required to performance-test the analyzer are given in Table 1-5.

4-3. Front panel checks for routine inspection are given in Table 4-1. Procedures for verifying that the instrument meets specifications are given in Paragraphs 4-23 through 4-28, and a test card in Table 4-5 contains data spaces for recording test results.

4-4. During any performance test, all shields and attaching hardware must be in place and the RF and IF Section plug-ins must be installed in the display section.

4-5. FRONT PANEL CHECKS.

4-6. Before proceeding to the front panel checks, the instrument must be adjusted and all the controls set as specified in the preset adjustment instructions in Paragraph 4-12. After the instrument is set up, proceed with the checks. The instrument should perform as called out in the procedure before going on to the specification tests (Paragraphs 4-12 through 4-21).

4-7. PERFORMANCE TESTS.

4-8. The performance tests given in this manual are suitable for incoming inspection, troubleshooting or preventive maintenance. The tests are designed to verify published instrument specifications. Perform the tests in the order given, and record data on the test card (Table 4-5) at the end of this section. These tests assume the use of an 8553B RF Section.

4-9. The tests are arranged in the following order:

Para. No.	Test Description
4-23	Calibrator Output
4-24	Bandwidth Accuracy
4-25	Bandwidth Selectivity
4-26	Switching between Bandwidths Accuracy
4-27	Amplitude Display Accuracy
4-28	Scan Time Accuracy

4-10. Each test is arranged so that the specification is written out as it appears in the Table of Specifications. Next, a description of the test and any special instructions or problem areas is included. Each test that requires test equipment has a test setup drawing and a list of required equipment. Each procedure gives control settings required for that particular test. Data spaces are included in each test procedure, and the spaces are repeated in the Performance Test Card at the end of this section.

4-11. Required specifications for test equipment are detailed in Table 1-2. in Section I. If substitute test equipment is to be used, it must meet the specifications listed in order to performance-test the analyzer.

4-12. FRONT PANEL CHECK PROCEDURE.

4-13. Preset Adjustments.

4-14. Turn analyzer ON and preset the INTENSITY & FOCUS to approximately 1 o'clock. While the analyzer is warming up make the following control settings:

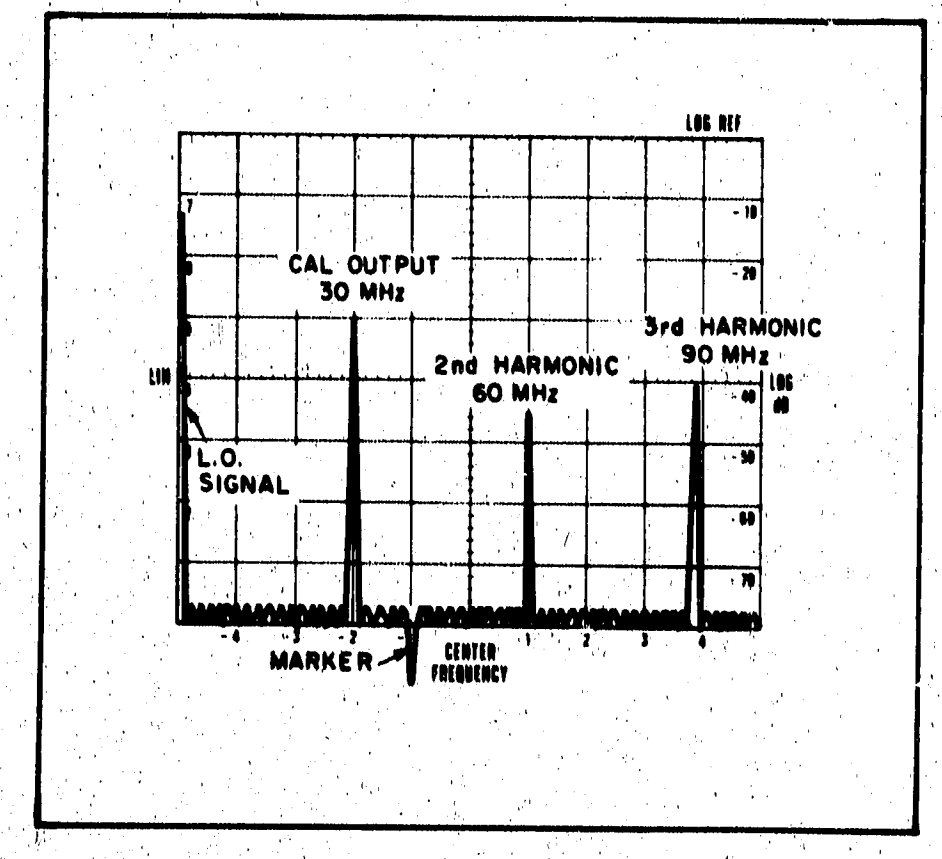


Figure 4-1. 30 MHz Calibrator Signal & Harmonics

RANGE MHz	0--110
FREQUENCY	40 MHz
FINE TUNE	Centered
BANDWIDTH	300 kHz
SCAN WIDTH	0—100 MHz
SCAN WIDTH PER DIVISION	10 MHz
INPUT ATTENUATION	10 dB
TUNING STABILIZER	ON
BASELINE CLIPPER	ccw
SCAN TIME PER DIVISION	1 MILLISECOND
LOG REF LEVEL	—10 dBm
LOG REF LEVEL Vernier	0
LOG/LINEAR	LOG
VIDEO FILTER	10 kHz
SCAN MODE	INT
SCAN TRIGGER	AUTO

4-15. Connect CAL OUTPUT to RF INPUT using a BNC-to-BNC cable. The display on your analyzer should be similar to Figure 4-1.

4-16. Display Section Adjustments.

a. Set LOG REF LEVEL max ccw.

b. Set SCAN TIME PER DIVISION to 10 SECONDS and adjust FOCUS and ASTIGMATISM for the smallest round spot possible.

c. Reset SCAN TIME PER DIVISION to 1 MILLISECOND. Adjust TRACE ALIGN so that horizontal base line of the CRT trace is exactly parallel to the horizontal graticule lines.

4-17. IF Section Display Adjustments.

a. Adjust VERTICAL POSITION so that the horizontal base line of the CRT trace is exactly on the bottom horizontal graticule line of the CRT. Set LOG REF LEVEL to 0 dBm.

b. Adjust HORIZONTAL POSITION so display is centered on CRT. Then adjust HORIZONTAL GAIN until the displayed scan width is exactly 10 divisions. Some interaction between HORIZONTAL POSITION and GAIN may occur, requiring slight readjustment of the controls.

The display on your CRT should now match Figure 4-1 almost exactly. (The amplitudes of the individual signals may be slightly different.)

c. Note the inverted marker below the bottom graticule line. This marker indicates the display center frequency of the ZERO and SCAN WIDTH PER DIVISION tuning modes. Adjust the FREQUENCY control to place this marker exactly under the signal three divisions from the left.

This signal is the 30 MHz calibrator signal. Tune the marker carefully to null the signal.

NOTE

The other signals on the display are the "zero frequency" First LO feedthrough and the 60 MHz and 90 MHz harmonics of the calibrator signal. These harmonics have a relatively high level because the calibrator used is a multivibrator.

d. Set the SCAN WIDTH PER DIVISION control to 0.05 MHz and the BANDWIDTH to 10 kHz.

e. Switch the red SCAN WIDTH control to the PER DIVISION position. The BANDWIDTH, SCAN WIDTH PER DIVISION, and Center Frequency are now those selected in steps c and d. (The marker makes it easy to select any signal in 0—100 MHz scan and expand the display about that signal.)

f. Adjust FREQUENCY tuning to center 30 MHz calibrator signal, if necessary. Then reduce SCAN WIDTH PER DIVISION to 10 kHz. Use FINE TUNE to center the signal on the display. (The analyzer's First LO is automatically phase-locked to a crystal oscillator reference for the blue color-coded SCAN WIDTH positions since the TUNING STABILIZER was set to ON. Therefore, the FREQUENCY control — which tunes the First LO — should not be used to tune the analyzer; frequency would tune in 100 kHz steps.)

g. Adjust the LOG REF LEVEL controls so the maximum signal amplitude is exactly on —70 dB graticule line. Rotate LOG REF LEVEL control seven steps in the clockwise direction. The amplitude of the signal should increase in increments of one division per 10-dB step. See Figure 4-2.

h. Adjust VERTICAL GAIN to place maximum signal amplitude exactly on LOG REF (top) graticule line, Figure 4-2. Repeat Steps g and h to obtain optimum adjustment of VERTICAL GAIN (increments as close to one division per 10 dB step as possible).

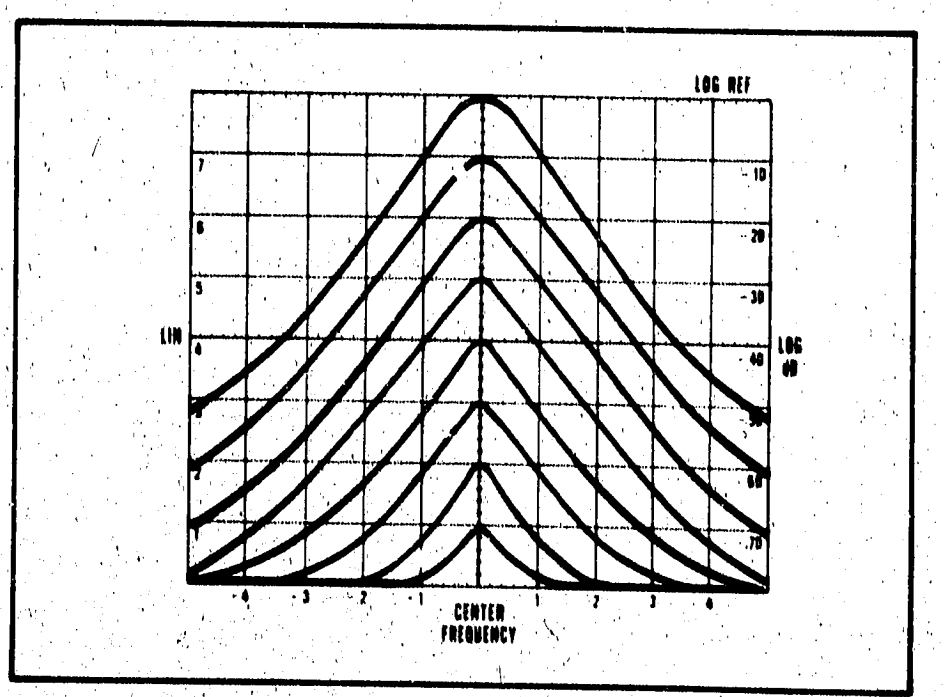


Figure 4-2. Vertical Gain Adjustment

4-18. Ampl. Cal Adjustment RF Section .

a. Set the LOG REF LEVEL controls to −30 dBm (−30 +0).

b. Adjust AMPL CAL so that the signal amplitude (−30 dBm) is exactly on the LOG REF (top) graticule line of the CRT.

The analyzer is now calibrated in the LOG display mode.

4-19. Ampl Cal Check for Linear Sensitivity Accuracy.

4-20. In the LINEAR display mode the vertical display is calibrated in absolute voltage. For LINEAR measurements the LIN scale factors on the left side of the CRT and the blue color-coded scales of the LINEAR SENSITIVITY controls are used. The signal voltage is the product (note lighted "x" lamp) of the CRT deflection and LINEAR SENSITIVITY control settings. It is usually most convenient to normalize the LINEAR SENSITIVITY vernier by setting it to "1" (blue scale).

a. Set the LOG/LINEAR switch to LINEAR. Set LINEAR SENSITIVITY to 1 mV/div (1 mV x 1). Since the −30 dBm calibrator output is ≅7.1 mV (across 50 ohms), the CRT deflection should be ≅7.1 divisions.

b. Adjust AMPL CAL on RF Section for a ≅7.1 div CRT deflection, if necessary. (LINEAR display is more expanded than the compressed LOG display, so adjustment of the AMPL CAL control can be made with more resolution in LINEAR without noticeable effect on the LOG calibration.)

The analyzer is now calibrated for both the LOG and LIN display modes.

4-21. Set controls as follows:

SCAN WIDTH	0—100 MHz
SCAN WIDTH PER DIVISION	10 MHz
BANDWIDTH	10 kHz
LOG/LINEAR	LOG
LOG REF LEVEL	−10 dBm

Perform tests in Table 4-1, Front Panel Checks.

Table 4-1. Front Panel Checks

Function	Procedure	Result
Base Line Clipper	1) Turn BASE LINE CLIPPER cw. 2) Return clipper to ccw.	1) At least the bottom 2 divisions should be blank.
Scan	3) Tune SCAN TIME across its range. 4) Return to 2 ms/div.	3) Scan should occur in all positions.
Scan Width	5) Turn SCAN WIDTH to PER DIVISION. 6) Center CAL OUTPUT signal on display. 7) Reduce SCAN WIDTH PER DIVISION to 20 kHz ; use FINE TUNE to center display.	5) 30 MHz signal and harmonics visible. DISPLAY UNCAL light comes on. 7) Signal remains on-screen,centered.
Phase Lock	8) Carefully turn FREQUENCY. 9) Turn TUNING STABILIZER to OFF; use FREQUENCY to center display. 10) Turn TUNING STABILIZER on, use FINE TUNE to center display.	8) Signal jumps to left or right hand edges of CRT (±100 kHz). This corresponds to the 100 kHz reference oscillator in the automatic phase control circuit. 9) Signal should not jump ±100 kHz when TUNING STABILIZER is turned off. 10) Signal should not jump 100 kHz.

Table 4-1. Front Panel Checks (cont'd)

Function	Procedure	Result
Bandwidth, and Display Uncal Light	11) Reduce BANDWIDTH and SCAN TIME PER DIVISION using FINE TUNE to center display. 12) Return BANDWIDTH to 10 kHz and SCAN WIDTH PER DIVISION to 20 kHz.	11) Display should be stable, and viewable as long as DISPLAY UNCAL is unlit.
Calibration	13) Lit index light on LOG REF LEVEL LINEAR SENSITIVITY corresponds to top line of graticule; with input attenuation at 20 dB and LOG REF LEVEL at −10 dBm, signal level is −30 dBm.	13) Calibrator signal is at −30 dBm level (2 divisions down from top of graticule).
Gain Vernier	14) Turn LOG REF LEVEL · LINEAR SENSITIVITY vernier cw.	14) Signal level increases by amount marked on vernier dial.
Attenuators	15) Turn INPUT ATTENUATION and LOG REF LEVEL · LINEAR SENSITIVITY in 10 dB steps.	15) Signal increases or decreases one vertical division per 10 dB step.

4-22. PERFORMANCE TESTS.

4-23. Calibrator Output.

SPECIFICATION:
Amplitude: −30 dBm ±0.3 dB
Frequency: 30 MHz ±0.3 MHz

DESCRIPTION: Calibrator amplitude accuracy is checked by measuring the 30 MHz fundamental voltage terminated in a known load. The frequency accuracy is checked by comparing the calibrator's 30 MHz fundamental frequency with an accurate 30 MHz source.

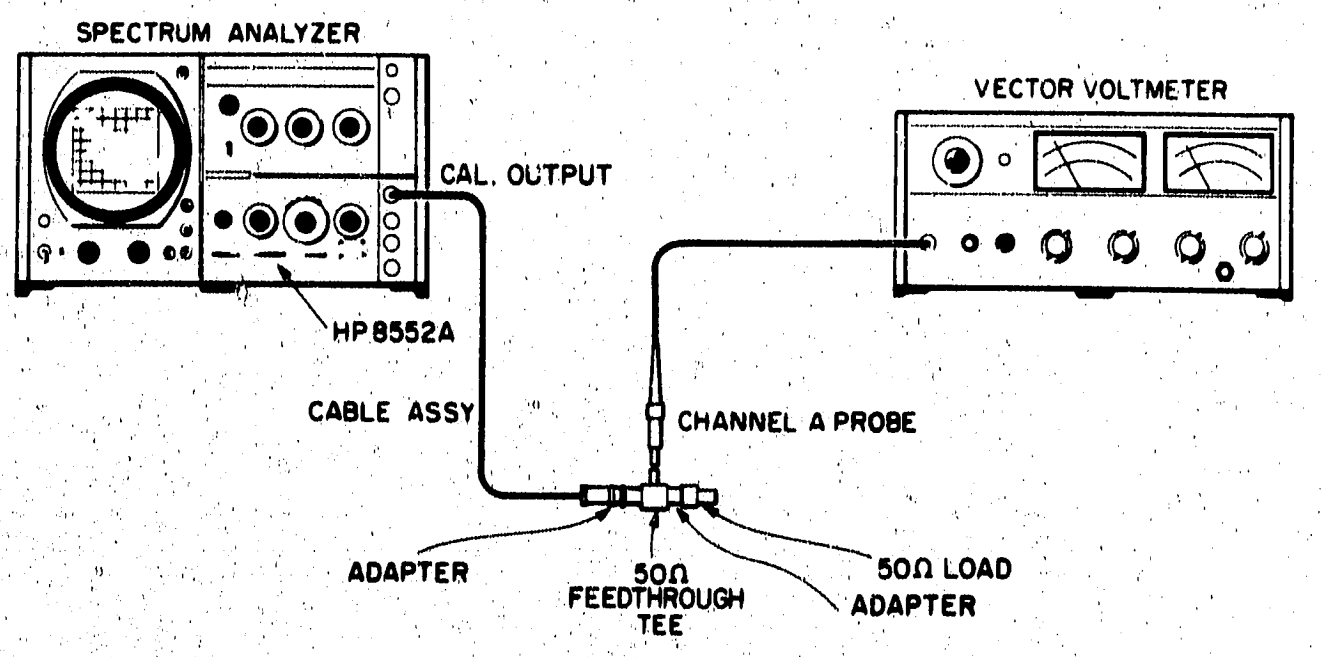


Figure 4-3. Calibrator Amplitude Test

PERFORMANCE TESTS (cont'd)

EQUIPMENT:

Vector Voltmeter	HP 8405A
Comb Generator	HP 8406A
Cable Assembly	HP 10503A
Adapter	UG-29B/U
50-Ohm Tee	HP 11536A
Adapter	UG-201A/U
50-Ohm Termination	HP 908A

1. Connect the equipment shown in Figure 4-3 and make the following settings:

8405A

FREQUENCY RANGE — MHz	20—40
CHANNEL	A
AMPLITUDE RANGE — dB	—30

2. Read amplitude directly on the 8405A Vector Voltmeter. It should be between —29.7 dBm and —30.3 dBm. (6.83 mV to 7.32 mV).

—29.7 dBm _____ —30.3 dBm

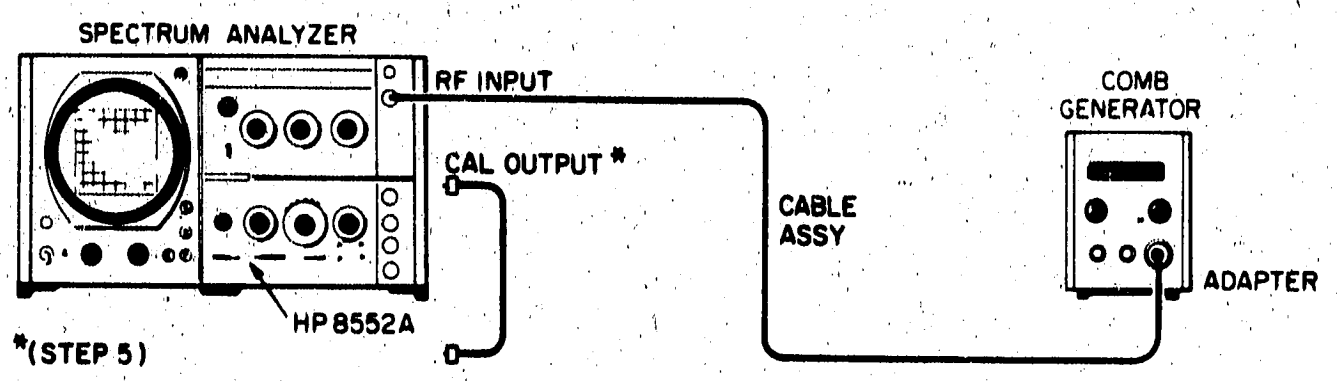


Figure 4-4. Calibrator Frequency Test

3. Connect the equipment shown in Figure 4-4 and make the following settings:

ANALYZER:

FREQUENCY	30 MHz
BANDWIDTH	3 kHz
SCAN WIDTH	PER DIVISION
SCAN WIDTH PER DIVISION	0.1 MHz
INPUT ATTENUATION	20 dB
SCAN TIME PER DIVISION	10 MILLISECONDS
LOG REF LEVEL	—30 dBm
LOG/LINEAR	LOG
VIDEO FILTER	OFF
SCAN MODE	INT
SCAN TRIGGER	AUTO

8406A:

COMB FREQUENCY — MC	10
INTERPOLATION AMPLITUDE — 1 MC	OFF
OUTPUT AMPLITUDE	cw (3 o'clock position)

4. Adjust FREQUENCY to center comb generator 30 MHz comb signal on the CENTER FREQUENCY graticule line.

5. Disconnect the comb generator and connect CAL OUTPUT to RF INPUT and observe the displayed calibrator signal. The calibrator signal should be between 29.7 MHz and 30.3 MHz (between the —3 and +3 graticule lines on the display).

29.7_____30.3 MHz

PERFORMANCE TESTS (cont'd)

4-24. Bandwidth Accuracy.

SPECIFICATION:
Individual IF bandwidth 3 dB points calibrated to ±20% (10 kHz bandwidth ±5%).

DESCRIPTION: While observing a signal on the CRT display, the 100 kHz, 30 kHz, 3 kHz and 1 kHz bandwidths are verified by measuring the half-power points of the signal. The 10 kHz bandwidth is measured by using a frequency counter to monitor the input signal generator frequency as it is tuned between the IF filter half-power points.

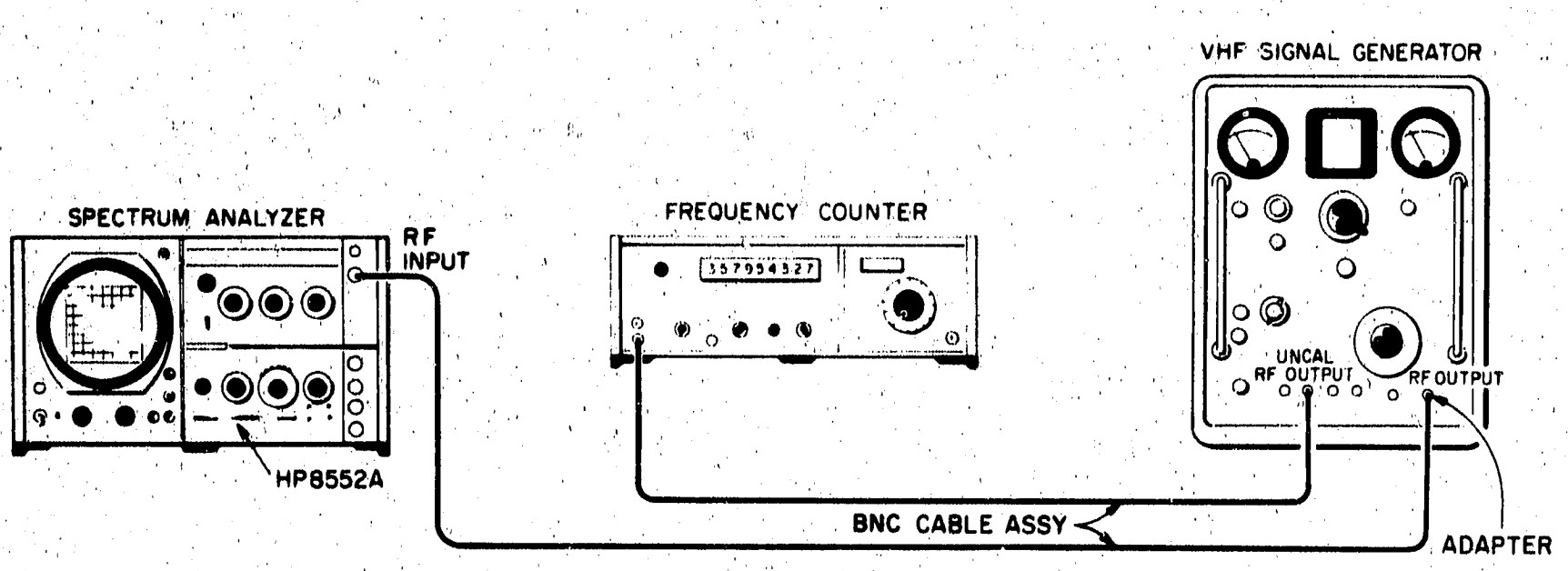


Figure 4-5. 10 kHz Bandwidth Accuracy Test Setup

EQUIPMENT:

Signal Generator	HP 608F
Frequency Counter	HP 5245L
Cable Assembly (2)	HP 10503A
Adapter	UG-201A/U

1. Make the following analyzer control settings:

FREQUENCY	30 MHz
BANDWIDTH	100 kHz
SCAN WIDTH	PER DIVISION
SCAN WIDTH PER DIVISION	0.05 MHz
INPUT ATTENUATION	10 dB
SCAN TIME PER DIVISION	2 MILLISECONDS
TUNING STABILIZER	OFF
BASE LINE CLIPPER	Max ccw
LOG/LINEAR	LINEAR
LINEAR SENSITIVITY	10 mV/Div
VIDEO FILTER	10 kHz
SCAN MODE	INT
SCAN TRIGGER	AUTO

PERFORMANCE TESTS (cont'd)

2. Tune FREQUENCY controls to 0 MHz to center the LO Feedthrough signal; switch TUNING STABILIZER on.
3. Use LINEAR SENSITIVITY Vernier control to adjust for 5.7 divisions signal amplitude.
4. Measure the bandwidth at the half-power points at the 4.0 division line. Bandwidth should be 100 ±20 kHz (1.6 to 2.4 divisions).

   1.6 _____ 2.4 div
5. Repeat steps 3 and 4 to measure the bandwidths listed in Table 4-2, and set the controls as indicated in the table.
6. To check the 10 kHz bandwidth, connnect the test setup shown in Figure 4-5 and make the following control settings.

ANALYZER:
- BANDWIDTH . . . . . 10 kHz
- SCAN WIDTH PER DIVISION . . . . . 0.2 MHz
- SCAN TIME PER DIVISION . . . . . 2 MILLISECONDS
- TUNING STABILIZER . . . . . OFF

608F:
- MEGACYCLES 30
- ATTENUATION . . . . . −30 dBm
- MODULATION . . . . . CW
- FREQUENCY RANGE . . . . . B
- RF OUTPUT . . . . . +7 (on meter)

5245L:
- SENSITIVITY (VOLTS RMS) 0.1
- FUNCTION . . . . . FREQUENCY

Table 4-2. Bandwidth Checks

BANDWIDTH	SCAN WIDTH PER DIVISION	SCAN TIME PER DIVISION	3 dB Bandwidth
30 kHz	20 kHz	2 MILLISECONDS	1.2 _____ 1.8 div
3 kHz	2 kHz	2 MILLISECONDS	1.2 _____ 1.8 div
1 kHz	0.5 kHz	5 MILLISECONDS	1.6 _____ 2.4 div
0.3 kHz	0.2 kHz	10 MILLISECONDS	1.2 _____ 1.8 div
0.1 kHz	0.05 kHz	20 MILLISECONDS	1.6 _____ 2.4 div
0.05 kHz	0.02 kHz	50 MILLISECONDS	2.0 _____ 3.0 div

7. Fine adjust the signal generator frequency to center the 30 MHz signal on the CRT display; switch TUNING STABILIZER on (up).
8. Using FINE TUNE to keep the display centered, reduce SCAN WIDTH PER DIVISION to 20 kHz. Set SCAN WIDTH to ZERO scan.
9. Maximize signal response using FINE TUNE and adjust LINEAR SENSITIVITY Vernier control for a 7.1 division display.
10. Decrease HP 608F frequency until the base line drops to the 5.0 division line. Record the signal generator frequency as read from the HP 5245L Frequency Counter.

    _____ MHz
11. Increase HP 608F frequency until the base line peaks and then drops to the 5.0 division line. Record the signal generator frequency.

    _____ MHz
12. The difference in the readings of steps 10 and 11 equals the half-power bandwidth. The bandwidth should be 10 ±0.5 kHz.

    9.5 _____ 10.5 kHz

PERFORMANCE TESTS (cont'd)

4-25. Bandwidth Selectivity.

SPECIFICATION:
60 dB/3 dB IF bandwidth ratio <20:1 for IF bandwidths from 1 kHz to 300 kHz.
60 dB/3 dB IF bandwidth ratio <25:1 for 50, 100 and 300 Hz IF bandwidth.

DESCRIPTION: Bandwidth selectivity is verified by observing the LO feedthru signal in the LOG mode on the CRT and measuring the bandwidth at the −60 dB points using the analyzer's calibrated scan widths. The ratio of this bandwidth to the 3 dB bandwidths defines the analyzer selectivity.

1. Make the following control settings:

ANALYZER:

FREQUENCY	0 MHz
BANDWIDTH	300 kHz
INPUT ATTENUATION	0 dB
SCAN WIDTH	PER DIVISION
SCAN WIDTH PER DIVISION	1 MHz
SCAN TIME PER DIVISION	50 MILLISECONDS
LOG/LINEAR	LOG
LOG REF LEVEL	20 dBm
BASE LINE CLIPPER	Max ccw
TUNING STABILIZER	On
VIDEO FILTER	100 Hz
SCAN MODE	INT
SCAN TRIGGER	AUTO

2. Tune FREQUENCY to center the LO feedthru signal on the CRT display; adjust LOG REF LEVEL Vernier to peak the signal on the top graticule line.

3. Observe the bandwidth at the −60 dB graticule line; bandwidth should be less than six divisions (6 MHz).

_____6 div

4. To check the remaining BANDWIDTH settings refer to Table 4-3 below for control settings and test limits.

Table 4-3. Bandwidth Selectivity Checks

BANDWIDTH	SCAN WIDTH PER DIVISION	SCAN TIME PER DIVISION	60 dB Bandwidth (−60 dB graticule line)
100 kHz	0.5 MHz	50 MILLISECONDS	_____ 4 div
30 kHz	0.1 MHz	50 MILLISECONDS	_____ 6 div
10 kHz	0.05 MHz	50 MILLISECONDS	_____ 4 div
3 kHz	10 kHz	50 MILLISECONDS	_____ 6 div
1 kHz	5 kHz	.1 SECOND	_____ 4 div
0.3 kHz	2 kHz	0.2 SECOND	_____ 3.75 div
0.1 kHz	0.5 kHz	0.2 SECOND	_____ 5 div
.05 kHz	0.2 kHz	0.5 SECOND	_____ 6.25 div.

PERFORMANCE TESTS (Cont'd)

4-26. Switching Between Bandwidths Accuracy.

SPECIFICATION:
At 20 degrees C, ±0.5 dB (LOG); ±5.8% (LINEAR).

DESCRIPTION: Relative bandwidth amplitude accuracy is verified by observing the amplitude of the LO feedthru while switching IF bandwidths. The display is observed in the LINEAR mode for best amplitude resolution.

1. Set the analyzer controls as follows:

FREQUENCY	0 MHz
FINE TUNE	Centered
BANDWIDTH	300 kHz
SCAN WIDTH	PER DIVISION
SCAN WIDTH PER DIVISION	0.2 MHz
INPUT ATTENUATION	10 dB
SCAN TIME PER DIVISION	5 MILLISECONDS
BASE LINE CLIPPER	Max ccw
LOG/LINEAR	LINEAR
LINEAR SENSITIVITY	10 mV/DIV
TUNING STABILIZER	OFF
VIDEO FILTER	OFF
SCAN MODE	INT
SCAN TRIGGER	AUTO

2. Adjust FREQUENCY to center LO feedthru signal on the CRT display. Switch TUNING STABILIZER on (up) and adjust FINE TUNE to center signal on CRT display.

3. Set LINEAR SENSITIVITY controls to approximately 7.1 division. Set SCAN WIDTH PER DIVISION to 0.5 kHz; SCAN TIME PER DIVISION to 0.5 SECOND.

4. Progressively switch BANDWIDTH from 300 kHz through .05 kHz. Note the signal amplitude at each BANDWIDTH. Maximum deviation between any two bandwidths should be <0.8 division.

_____ 0.8 Div.

PERFORMANCE TESTS (cont'd)

4-27. Amplitude Display Accuracy.

SPECIFICATION:
±0.25 dB/dB but not more than ±1.5 dB over the full 70 dB display range.

DESCRIPTION: A full eight division signal is displayed on the CRT in the LOG mode. The LOG REF LEVEL is then changed 70 dB in 10 dB steps. The error of the CRT display is measured at each step. It is assumed that the IF Section Display Adjustments in Paragraph 4-17 have been performed.

1. Connect CAL OUTPUT to RF INPUT.

2. Set Analyzer controls as follows:

FREQUENCY	30 MHz
FINE TUNE	Centered
BANDWIDTH	100 kHz
SCAN WIDTH	PER DIVISION
SCAN WIDTH PER DIVISION	0.5 MHz
INPUT ATTENUATION	20 dB
SCAN TIME PER DIVISION	5 MILLISECONDS
BASE LINE CLIPPER	Max ccw
LOG/LINEAR	LOG
LOG REF LEVEL	−20 dBm
VIDEO FILTER	OFF
SCAN MODE	INT
SCAN TRIGGER	AUTO

3. Adjust FREQUENCY to center the 30 MHz CAL signal on the CRT display and adjust LOG REF LEVEL Vernier for a full eight division vertical display.

4. Change the LOG REF LEVEL to reduce the displayed signal amplitude 10 dB. Signal amplitude should be seven divisions ±0.15 division.

6.85_____7.15 div

5. Change the LOG REF LEVEL to reduce the signal amplitude in 10 dB steps to verify the entire 70 dB display range.

a. −20 dB	5.85	6.15 div	d. −50 dB	2.85	3.15 div
b. −30 dB	4.85	5.15 div	e. −60 dB	1.85	2.15 div
c. −40 dB	3.85	4.15 div	f. −70 dB	0.85	1.15 div

PERFORMANCE TESTS (cont'd)

4-28. Scan Time Accuracy.

SPECIFICATION:
0.1 ms/div up to 20 ms/div ±10%.
50 ms/div to 10s/div ±20%.

DESCRIPTION: A sine wave modulated RF signal is connected to the RF INPUT. The demodulated signal is displayed on the analyzer CRT and its peaks aligned with the CRT graticule by adjusting the modulation frequency. Scan time is verified by measuring the period average of the modulation signal using a frequency counter.

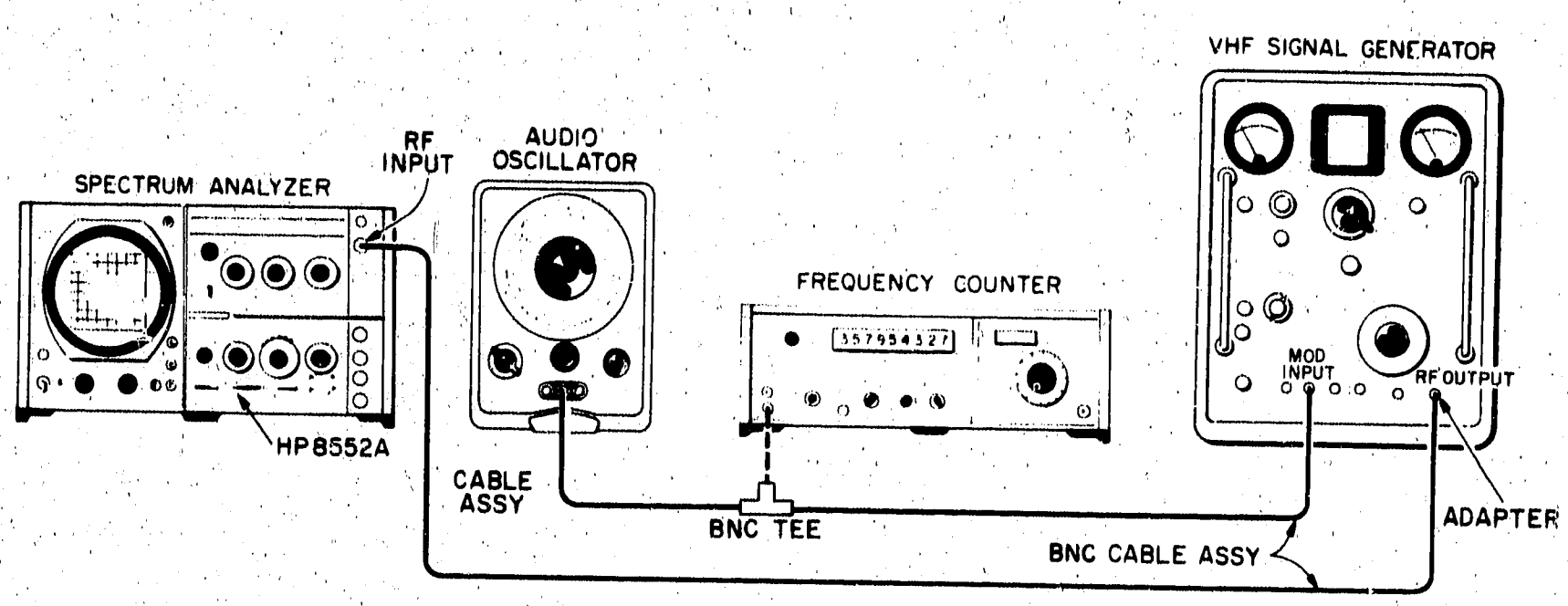


Figure 4-6. Scan Time Accuracy Test Setup.

EQUIPMENT:

Frequency Counter	HP 5245L
Audio Oscillator	HP 200CD
Signal Generator	HP 608F
Cable Assembly (2)	HP 10503A
Cable Assembly	HP 11001A
BNC Tee	UG-274B/U
Adapter	UG-201A/U

1. Connect the test setup in Figure 4-6 and make the following control settings:

ANALYZER:

FREQUENCY	100 MHz
FINE TUNE	Centered
BANDWIDTH	300 kHz
SCAN WIDTH	ZERO
INPUT ATTENUATION	10 dB
SCAN TIME PER DIVISION	2 MILLISECONDS
BASE LINE CLIPPER	Max ccw
LOG/LINEAR	LINEAR
LINEAR SENSITIVITY	1 mV/DIV
VIDEO FILTER	10 kHz
SCAN MODE	INT
SCAN TRIGGER	VIDEO

PERFORMANCE TESTS (cont'd)

608F:
- MEGACYCLES 100
- ATTENUATION . . . . . −40 dBm
- MODULATION . . . . . EXT AM
- FREQUENCY RANGE . . . . . D

5245L:
- SENSITIVITY (VOLTS RMS) 0.1
- FUNCTION . . . . . PERIOD AVERAGE - (10)
- TIME BASE . . . . . 10 μs

200CD:
- RANGE X100
- Frequency Dial 5

2. Adjust the HP 200CD AMPLITUDE for 90% modulation as indicated on the HP 608F panel meter.

3. Fine tune the HP 608F Signal Generator for maximum signal indication of the analyzer CRT. Adjust LINEAR SENSITIVITY Vernier control for a convenient display height.

4. Position the first modulation peak directly on the −5 graticule line by adjusting the HORIZONTAL POSITION control.

5. Adjust the audio oscillator modulation frequency to align the tenth modulation peak with the +4 graticule line (see Figure 4-7). Total scan time is read on the HP 5245L and should be 2.0 ±0.2 ms.

   1.8_____ 2.2 ms

6. Repeat steps 4 and 5 to verify the SCAN TIME PER DIVISION positions as listed in Table 2-5. The approximate HP 200CD frequency settings and HP 5245L PERIOD AVERAGE tolerances are also contained in Table 4-1.

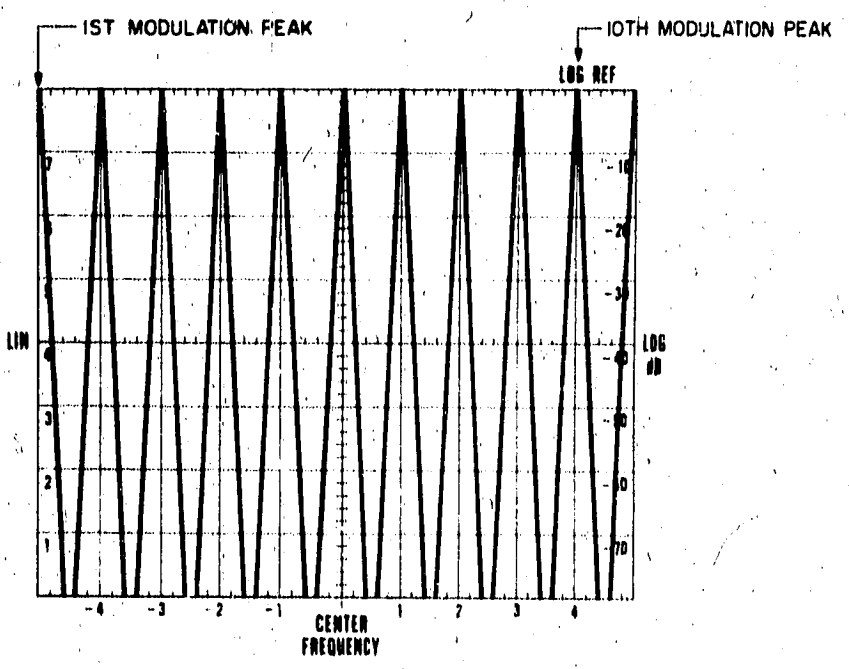


Figure 4-7. Scan Time Modulation Peaks

Table 4-4. Modulation Frequencies for Checking Scan Time

SCAN TIME PER DIVISION	HP 200CD Frequency	Scan Time
0.1 MILLISECOND	10 kHz	90 _____ 110 μs
0.2 MILLISECOND	5 kHz	180 _____ 220 μs
0.5 MILLISECOND	2 kHz	450 _____ 550 μs
1 MILLISECOND	1 kHz	0.9 _____ 1.1 ms
2 MILLISECONDS	500 Hz	1.8 _____ 2.2 ms
5 MILLISECONDS	200 Hz	4.5 _____ 5.5 ms
10 MILLISECONDS	100 Hz	9.0 _____ 11.0 ms
20 MILLISECONDS	50 Hz	18.0 _____ 22.0 ms
50 MILLISECONDS	20 Hz	40.0 _____ 60.0 ms
0.1 SECOND	10 Hz	80.0 _____ 120 ms
0.2 SECOND	5 Hz	160 _____ 240 ms

Table 4-5. PERFORMANCE CHECK TEST RECORD

Hewlett-Packard Model 8552
Spectrum Analyzer IF Section

Test Performed by: _____

Date: _____

Serial No. ___ - _____

Para. No.	Test Description	Measurement Unit	Min	Actual	Max
4-23	**Calibrator Output**				
	Amplitude: −30 dBm ±0.3 dBm	dBm	−29.7	_____	−30.3
	Frequency: 30 MHz, ±0.3 MHz	MHz	29.7	_____	30.3
4-24	**Bandwidth Accuracy**				
	Bandwidths: ±20% 10 kHz Bandwidths: ±5%				
	100 kHz Bandwidth	divisions	1.6	_____	2.4
	30 kHz Bandwidth	divisions	1.2	_____	1.8
	3 kHz Bandwidth	divisions	1.2	_____	1.8
	1 kHz Bandwidth	divisions	0.4	_____	0.6
	10 kHz Bandwidth	kHz	9.5	_____	10.5
4-25	**Bandwidth Selectivity**				
	Bandwidths: −60 dB Bandwidth				
	300 kHz 6 MHz	divisions		_____	6
	100 kHz 2 MHz	divisions		_____	4
	30 kHz < 600 kHz	divisions		_____	6
	10 kHz < 200 kHz	divisions		_____	4
	3 kHz < 60 kHz	divisions		_____	6
	1 kHz < 20 kHz	divisions		_____	4
	0.3 kHz < 7.5 kHz	divisions		_____	3.75
4-26	**Switching Between Bandwidths**				
	Accuracy: ±5% (LINEAR)	divisions		_____	0.8
4-27	**Amplitude Display**				
	Accuracy at −10 dB: ±.15 dB	divisions	6.85	_____	7.15
	−20 dB: ±.15 dB	divisions	5.85	_____	6.15
	−30 dB: ±.15 dB	divisions	4.85	_____	5.15
	−40 dB: ±.15 dB	divisions	3.85	_____	4.15
	−50 dB: ±.15 dB	divisions	2.85	_____	3.15
	−60 dB: ±.15 dB	divisions	1.85	_____	2.15
	−70 dB: ±.15 dB	divisions	0.85	_____	1.15

Table 4-5. Performance Test Record (cont'd)

Para. No.	Test Description	Measurement Unit	Min	Actual	Max
4-28	**Scan Time**				
	Accuracy at 0.1 millisecond	μs	90	_____	110
	0.2 millisecond	μs	180	_____	220
	0.5 millisecond	μs	450	_____	550
	1 millisecond	ms	0.9	_____	1.1
	2 millisecond	ms	1.8	_____	2.2
	5 milliseconds	ms	4.5	_____	5.5
	10 milliseconds	ms	9.0	_____	11.0
	20 milliseconds	ms	18.0	_____	22.0
	50 milliseconds	ms	40.0	_____	60.0
	0.1 seconds	ms	80	_____	120
	0.2 second	ms	160	_____	240

ADJUSTMENTS

SECTION V
ADJUSTMENTS

5-1. INTRODUCTION.

5-2. This section describes adjustments and checks required to return the analyzer IF section to peak operating condition when repairs are required. Included in this section are test setups, procedures, and tips about tools and test equipment. Adjustment location photographs are located on fold-outs at the back of the manual. A test record for recording data taken during adjustment procedures is included at the end of this section.

5-3. EQUIPMENT REQUIRED.

5-4. A complete list of test equipment and a list of accessories are contained in Table 1-2. In addition, each test procedure contains a list of test equipment and identifies all test equipment and accessories by call-outs. Any equipment substituted for the instruments or accessories listed must meet the minimum specifications in order to calibrate the analyzer.

5-5. Posidriv Screwdriv

5-6. Many screws in the instrument appear to be Phillips, but are not. The table of accessories gives the name and number of the Pozidriv screwdrivers designed to fit these screws. To avoid damage to the screw slots, the Posidriv screwdrivers should be used.

5 7. Slug Tuning Tools.

5-8. The Gowanda Model PC9668 (HP 8710-1010) tuning tool is for tuning the slugs in the ferrite inductors used in the analyzer plug-ins. No other tool should be used for this purpose.

5-9. Blade Tuning Tools.

5-10. For adjustments requiring a nonmetallic metal-blade tuning tool, use the General Cement Model No. 5003 (HP 8730-0013). It may be necessary to cut away part of the plastic on the tuning blade end to use the tool on all the adjustments. In situations not requiring nonmetallic tuning tools, an ordinary small screwdriver or other suitable tool is sufficient. No matter what tool is used, never try to force any adjustment control in the analyzer. This is especially critical when tuning variable slug-tuned inductors and variable capacitors.

5-11. HP 11592A Service Kit.

5-12. The HP 11592A Service Kit is an accessory item available from Hewlett-Packard for use in maintaining the spectrum analyzer. No attempt to adjust the analyzer should be made unless the user has the service kit. The kit can be obtained by contacting your nearest Hewlett-Packard Sales and Service office. A list of HP field offices is included at the back of this manual.

5-13. Table 1-2 contains a detailed description of the contents of the service kit. Any item in the kit may be ordered separately if desired. The wiring in the 11592-60015 Extended Assembly is especially critical and fabrication should not be attempted in the field. Other items in the kit may be built in the field if desired.

5-14. Extender Cable Installation.

5-15. Plug-in Removal. Push the front panel latch in the direction indicated by the arrow until the latch disengages and pops out from the panel. Pull the plug-ins out of the instrument. Locate the black press-to-release button on the left side of the RF section. Press the button and firmly pull the two sections apart.

5-16. When the two sections separate at the front panel, raise the upper section until it is above the lower section by two or three inches at the front panel. Disengage the metal tab-slot connection at the rear of the plug-ins and separate the two sections.

5-17. Plug-In Cover Removal.

5-18. Remove the bottom cover from the IF section. Do not remove the shield covers from the A1 and A8 assemblies in the IF section until those assemblies are to be adjusted.

5-19. Extender Connections.

5-20. Place the plate end of the HP 11592-60015 Extender Assembly in the display section and press firmly into place so that both plugs make contact. The plate and plugs cannot be installed upside down as the plate has two holes corresponding to two guide rods in the mainframe.

5-21. Connect the upper cable plug to the RF Section and the lower cable plug to the IF Section. The plugs are keyed so that they will go on correctly and will not make contact upside down. Connect the HP 11592-60014 Interconnection Cable Assembly between the RF and IF sections. The connectors are keyed by the shape of the plug and the arrangement of the pins. Press the connectors firmly together and extend the instrument sections as far apart as the cables will allow without putting stress on the connectors.

5-22. FACTORY SELECTED COMPONENTS.

5-23. Table 5-4 contains a list of factory selected components by reference designation, basis of selection, and schematic diagram location on which the component is illustrated. Factory selected components are designated by an asterisk (*) on the schematic diagrams in Section VIII of this manual.

5-24. RELATED ADJUSTMENTS.

5-25. The adjustment procedures are arranged in numerical order. Many adjustments are directly related to preceding or following ones. The following sets of adjustments are related, and if one adjustment in the set is made, the other procedures in that set should be checked or adjusted.

Power Supply Checks and Adjustments (Para. 5-27).

Scan Circuits.

1. Horizontal Scan Checks and Adjustments (Para. 5-28).
2. Final Scan Checks (Para. 5-29).

Log/Linear Amplifier Circuits.

1. Vertical Deflection Amplifier Checks (Para. 5-30).
2. Log/Linear Amplifier Checks and Adjustments (Para. 5-31).

3 MHz IF Circuits.

1. 3 MHz IF Bandwidth Checks (Para. 5-32).
2. LC Filter Adjustment (Para. 5-33).
3. Crystal Filter Adjustment (Para. 5-34).
4. 300 kHz Bandpass Filter Adjustment (Para. 5-35).
5. 3 MHz IF Gain Adjustments (para. 5-36).

Converter Circuits.

1. 47 MHz Local Oscillator Check and Adjustment (Para. 5-37).
2. 50 MHz IF Bandpass Check and Adjustment (Para. 5-38).
3. 44 MHz Rejection Adjustment (Para. 5-39).

30 MHz Calibration Oscillator Check and Adjustment (Para. 5-40).

Analogic Check and Adjustment (Para. 5-41).

5-26. CHECKS AND ADJUSTMENTS.

5-27. Power Supply Check and Adjustment.

REFERENCE:
Schematic 17

DESCRIPTION: The spectrum analyzer If Section regulates power fed from the display section. These checks verify and validate the display section power supply voltages and the regulated voltages in the spectrum analyzer plug-ins.

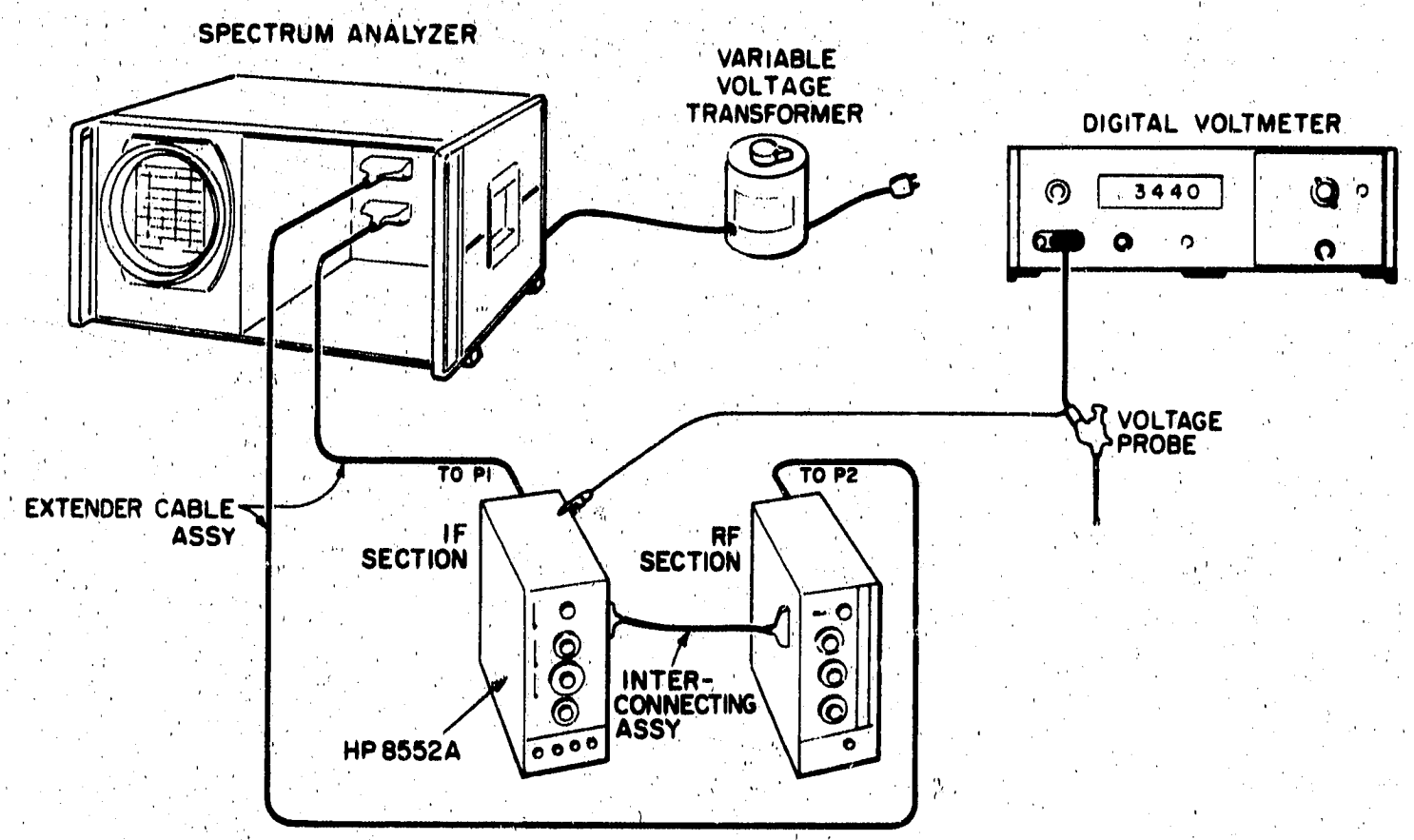


Figure 5-1. Power Supply Check and Adjustment Test Setup

EQUIPMENT:

Interconnection Assembly	HP 11592-60015
Digital Voltmeter	HP 3440A/3443A
Interconnection Assembly	HP 11592-60014
Straight-Through Voltage Probe	HP 10025A
Variable Voltage Transformer	W5MT3A

1. Connect the test setup shown in Figure 5-1. Measure the DC display voltages with the HP 3440A/3443A Digital Voltmeter while the analyzer plug-ins are installed on extender cables.

Test Point (to Chassis)	Wire Color	Voltage
P1-9	red	+250 ±3 Vdc
P1-4, P2-2	wht/red	+100 ±1 Vdc
P1-6, P2-6	vio	−100 ±1 Vdc
F1, F2	wht/vio	−12.6 ±1 Vdc

2. If the display section supplies need adjustment, refer to the manual provided with the display section for instructions.

CHECKS AND ADJUSTMENTS (cont'd)

5-27. Power Supply Check and Adjustment (cont'd)

3. Connect the digital voltmeter to the IF Section XA5-11 (wht/blk/red) and measure +20 ±0.10 Vdc. Ripple should be <0.5 mVrms. These tolerances should be maintained as the line voltage is varied between 103.5 Vac and 126.5 Vac using the variable voltage transformer.

   +19.90 _____ +20.10 Vdc

4. If the +20 Vdc supply is out of tolerance, adjust A5R16 +20V ADJ on the power supply assembly.

5. Connect the digital voltmeter to the IF Section XA5-8 (wht/blk/vio) and measure −10 ±0.01 Vdc. Ripple should be <0.5 mVrms. These tolerances should be maintained as the line voltage is varied between 103.5 Vac and 126.5 Vac using the variable voltage transformer.

   −9.99 _____ −10.01 Vdc

6. If the −10 Vdc supply is out of tolerance, adjust A5R32 −10V ADJ on the power supply assembly.

5-28. Horizontal Scan Check and Adjustment.

REFERENCE:
Schematic 14.

DESCRIPTION: The SCAN OUT voltage is measured and pre-set in this procedure. The Final Scan Checks (Paragraph 5-29) are then performed. The SCAN OUT voltage waveform is observed and adjustments made, if necessary, to obtain the proper waveform.

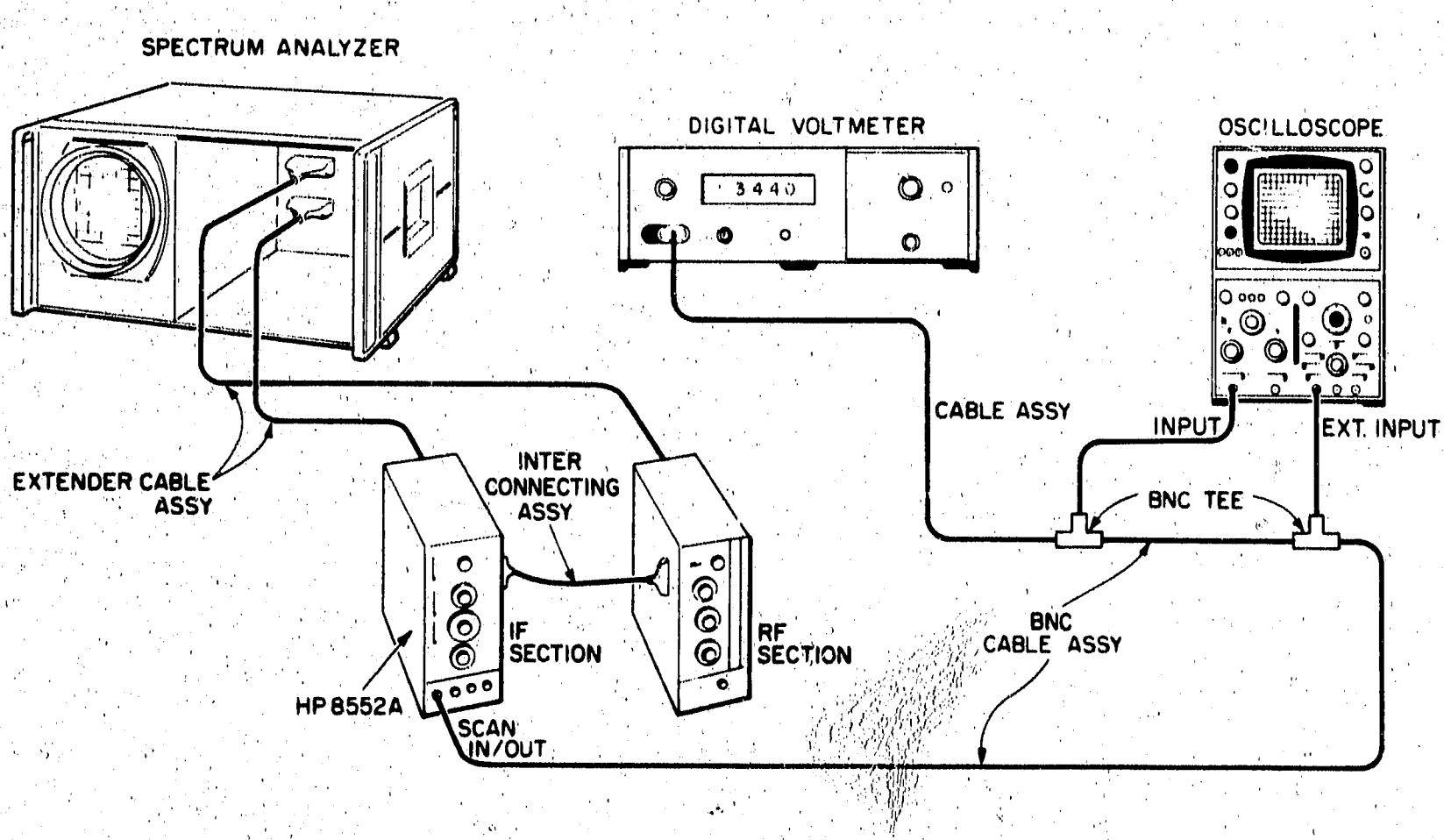


Figure 5-2. Scan Generator Check and Adjustment Test Setup.

CHECKS AND ADJUSTMENTS (cont'd)

5-28. Horizontal Scan Check and Adjustment (cont'd)

EQUIPMENT:

Oscilloscope	HP 180A/1801A/1821A
Digital Voltmeter	HP 3440A/3443A
Extender Assembly	HP 11592-60015
Interconnection Assembly	HP 11592-60014
BNC Tee (2)	UG-274B/U
Cable Assembly (2)	HP 10503A
Cable Assembly	HP 11001A

1. Connect the test setup shown in Figure 5-2 and make the following control settings:

ANALYZER:

BASE LINE CLIPPER	Max ccw
SCAN TIME PER DIVISION	5 MILLISECONDS
SCAN MODE	INT
SCAN TRIGGER	AUTO

180A/1801A/1821A:

HORIZONTAL SCALE	10 milliseconds/division
VERTICAL SENSITIVITY	2 volts/division
EXTERNAL TRIGGER	trigger on external dc signal

3440A/3443A:

SAMPLE RATE	9 o'clock
RANGE	AUTO

2. Synchronize the oscilloscope horizontal scan with the signal from the analyzer SCAN IN/OUT jack.

3. Observe and measure the SCAN IN/OUT waveform and compare it against the waveform shown in Figure 5-3. Rise time should be 54 ±4 milliseconds.

50_____58 ms

4. If rise time of the scan voltage is out of tolerance, adjust A6R15 SCAN TIME control. Then proceed with the remainder of the scan generator adjustments given below.

5. Set the analyzer SCAN TRIGGER to EXT. Use the digital voltmeter to measure the dc voltage level at the SCAN IN/OUT jack. Voltage should be −5.0 ±0.02 Vdc.

−4.98_____−5.02 Vdc

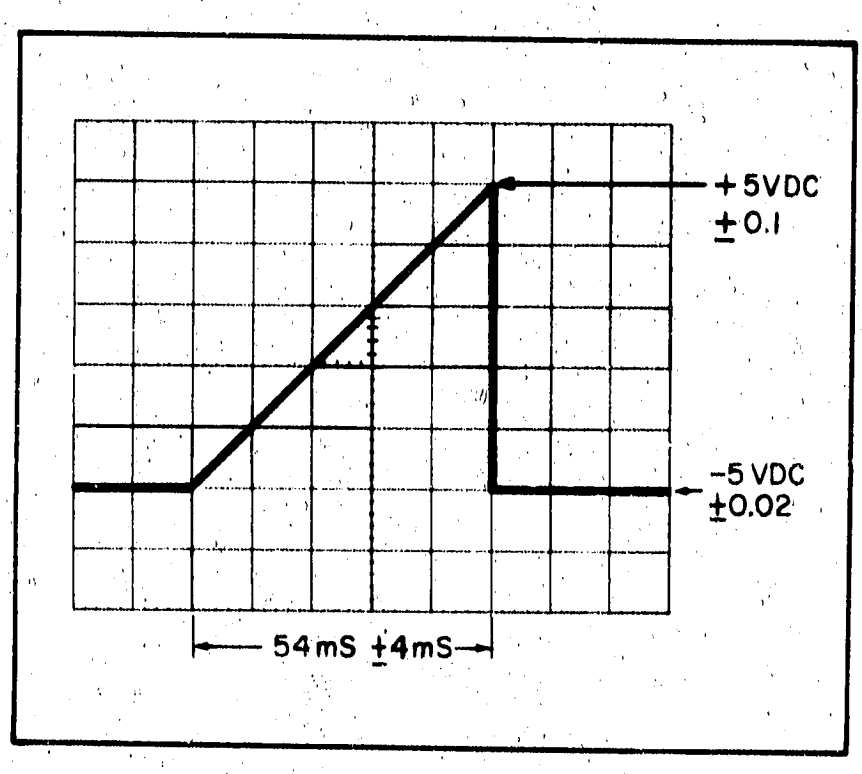


Figure 5-3. Scan Voltage Waveform Measurement

6. If the voltage is out of tolerance, adjust A6R49 −5V ADJ control on the scan generator assembly.

7. Turn the SCAN TIME PER DIVISION control to 10 SECONDS, SCAN MODE to SINGLE; push the SINGLE button.

8. Observe the SCAN IN/OUT voltage as the scan reaches the right-hand edge of the graticule. The highest reading should be +5.0 ±0.1 Vdc. Repeat this operation several times to make sure the voltage reading is correct.

+4.9_____+5.1 Vdc

9. If the voltage is out of tolerance, adjust A6R39 SCAN AMPL control on the scan generator assembly.

CHECKS AND ADJUSTMENTS (cont'd)

5-29. Final Scan Check.

REFERENCE:
Schematic 14.

DESCRIPTION: A modulated RF signal is connected to the RF INPUT. The demodulated signal on the analyzer display is used to fine-adjust scan time circuits. Then, the operation of remaining scan circuits is checked.

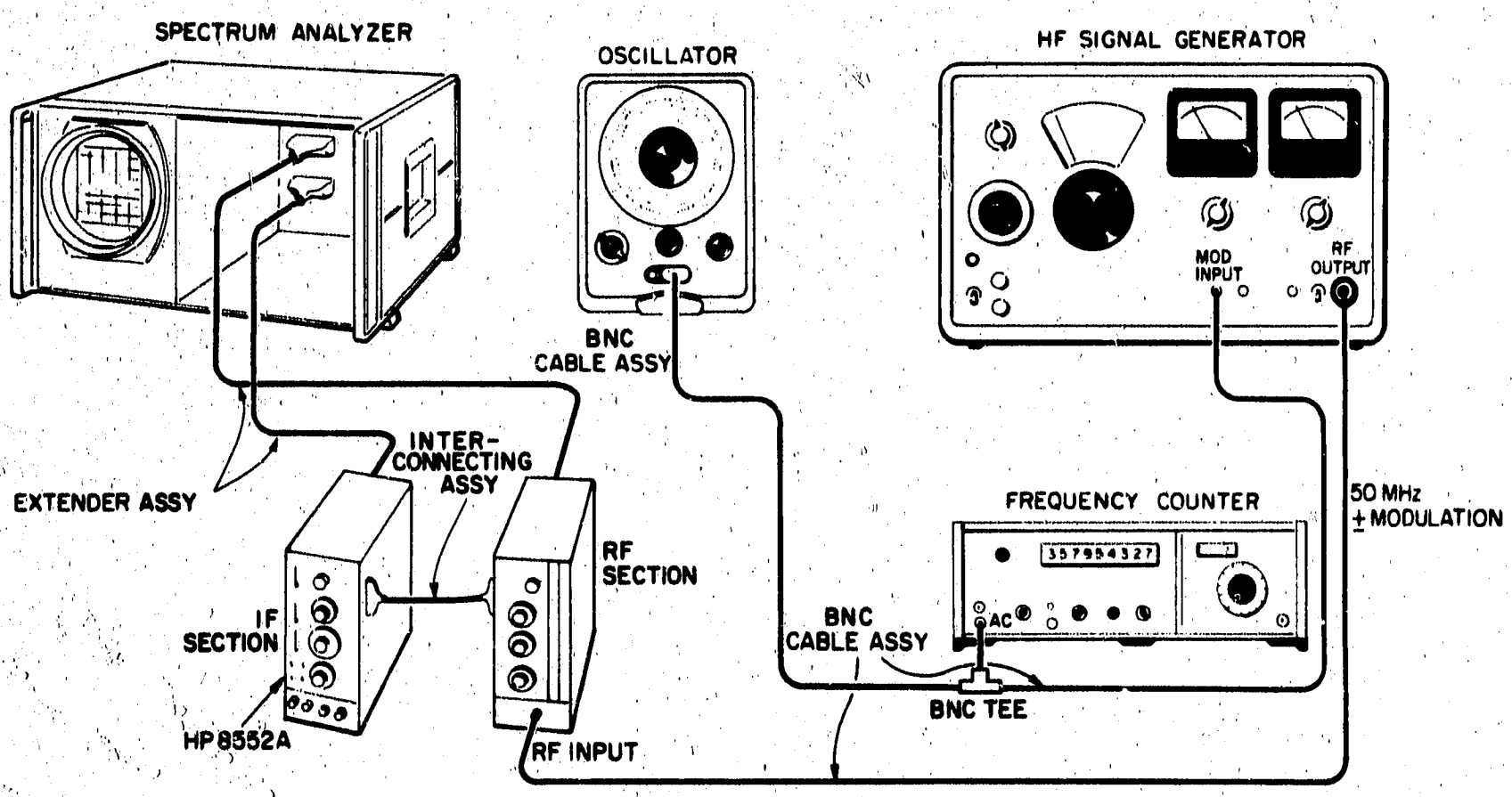


Figure 5-4. Final Scan Time Adjustment Test Setup

EQUIPMENT:

Frequency Counter	HP 5245L
Oscillator	HP 200CD
Signal Generator	HP 606B
Cable Assembly (2)	HP 10503A
Cable Assembly	HP 11001A
Interconnecting Assembly	HP 11592-60014
Extender Assembly	HP 11592-60015
BNC Tee	UG-274B/U

1. Connect the test setup shown in Figure 5-4 and make the following control settings:

ANALYZER:

FREQUENCY	50 MHz
FINE TUNE	Centered
BANDWIDTH	300 kHz
SCAN WIDTH	ZERO
INPUT ATTENUATION	0 dB
BASE LINE CLIPPER	Max ccw
SCAN TIME PER DIVISION	1 MILLISECOND
LINEAR SENSITIVITY	1 mV/DIV

CHECKS AND ADJUSTMENTS (cont'd)

5-29. Final Scan Check (cont'd)

ANALYZER control settings (cont'd)

LOG/LINEAR	LINEAR
VIDEO FILTER	10 kHz
SCAN MODE	INT
SCAN TRIGGER	VIDEO

606B:

FREQUENCY	50 MHz
ATTENUATOR (dBm)	−40
MODULATION SELECTOR	EXT AC
RANGE	6

5245L:

SENSITIVITY	0.1
FUNCTION	PERIOD AVERAGE - (10)
TIME BASE	10 μs

2. Adjust the HP 200CD Audio Oscillator AMPLITUDE for 90 percent modulation as indicated on the HP 606B Signal Generator.

3. Fine tune the signal generator for maximum signal indication on the analyzer. Adjust LINEAR SENSITIVITY controls for a convenient display height.

4. Adjust the audio oscillator modulation frequency to give a 1.0 ms HP 5245L Period Average reading.

Table 5-1. Modulation Frequencies for Checking Scan Time

SCAN TIME PER DIVISION	HP 200CD Frequency	HP 5245L Period Average
1 MILLISECOND	1 kHz	1.0 ±1 ms
5 MILLISECONDS	200 Hz	5.0 ±0.5 ms
10 MILLISECONDS	100 Hz	10.0 ±1 ms
50 MILLISECONDS	20 Hz	50.0 ±10 ms
0.1 SECOND	10 Hz	100.0 ±20 ms

5. Position the first modulation peak directly on the −5 graticule line by adjusting the HORIZONTAL POSITION control.

6. If the tenth modulation peak does not align with the +4 graticule line, adjust the SCAN TIME control A6R15 on the Scan Generator Assembly. (See Figure 4-7).

7. Check the scan time limits of the SCAN TIME PER DIVISION positions as listed in Table 5-1 by setting the first modulation peak in alignment with the −5 graticule line. Then align the tenth modulation peak with the +4 graticule line by slightly changing, if necessary, the modulation frequency from the audio oscillator (one peak per division). The HP 5245L Period Average readings should be within the tolerances as listed in Table 5-1.

CHECKS AND ADJUSTMENTS (cont'd)

5-29. Final Scan Check (cont'd)

8. To check scan time linearity, set the controls as follows:

SCAN TIME PER DIVISION . . . . . 2 MILLISECONDS
Modulation Frequency (HP 200 CD) . . . . . 500 Hz

9. Use the HORIZONTAL POSITION control to set the first modulation peak on the −5 graticule line. Adjust, if necessary, the audio oscillator modulation frequency to position the tenth modulation peak on the +4 graticule line. The peaks should align with each graticule line ±0.1 division.

Graticule	Min	Actual	Max.	Graticule	Min	Actual	Max.
−5	−0.1	_____	+0.1	CENTER FREQUENCY	−0.1	_____	+0.1
−4	−0.1	_____	+0.1	+1	−0.1	_____	+0.1
−3	−0.1	_____	+0.1	+2	−0.1	_____	+0.1
−2	−0.1	_____	+0.1	+3	−0.1	_____	+0.1
−1	−0.1	_____	+0.1	+4	−0.1	_____	+0.1

10. Switch to each position of the SCAN TRIGGER switch and make sure that the scan triggers. To verify the EXT position, place an ac signal (5 Hz to 50 kHz) at the TRIGGER/BLANK INPUT.

EXT Trigger: 2 _____ 20 V p-p

11. To check VIDEO trigger operation, reduce the signal input slowly to 1.5 divisions of vertical deflection. The scan should continue to trigger down to this level.

VIDEO TRIGGER: 1.5 divisions _____

12. To check the EXT position of the SCAN MODE switch, connect an 8 volt peak-to-peak, 1 kHz sine-wave signal from the HP 200CD Oscillator to the SCAN IN/OUT jack. A horizontal trace should appear on the CRT display.

EXT SCAN MODE: 8 V p-p _____

5-30. Vertical Deflection Amplifier Check.

REFERENCE:
Schematics 10, 11, 12, 13.

DESCRIPTION: The A4 Crystal Filter Assembly is removed from the IF Section. A 3 MHz signal of known amplitude is applied at the input (XA4-14) of the LOG REF LEVEL LINEAR SENSITIVITY attenuator. The VERTICAL POSITION and VERTICAL GAIN controls are then checked. A time domain waveform is then placed on the analyzer by an AM modulated 3 MHz signal at XA4-14. Operation of the BASE LINE CLIPPER is checked visually on the display.

CHECKS AND ADJUSTMENTS (cont'd)

5-30. Vertical Deflection Amplifier Check (cont'd)

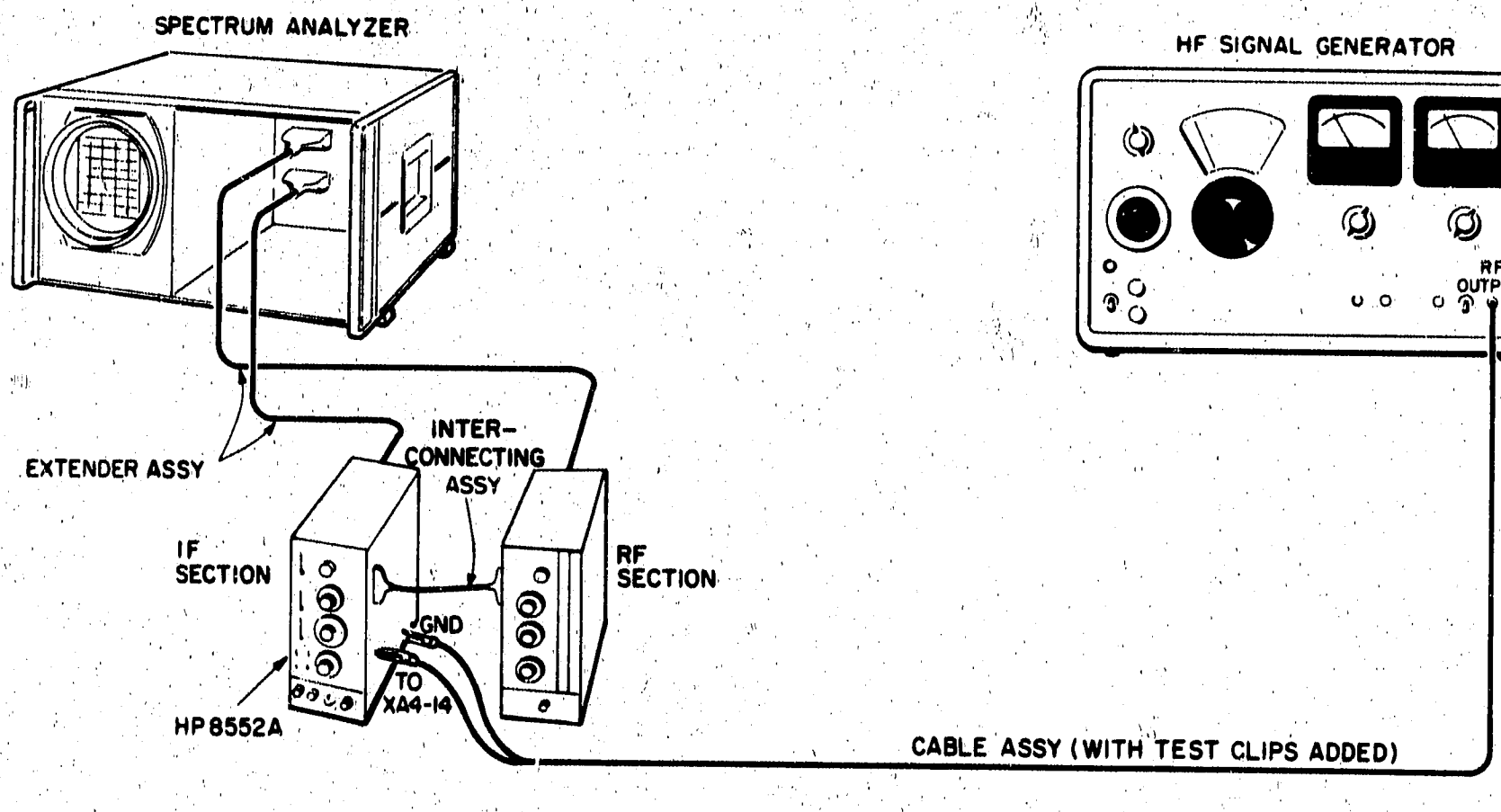


Figure 5-5. Vertical Deflection Amplifier Test Setup

EQUIPMENT:

Signal Generator	HP 606B
Cable Assembly (with test clips installed)	HP 10501A
Interconnection Assembly	HP 11592-60014
Extender Assembly	HP 11592-60015

1. With the analyzer power off, remove the A4 Crystal Filter board from the 8552A.

2. Connect the test setup shown in Figure 5-5 , turn Analyzer power ON, and set controls as follows:

ANALYZER:

INPUT ATTENUATION	0 dB
SCAN TIME PER DIVISION	2 MILLISECONDS
LOG REF LEVEL	−20 dBm
LOG/LINEAR	LOG
BASE LINE CLIPPER	Max ccw
VIDEO FILTER	OFF
SCAN MODE	INT
SCAN TRIGGER	AUTO

606B:

FREQUENCY	3 MHz
ATTENUATOR (dBm)	−100
MODULATION SELECTOR	CW
RANGE	4

CHECKS AND ADJUSTMENTS (cont'd)

5-30. Vertical Deflection Amplifier Check (cont'd)

3. Connect a 3 MHz CW signal from the 606B to pin XA4-14.

4. With an input signal at −100 dBm, adjust the front-panel VERTICAL POSITION control. The baseline should move ±2 vertical divisions as the control is moved through its range.

−2 _____ +2 div

5. Re-set the base line to the bottom vertical graticule line. Then increase the signal level to −50 dBm at XA4-14.

6. Switch LOG/LINEAR to LINEAR. Observe the display as the VERTICAL GAIN control is turned through its full range. The trace should move at least two vertical divisions.

2 div _____

7. Switch LOG/LINEAR to LOG. Increase the signal level to 0 dBm and adjust VERTICAL GAIN for an eight division trace deflection.

8. Make the following control settings on the 606B:

606B:

RANGE	4
FREQUENCY	3 MHz (±1 kHz)
MODULATION SELECTOR	INT 1000 Hz
ATTENUATION (dBm)	−110
VERNIER	Set for 0 on dB scale
MODULATION AMPLITUDE	90%

9. Turn the BASE LINE CLIPPER until the signal is blanked. The control arrow should indicate between 8 and 12 o'clock.

10. Increase the signal generator level to −50 dBm. Set the SCAN TRIGGER to VIDEO.

11. The scan should trigger on the video signal. Turn the BASE LINE CLIPPER fully clockwise and check signal clipping.

12. The clipping circuit should function so that two to eight divisions of signal above the base line are blanked when the BASE LINE CLIPPER is fully clockwise.

2 _____ 8 div

13. Regardless of BASE LINE CLIPPER position, the scan should trigger on the video signal.

5-31. Log/Linear Amplifier Check and Adjustment.

REFERENCE:
Schematics 10, 11, 12.

DESCRIPTION: A 3 MHz signal is applied at the input to the LOG REF LEVEL − LINEAR SENSITIVITY attenuator (XA4-14). The log and linear amplifier circuits are calibrated by varying the signal amplitude by known increments.

CHECKS AND ADJUSTMENTS (cont'd)

5-31. Log/Linear Amplifier Check and Adjustment (cont'd)

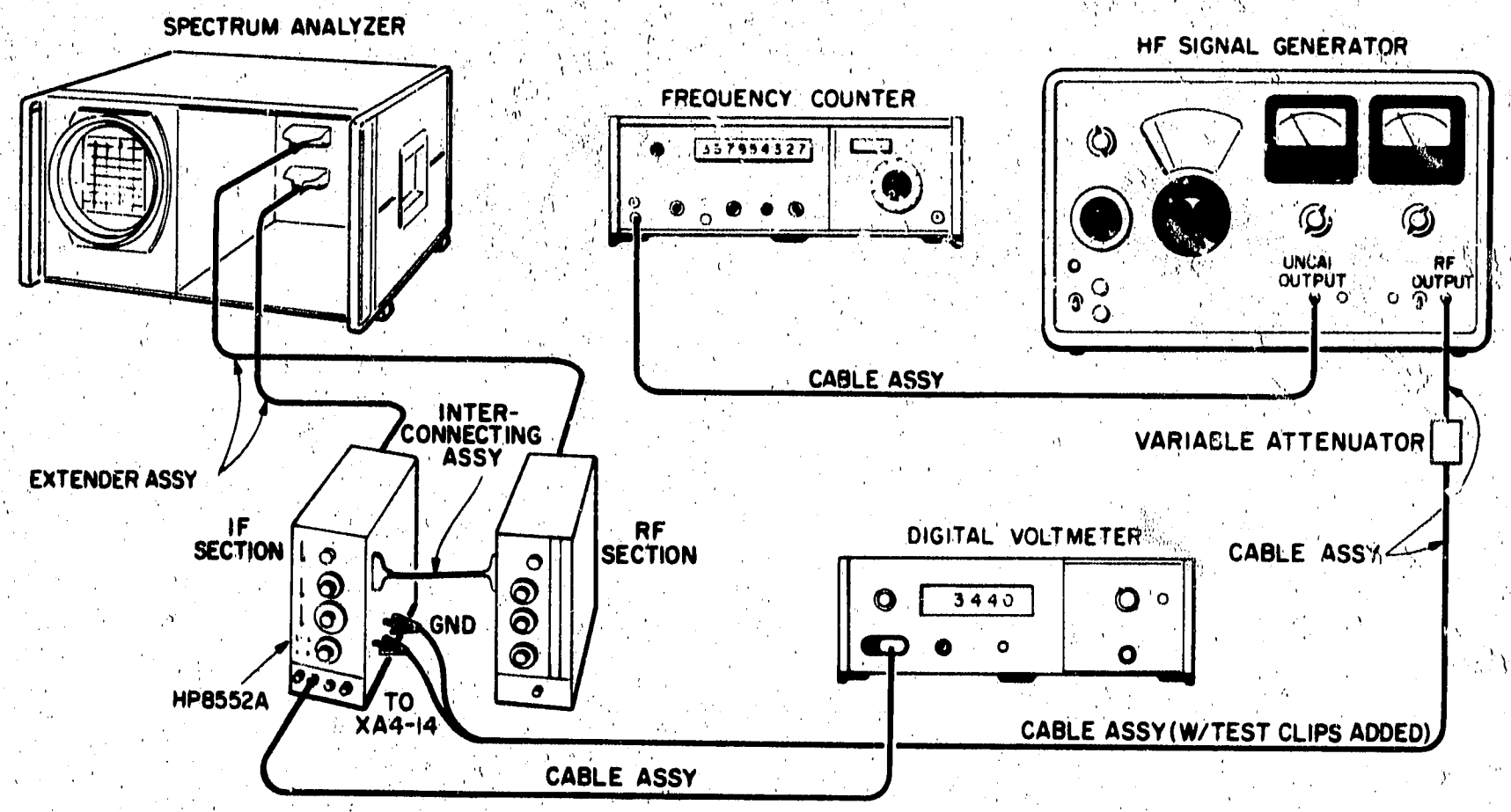


Figure 5-6. Log/Linear Amplifier Check and Adjustment Test Setup

EQUIPMENT:

Signal Generator	HP 606B
Frequency Counter	HP 5245L
Cable Assembly (install test clips on unterminated end)	HP 10501A
Tuning Tool, Slot	Gowanda PC-9668
Straight-through Voltage Probe	HP 10025A
Digital Voltmeter	HP 3440A/3443A
Interconnecting Assembly	HP 11592-60014
Extender Assembly	HP 11592-60015
Cable Assembly	HP 11001A
Attenuator	HP 355C
Cable Assembly (3)	HP 10503A

1. With the analyzer power off, remove A4 Crystal Filter board from the IF Section.

2. Connect the test setup shown in Figure 5-6 and make the following control settings:

ANALYZER:

LOG/LINEAR	LOG
LOG REF LEVEL	−20 dBm
INPUT ATTENUATION	0 dB
SCAN TIME PER DIVISION	2 MILLISECONDS
BASE LINE CLIPPER	Max ccw
VIDEO FILTER	10 kHz
SCAN MODE	INT
SCAN TRIGGER	AUTO

CHECKS AND ADJUSTMENTS (cont'd)

5-31. Log/Linear Amplifier Check and Adjustment (cont'd)

3440A/3443A:

SAMPLE RATE	9 o'clock
RANGE	AUTO

606B:

RANGE	4
FREQUENCY	3 MHz (±1 kHz)
MODULATION SELECTOR	CW
ATTENUATOR - dBm	−110
VERNIER	Set for 0 on meter dB scale

5245L:

SAMPLE RATE	9 o'clock
SENSITIVITY	1 (volts rms)
TIME BASE	1 s
FUNCTION	FREQUENCY

355C:

ATTENUATION	0 dB

3. Turn the analyzer power on and connect a 3 MHz ±1 kHz CW signal from the 606B to pin XA4-14. With an input signal of −110 dBm adjust the VERTICAL POSITION control to set the base line on the bottom graticule line.

4. Increase the signal generator level to −40 dBm and adjust A8L12 for maximum vertical deflection on the trace. Repeat −110 dBm adjustment if necessary.

5. Increase the signal level to +10 dBm. Adjust the VERTICAL GAIN control for eight divisions of vertical deflection.

6. Decrease the signal generator level to −60 dBm and set ATTEN VERNIER for 1.0 division deflection of the vertical display. Retain this ATTEN VERNIER setting through step 14.

7. Increase the signal level 20 dB (do not move ATTEN VERNIER) and set LOG/LINEAR to LINEAR.

8. Adjust A8R52, LINEAR GAIN, for 7.07 divisions of vertical deflection. Measure the dc voltage present at the VERTICAL OUTPUT jack with a digital voltmeter. Record the voltage.

   VERTICAL OUTPUT Voltage: _____

9. Set the HP 355C attenuation to 4 dB and turn LINEAR SENSITIVITY to 20 μV/DIV. Adjust 4 dB ADJ A8R63 to the reference voltage in step 8, ±6 mVdc. Repeat step 8 if necessary.

10. With the analyzer power off, re-install the A4 Crystal Filter board, also remove the A7 Deflection Amplifier Assembly.

11. Set the HF 355C to 0 dB; set the HP 606B Signal Generator 3 MHz level to −110 dBm, and set LOG/LINEAR to LOG (LOG REF LEVEL at −20 dBm).

12. Turn the analyzer on and measure the dc voltage with the HP 3440A/3443A Digital Voltmeter and straight-through voltage probe (HP 10025A) connected to XA8-14. The dc level should measure more negative than −6 mVdc.

    _____ −6 mVdc

CHECKS AND ADJUSTMENTS (cont'd)

5-31. Log/Linear Amplifier Check and Adjustment (cont'd)

13. Increase the signal generator level to +10 dBm. The signal level at XA8-14 should be −800 ±40 mVdc.
−840_____−760 mV

14. Decrease the signal generator level in 10 dB steps (to −60 dBm). For each 10 dB reduction, the dc level at XA8-14 should increase by 100 ±40 mVdc.

Signal Generator Level at XA4-14	DC Level at XA8-14		Signal Generator Level at XA4-14	DC Level at XA8-14	
0 dBm	−740 mVdc	−660	−40 dBm	−340 mVdc	−260
−10 dBm	−640 mVdc	−560	−50 dBm	−240 mVdc	−160
−20 dBm	−540 mVdc	−460	−60 dBm	−140 mVdc	− 60
−30 dBm	−440 mVdc	−360			

15. Turn the analyzer power off and re-install the A7 Deflection Amplifier assembly.

16. Turn the analyzer power on. Check vertical position Step 3. Set the LOG/LINEAR switch to LINEAR. Set the signal generator output to −30 dBm.

17. Adjust the generator output level vernier for a full eight division display on the analyzer.

18. Carefully reduce the signal input to the analyzer at XA4-14 by the amounts shown in the table below using the HP 355C and HP 606B output attenuators. Deflection should be ±0.2 division for the levels indicated.

Input at XA4-14	CRT Display: Deflection in Divisions	
Reference — 30 dBm (approx.)	Reference to	8.0
Add 6 dB attenuation		4.0 ±0.2
Add 12 dB attenuation		2.0 ±0.2
Add 20 dB attenuation		0.8 ±0.2
Add 30 dB attenuation		0.25 ±0.2
Add 70 dB attenuation		0 ±0.2

19. Reinstall the A4 Assembly.

CHECKS AND ADJUSTMENTS (cont'd)

5-32. 3 MHz IF Bandwidth Checks.

REFERENCE: Schematics 5, 6, 7, 8, 9, 10, 11, 12.

DESCRIPTION: Signals are applied to the analyzer and the display is used in LINEAR to measure the bandwidths accurately. A full scale reference is set in ZERO scan and tuned on either side of the center frequency down to the half power points and the bandwidth is then measured using a frequency counter.

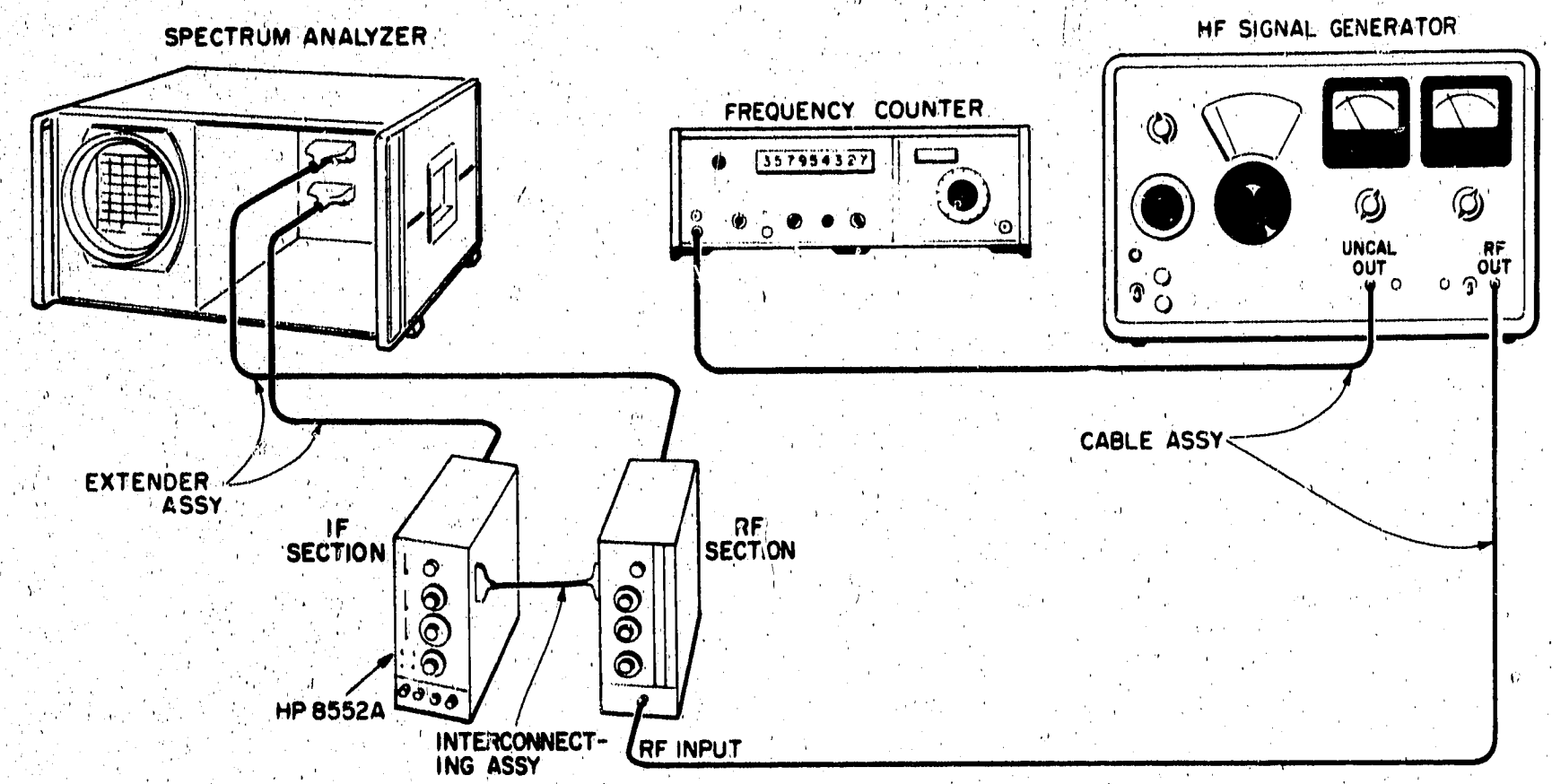


Figure 5-7. 3 MHz IF Bandwidth Checks: 100, 30, 10 kHz Test Setup

EQUIPMENT:

Signal Generator	HP 606B
Oscillator Synchronizer	HP 8708A
Frequency Counter	HP 5245L
Cable Assembly (4)	HP 10503A
Interconnecting Assembly	HP 11592-60014
Extender Assembly	HP 11592A-60015

1. Connect the test setup in Figure 5-7 and make the following control settings:

ANALYZER:

FREQUENCY	11 MHz
TUNING STABILIZER	ON
BANDWIDTH	100 kHz
SCAN WIDTH	PER DIVISION
SCAN WIDTH PER DIVISION	20 kHz
INPUT ATTENUATION	20 dB
BASE LINE CLIPPER	Max ccw
SCAN TIME PER DIVISION	2 MILLISECONDS
LINEAR SENSITIVITY	1 mV/DIV

CHECKS AND ADJUSTMENTS (cont'd)

5-32. 3 MHz IF Bandwidth Checks (cont'd)

ANALYZER control settings (cont'd)

VIDEO FILTER	OFF
LOG/LINEAR	LINEAR
SCAN MODE	INT
SCAN TRIGGER	AUTO

606B:

RANGE	5
FREQUENCY	11 MHz
MODULATION SELECTOR	CW
ATTENUATOR - dBm	−30
VERNIER	Set for 0 on dB meter

8708A: (3 to .05 kHz Test Setup)

FREQUENCY RANGE	5
RF INPUT	Under lit lamp
MODULATION	CW
FREQUENCY TUNING	Centered
AC-DC	AC

5245L:

SAMPLE RATE	9 o'clock
TIME BASE	1 s
FUNCTION	FREQUENCY
SENSITIVITY	0.1 (volts rms)

2. Set the signal generator frequency precisely to 11 MHz, as monitored on the frequency counter.

3. Center the display using the FINE TUNE control. Set SCAN WIDTH PER DIVISION to 20 kHz; switch to ZERO scan.

4. Turn FINE TUNE to peak the display. Adjust LINEAR SENSITIVITY controls for a 7.1 division display.

5. Note the exact reading on the frequency counter. Turn the signal generator frequency control above 11 MHz until the display drops to the half-power point at 5.0 divisions. Measure the frequency:

_____ MHz

6. Turn the signal generator frequency control below 11 MHz until the display again drops to the half-power point at 5.0 divisions. Measure the frequency:

_____ MHz

7. The bandwidth should be 100 kHz ±20 kHz.

80 _____ 120 kHz

8. Measure 30 kHz and 10 kHz bandwidths using the same procedure used in the 100 kHz test. Test limits:

30 kHz Bandwidth: 23 _____ 37 kHz
10 kHz Bandwidth: 9.4 _____ 10.6 kHz

CHECKS AND ADJUSTMENTS (cont'd)

5-32. 3 MHz IF Bandwidth Checks (cont'd)

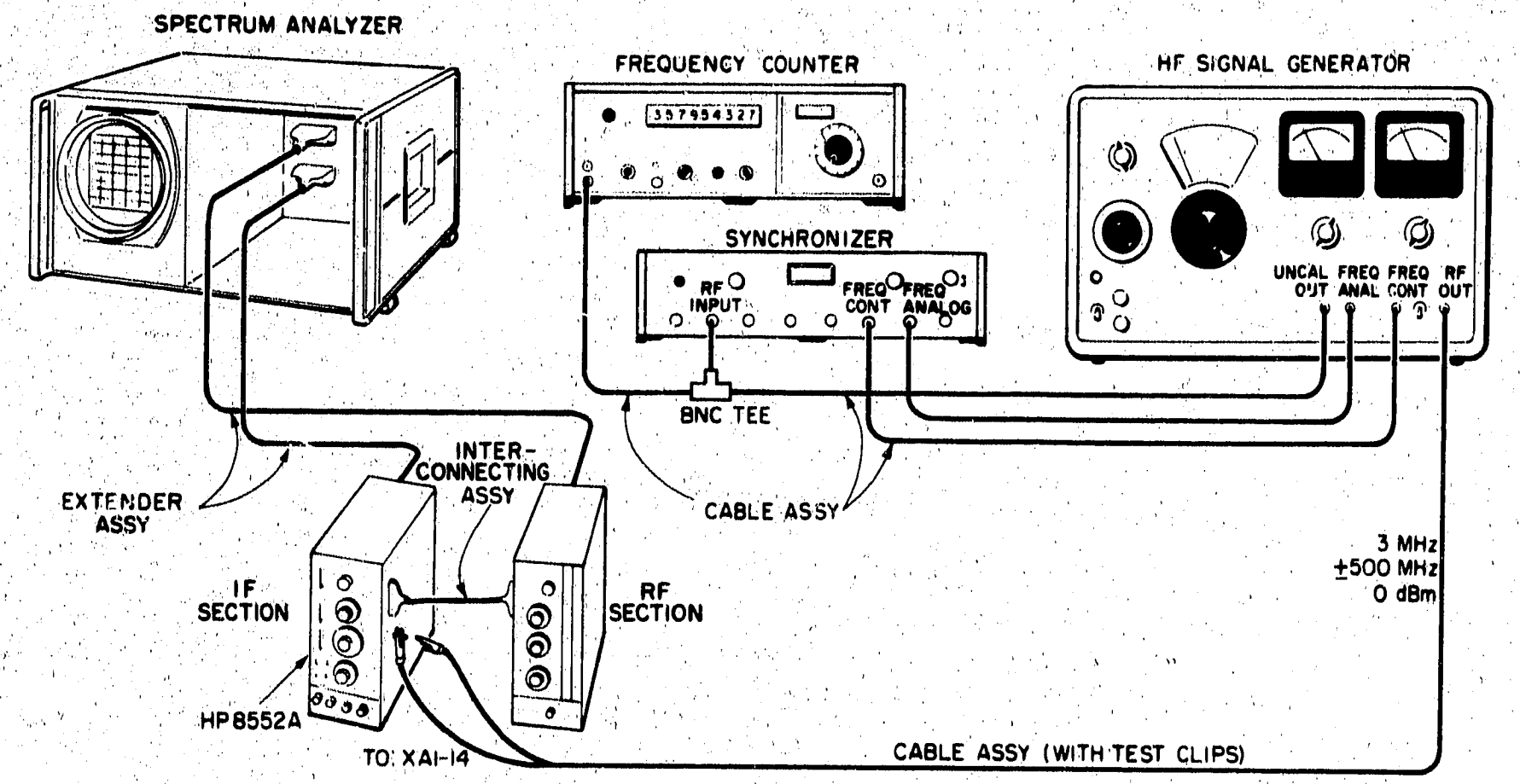


Figure 5-8. 3 MHz IF Bandwidth Checks: 3 to .05 kHz Test Setup

9. Remove 3 MHz Amplifier Assembly A2 and connect test setup as shown in Figure 5-8. Set signal generator frequency to 3 MHz (±500 Hz) at −40 dBm; set LINEAR SENSITIVITY control of spectrum analyzer fully ccw (see step 1, HP 8708A Test Setup).

10. Connect generator output to XA1-14.

11. Set BANDWIDTH control of spectrum analyzer to .05 kHz and set FREQUENCY TUNING control of 8708A to −.05%. Adjust frequency VERNIER of 8708A to peak display.

NOTE

For any bandwidth in this procedure, the VERNIER attenuator of 606B may require slight adjustment to peak the display at 7.1 divisions.

12. Turn frequency VERNIER of 8708A clockwise until display trace drops to 5.0 division line; read and record the HP 5245L frequency. Turn VERNIER counterclockwise until display peaks and then drops to 5.0 division line; read and record this frequency.

.05 kHz Bandwidth: 36____64 Hz

13. Set BANDWIDTH control of spectrum analyzer to 0.1 kHz and repeat step 12.

0.1 kHz Bandwidth: 70_____130 Hz

14. Set BANDWIDTH control of spectrum analyzer to 0.3 kHz and repeat step 12.

0.3 kHz Bandwidth: 210_____390 Hz

15. Set BANDWIDTH control of spectrum analyzer to 1 kHz and repeat step 12. (If trace fails to reach 5.0 division line, set FREQUENCY TUNING of 8708A to −.10% and turn frequency VERNIER clockwise until the 5.0 division is reached.)

1 kHz Bandwidth: 700____1300 Hz

CHECKS AND ADJUSTMENTS (cont'd)

5-32. 3 MHz IF Bandwidth Checks (cont'd)

16. Set BANDWIDTH control of spectrum analyzer to 3 kHz and repeat step 12. (FREQUENCY TUNING and frequency VERNIER controls may require different settings to drop the signal to the 5.0 division line on each side of the peak.)

3 kHz Bandwidth: 2100_____3900 Hz

5-33. LC Filter Adjustment.

REFERENCE:
Schematic 7

DESCRIPTION: The LC Filter circuits are first tuned. Then the gain of the 10 kHz bandwidth is measured. The 10 kHz gain control is set on A1 so that the 300 kHz bandwidth has the same gain as the 10 kHz bandwidth.

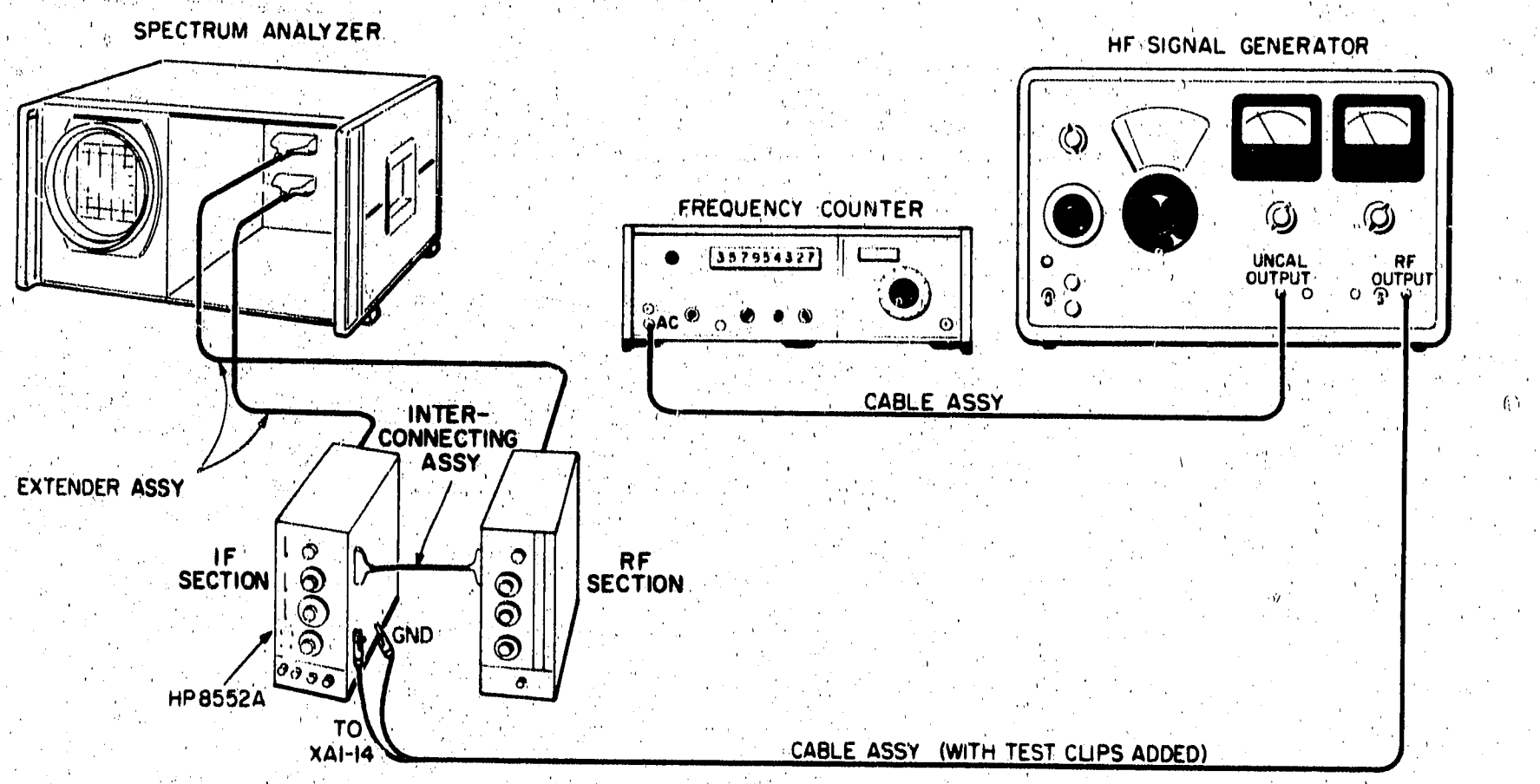


Figure 5-9. LC Filter Adjustment Test Setup.

EQUIPMENT:

Signal Generator	HP 606B
Frequency Counter	HP 5245L
Cable Assembly (1)	HP 10503A
Interconnecting Assembly	HP 11592-60014
Extender Assembly	HP 11592-60015
Cable Assembly (with test clips installed)	HP 10501A

CHECKS AND ADJUSTMENTS (cont'd)

5-33. LC Filter Adjustment (cont'd)

1. Connect the test setup in Figure 5-9 and make the following control settings:

ANALYZER:

INPUT ATTENUATION	10 dB
BANDWIDTH	10 kHz
SCAN WIDTH	PER DIVISION
LOG REF LEVEL	−30 dBm
SCAN MODE	INT
SCAN TRIGGER	AUTO
VIDEO FILTER	OFF
LOG/LINEAR	LOG

606B:

FREQUENCY	3 MHz ±500 Hz
ATTENUATION — dBm	0
RANGE	4
MODULATION SELECTOR	CW
VERNIER	Set for 0 dB on meter

5245L:

SAMPLE RATE	9 o'clock
TIME BASE	0.1 s
FUNCTION	FREQUENCY
SENSITIVITY (volts rms)	0.1

2. Remove the A2 3 MHz Amplifier assembly from the IF Section.

3. Connect the 3 MHz ±500 Hz signal from the signal generator to pin XA1-14. Set the generator level for 0 dBm.

4. Observe the display and adjust the PEAK tuning capacitors A1C4, 10, 16, and 22. Tune the capacitors for maximum trace deflection on the display.

5. Turn the BANDWIDTH control to 300 kHz. Note the signal level; then switch back to 10 kHz BANDWIDTH and adjust A1R35, 10 kHz ADJ, for the same level; ±0.1 division.

−0.1_____+0.1 div

6. If any of the PEAK capacitors are at the end of their range remove the circuit board from the analyzer and install it on the extender.

7. Center the capacitor and tune its corresponding inductor for maximum deflection on the display.

Peak Capacitor	Inductor
A1C4	A1L3
A1C10	A1L4
A1C16	A1L5
A1C22	A1L6

8. Re-install the circuit board without the extender and fine tune the PEAK capacitors.

9. Check the change in signal amplitude on the display as the BANDWIDTH switch is moved to 300 kHz, 100 kHz, 30 kHz and 10 kHz. Deflection in these bandwidths should all be within ±0.4 division of each other.

300 kHz: Reference
100 kHz: −0.4 ____ +0.4 div
30 kHz: −0.4 ____ +0.4 div
10 kHz: −0.4 ____ +0.4 div

10. Reinstall A2 3 MHz Amplifier assembly.

CHECKS AND ADJUSTMENTS (cont'd)

5-34. Crystal Filter Adjustment.

REFERENCE: Schematics 8, 9, 10.

DESCRIPTION: The crystal filter circuits are adjusted by shorting the signal path and bypassing two circuits while adjusting the tuning capacitors for the third. The displayed waveform is adjusted for symmetry and null.

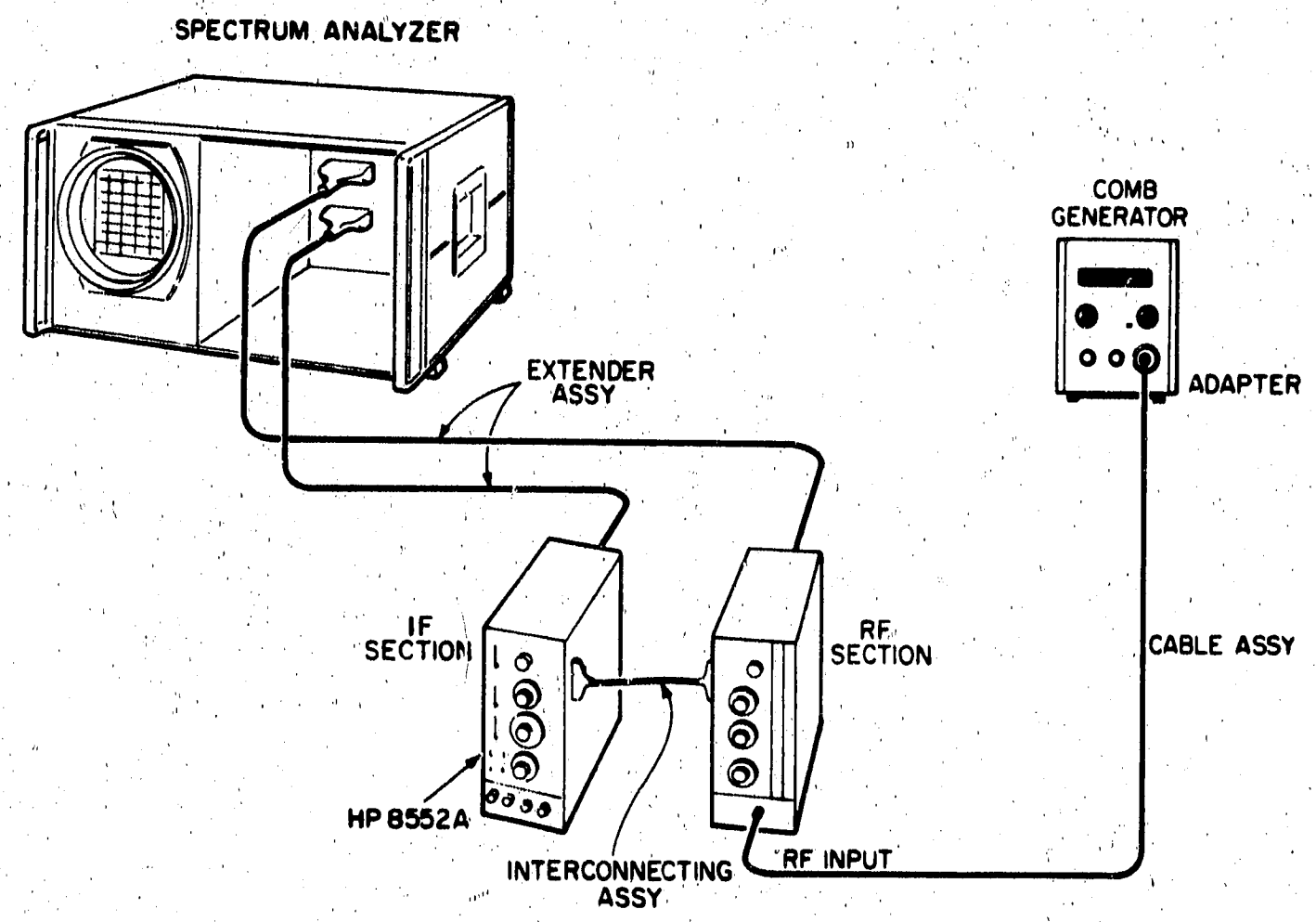


Figure 5-10. Crystal Filter Adjustment Test Setup.

EQUIPMENT:

Comb Generator	HP 8406A
Cable Assembly	HP 10503A
Interconnecting Assembly	HP 11592-60014
Extender Assembly	HP 11592-60015
Clip Lead 6 inches or longer (2)	

1. Connect the test setup in Figure 5-10 and make the following control settings:

ANALYZER:

FREQUENCY	11 MHz
FINE TUNE	Center display
INPUT ATTENUATION	10 dB
TUNING STABILIZER	ON
BANDWIDTH	3 kHz
SCAN WIDTH	PER DIVISION
SCAN WIDTH PER DIVISION	20 kHz
SCAN TIME PER DIVISION	5 MILLISECONDS
LOG REF LEVEL	−30 dBm
LOG/LINEAR	LOG
VIDEO FILTER	OFF

CHECKS AND ADJUSTMENTS (cont'd)

5-34. Crystal Filter Adjustment (cont'd)

ANALYZER control settings (cont'd)

SCAN MODE	INT
SCAN TRIGGER	LINE

8406A:

COMB FREQUENCY	100 MHz
OUTPUT AMPLITUDE	3 o'clock

2. Place the A4 Crystal Filter Assembly on an extender board and install it in the IF Section.

3. Short the relay contacts listed below using clip leads and adjust as indicated:

Short	Adjust for Symmetrical Skirts 30 dB Down	Adjust for Null
A4K1, A4K2	A4C38	A4C45
A4K1, A4K3	A4C23	A4C30
A4K2, A4K3	A4C9	A4C15

4. Install the A4 assembly without an extender.

5. Fine tune A4C15, A4C30, and A4C45 for display null.

6. Set Controls as follows:

SCAN WIDTH PER DIVISION	0.5 kHz
SCAN TIMER PER DIVISION	50 MILLISECONDS

7. Turn BANDWIDTH from 3 to 1, to 0.3 kHz. Peak amplitude should change less than ±0.4 div. Note average peak value.

8. Set Controls as follows:

SCAN WIDTH PER DIVISION	0.2 kHz
BANDWIDTH	0.1 kHz
SCAN TIME PER DIVISION	0.5 SECONDS

9. Adjust A4R85, 0.1 kHz, for average value obtained above.

10. Set Controls as follows:

BANDWIDTH	.05 kHz
SCAN TIME PER DIVISION	0.5 SECONDS

11. Adjust A4R88, .05 kHz, for average value obtained above.

CHECKS AND ADJUSTMENTS (cont'd)

5-35. 300 kHz Bandpass Filter Adjustment.

REFERENCE: Schematic 5.

DESCRIPTION: The 300 kHz bandpass filter is adjusted at the input to the A1 LC Filter assembly for symmetry and center frequency. Then the 300 kHz bandwidth is checked to see that it has the same gain as the 10 kHz bandwidth.

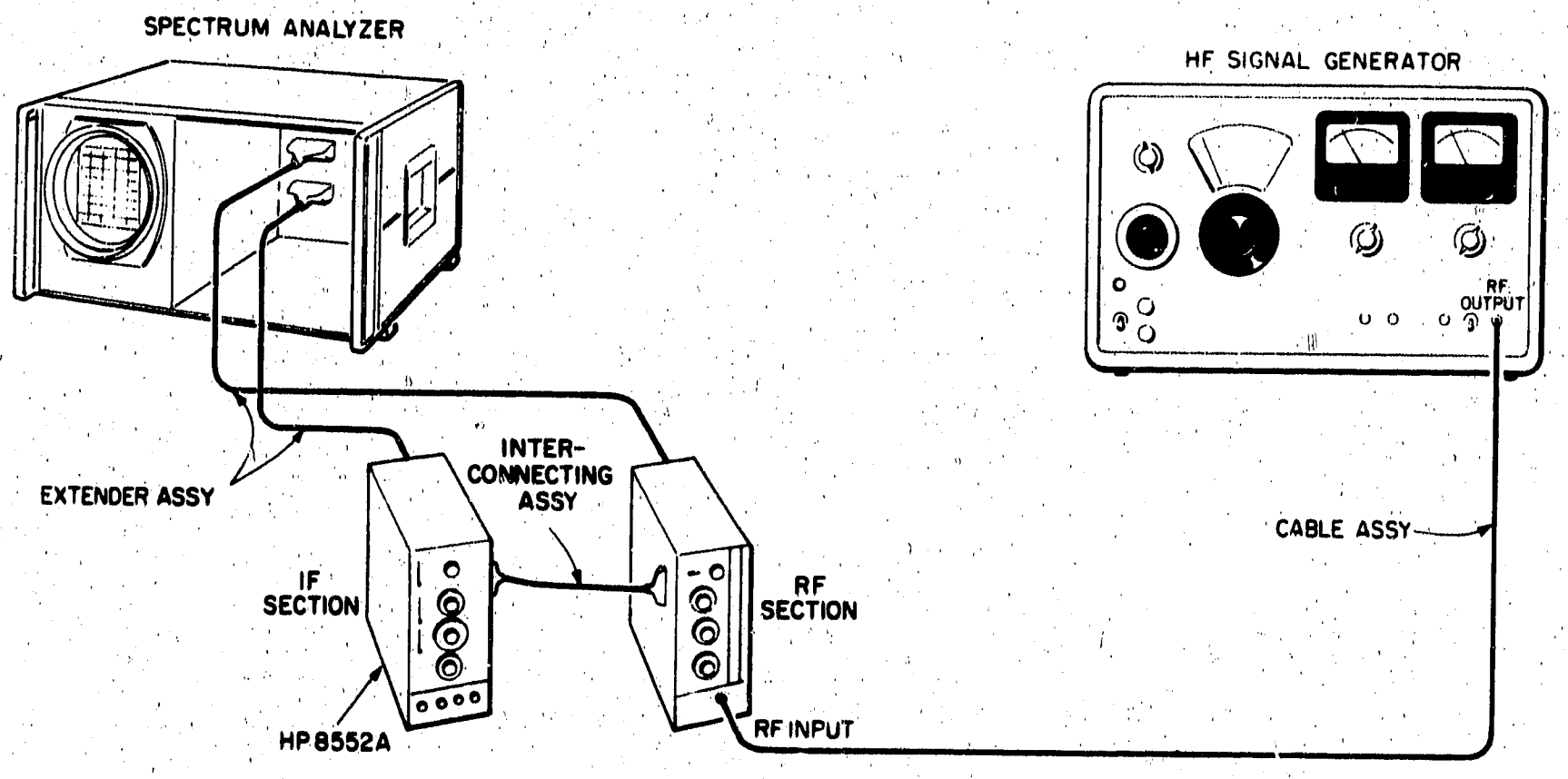


Figure 5-11. 300 kHz Bandpass Adjustment Test Setup

EQUIPMENT:

Signal Generator	HP 606B
Cable Assembly	HP 10503A
Interconnecting Assembly	HP 11592-60014
Extender Assembly	HP 11592-60015
Tuning Tool	HP 8710-0095

1. Connect the test setup shown in Figure 5-11 and make the following control settings:

ANALYZER:

INPUT ATTENUATION	20 dB
BANDWIDTH	300 kHz
SCAN WIDTH	PER DIVISION
SCAN WIDTH PER DIVISION	50 kHz
FREQUENCY	11 MHz
FINE TUNE	Centered
SCAN TIME PER DIVISION	5 MILLISECONDS
VIDEO FILTER	10 kHz

CHECKS AND ADJUSTMENTS (cont'd)

5-35. 300 kHz Bandpass Filter Adjustment (cont'd)

ANALYZER control settings (cont'd)

SCAN MODE	INT
SCAN TRIGGER	LINE
LOG/LINEAR	LINEAR
LINEAR SENSITIVITY	1 mV/DIV
BASE LINE CLIPPER	Max ccw

606B:

FREQUENCY	11 MHz
ATTENUATOR - dBm	−30
RANGE	5
MODULATION SELECTOR	CW
VERNIER	Set for 0 dB on meter

2. Connect the signal generator output to the RF INPUT. Place the A2 3 MHz Amplifier assembly on an extender and install it in the analyzer. Center the display with the FREQUENCY control.

3. Adjust A2L7, A2L9 and A2R1 IMP for a smooth, symmetrical waveshape centered on the analyzer display.

4. Set SCAN TIME PER DIVISION to 20 MILLISECONDS and BANDWIDTH to 3 kHz. The display should remain centered. Return these controls to 5 MILLISECONDS and 300 kHz, respectively.

5. Install the circuit board without the extender. Readjust A2R1 IMP if necessary.

6. Adjust LINEAR SENSITIVITY for 7.1 divisions of display.

7. With a full 7.1 division display, observe the bandpass skirts at 5.0 divisions (half-power points). The bandwidth should be 300 kHz, +50, −70 kHz.

230 _____ 350 kHz

8. If necessary, repeat adjustment procedure.

9. Switch BANDWIDTH to 10 kHz. The peak amplitude should remain the same ±0.4 division. If not, perform the LC Filter Adjustment, Paragraph 5-33.

5-36. 3 MHz IF Gain Adjustment.

REFERENCE: Schematics 5, 6, 7, 8, 9, 10.

DESCRIPTION: The amplifier gain controls are adjusted for various positions of the LOG REF LEVEL attenuator and then the remaining positions of the LINEAR SENSITIVITY dial are checked. The VERTICAL OUTPUT circuit adjustment is set for output voltage with full-scale display deflection.

CHECKS AND ADJUSTMENTS (cont'd)

5-36. 3 MHz IF Gain Adjustment (cont'd)

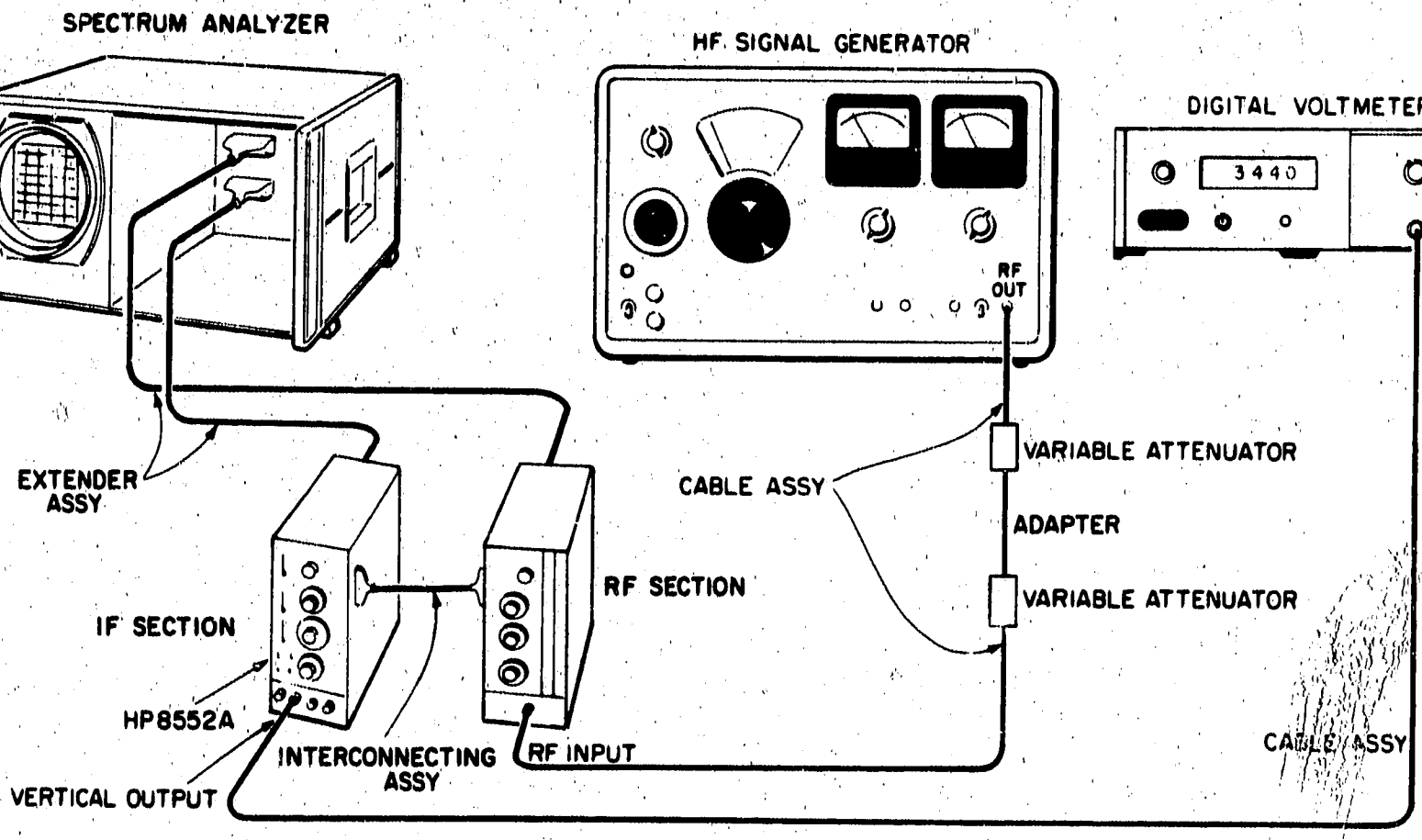


Figure 5-12. 3 MHz IF Gain Adjustments Test Setup

EQUIPMENT:

Signal Generator	HP 606B
Digital Voltmeter	HP 3440A/3443A
Attenuator	HP 355C
Adapter	HP 1258-0216
Interconnecting Assembly	HP 11592-60014
Extender Assembly	HP 11592-60015
Attenuator	355D
Cable Assembly (3)	HP 10503A

1. Connect the test setup shown in Figure 5-12 and make the following control settings:

ANALYZER:

FREQUENCY	11 MHz
TUNING STABILIZER	On
BANDWIDTH	100 kHz
SCAN WIDTH	ZERO
INPUT ATTENUATION	0 dB
SCAN TIME PER DIVISION	2 MILLISECONDS
LINEAR SENSITIVITY	1 mV/DIV
LOG/LINEAR	LINEAR
BASE LINE CLIPPER	Max ccw
SCAN MODE	INT
SCAN TRIGGER	AUTO
VIDEO FILTER	OFF

CHECKS AND ADJUSTMENTS (cont'd)

5-36. 3 MHz IF Gain Adjustment (cont'd)

606B:

FREQUENCY	11 MHz
ATTENUATOR (dBm)	−20
RANGE	5
MODULATION SELECTOR	CW
VERNIER	Set for 0 dB on meter

3440A/3443A:

SAMPLE RATE	9 o'clock
RANGE	AUTO

355C and 355D:

ATTENUATION	0 dB

2. Adjust FREQUENCY control for maximum trace deflection.

3. Adjust signal generator output so that VERTICAL OUTPUT voltage is −1.000 ±0.005 Vdc.

4. Increase test attenuators by 12 dB.

5. Turn LOG REF LEVEL vernier to −12 dB.

6. Adjust A2R44 for −1.000 ±0.005 Vdc.

7. Decrease test attenuators by 12 dB.

8. Turn LOG REF LEVEL vernier to 0 dB.

9. Adjust A2R51 for −1.000 ±0.005 Vdc.

10. Repeat adjustments in steps 4 through 9 to minimize interaction between controls.

11. Set test attenuator to 6 dB.

12. Turn LOG REF LEVEL vernier to −6. Note error from 1.000 Vdc and adjust HP 606B output for −1.000 Vdc minus error.

13. Set test attenuator to 12 dB and repeat steps 5 through 10.

14. Measure the LOG REF LEVEL vernier accuracy at each dB mark by the substitution method employed in steps 4 through 9. The VERTICAL OUTPUT voltage at each step should be −1.000 ±0.04 Vdc.

CHECKS AND ADJUSTMENTS (cont'd)

5-36. 3 MHz IF Gain Adjustment (cont'd)

−1 dB	−0.96 _____	−1.04 Vdc	−7 dB	−0.96 _____	−1.04 Vdc
−2 dB	−0.96 _____	−1.04 Vdc	−8 dB	−0.96 _____	−1.04 Vdc
−3 dB	−0.96 _____	−1.04 Vdc	−9 dB	−0.96 _____	−1.04 Vdc
−4 dB	−0.96 _____	−1.04 Vdc	−10 dB	−0.96 _____	−1.04 Vdc
−5 dB	−0.96 _____	−1.04 Vdc	−11 dB	−0.96 _____	−1.04 Vdc
−6 dB	−0.96 _____	−1.04 Vdc	−12 dB	−0.96 _____	−1.04 Vdc

15. Change the control settings as follows:

ANALYZER:
- INPUT ATTENUATION . . . . . 10 dB
- LOG REF LEVEL Controls . . . . . 0 dBm
- LOG/LINEAR . . . . . LOG

606B:
- ATTENUATOR (dBm) 0

355D and 355C:
- ATTENUATION: . . . . . 0 dB

16. Tune FREQUENCY control for maximum trace deflection.

17. Note reference voltage at VERTICAL OUTPUT.

Reference Voltage: _____

18. Adjust 3 MHz IF Gain positions as follows:

Test Attenuator	LOG REF LEVEL	Adjust	Error Limit: ±2 mVdc (from Reference Voltage)
10 dB	−10 dBm	A4R55	−2 _____ +2
20 dB	−20 dBm	A4R30	−2 _____ +2
30 dB	−30 dBm	A2R21	−2 _____ +2
40 dB	−40 dBm	A2R24	−2 _____ +2
50 dB	−50 dBm	A2R27	−2 _____ +2

19. Check the remaining attenuator steps as follows:

a. Connect a shorting strap between the green and blue wires on the LOG REF LEVEL switch A10S1-2R.

b. Set LOG/LINEAR control to LINEAR and test attenuators to 43 dB.

c. Set LINEAR SENSITIVITY to 0.1 mV/DIV with INPUT ATTENUATION at 10 dB.

d. Measure the voltage at the VERTICAL OUTPUT jack.

Reference Voltage: _____

CHECKS AND ADJUSTMENTS (cont'd)

5-36. 3 MHz IF Gain Adjustment (cont'd)

e. Check the remaining LINEAR SENSITIVITY positions according to the table below.

f. Remove the shorting strap installed in step a above.

Test Attenuator	LINEAR SENSITIVITY	Error Limit: ±15 mVdc
43 dB	0.1 mV/DIV	−15 _____ +15
33 dB	0.2 mV/DIV	−15 _____ +15
23 dB	1.0 mV/DIV	−15 _____ +15
13 dB	2.0 mV/DIV	−15 _____ +15
3 dB	10.0 mV/DIV	−15 _____ +15

5-37. 47 MHz Local Oscillator Check and Adjustment.

REFERENCE: Schematics 3, 4.

DESCRIPTION: The 47 MHz local oscillator tuning voltages are removed by disconnecting the extender cable between the two analyzer sections. The low-end limit of the oscillator is adjusted. Then, dc voltage is applied to the tuning circuits and the upper-end limit adjusted. Points between the upper and lower limits are checked to verify frequency linearity with linear tuning voltage applied.

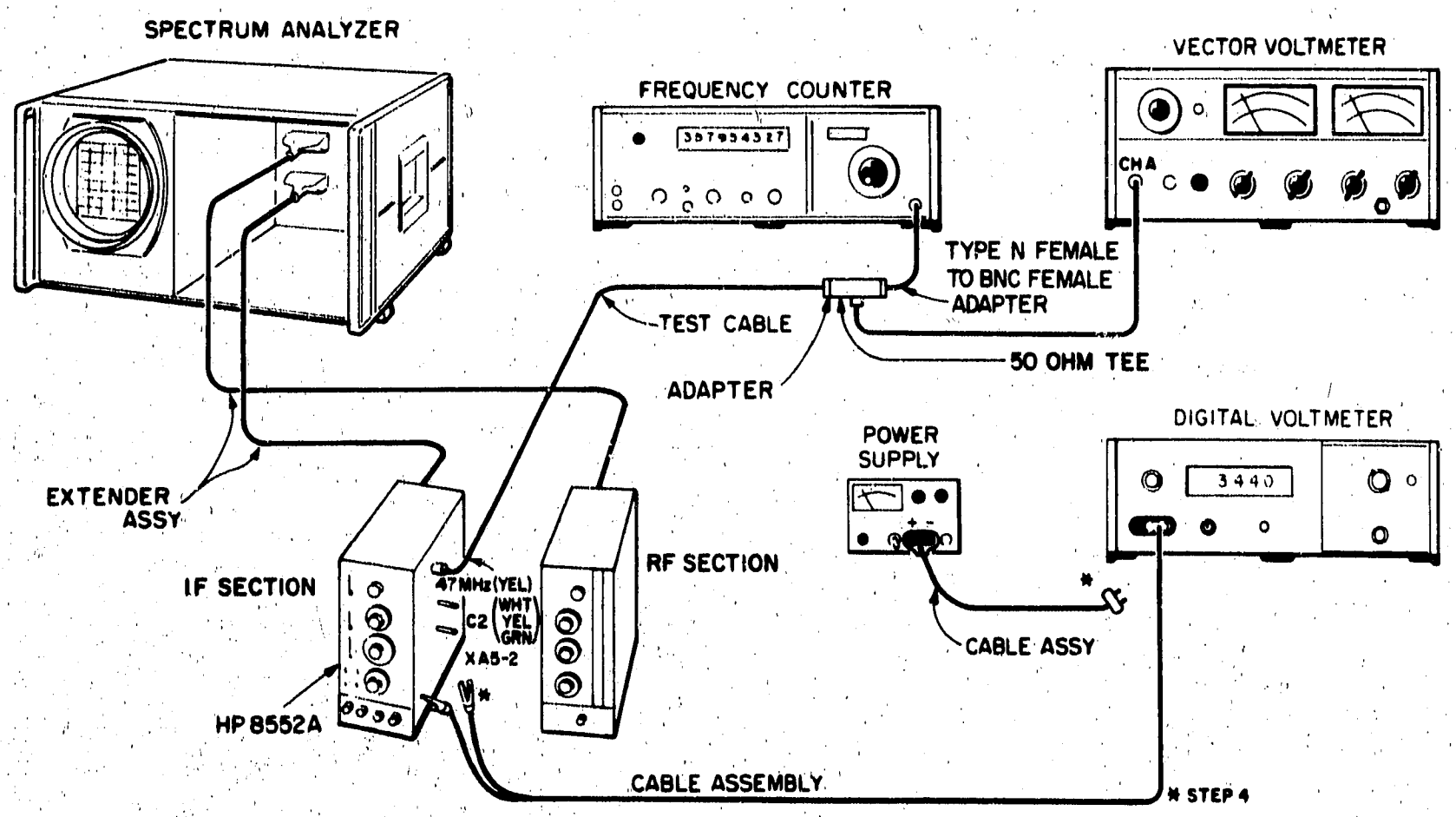


Figure 5-13. 47 MHz Local Oscillator Check and Adjustment Test Setup

CHECKS AND ADJUSTMENTS (cont'd)

5-37. 47 MHz Local Oscillator Check and Adjustment (cont'd)

EQUIPMENT:

Vector Voltmeter	HP 8405A
Power Supply	HP 6217A
Digital Voltmeter	HP 3440A/3443A
Frequency Counter	HP 5245L
Extender Assembly	HP 11592-60015
Test Cable	HP 11592-60001
Cable Assembly	HP 11002A
Cable Assembly	HP 11000A
50-Ohm Tee	HP 11536A
Adapter (2)	UG-201A/U
Type N Female to BNC Female Adapter	FXR 21850

1. Make the following control settings:

3440A/3443A:

RANGE	100V
SAMPLE RATE	9 o'clock
INPUT	Remove ground strap

8405A:

FREQUENCY RANGE - MHz	40—60
PROBE	CH A
RANGE	300 mV

5245L/5252A:

SENSITIVITY (volts rms)	0.1
TIME BASE	0.1 s
FUNCTION	FREQUENCY
SAMPLE RATE	9 o'clock

6217A:

VOLTAGE	0 Vdc
METER SELECTION	VOLTS

2. Refer to Figure 5-13 and note no interconnection between the IF Section and the RF Section. This eliminates inputs to the 47 MHz local oscillator tuning amplifier. Connect a clip lead between XA5-5 and chassis ground. Connect the DVM to C2 and measure the voltage. The level should be 0 ±200 mVdc.

—200 _____ +200 mVdc

3. Connect the counter and vector voltmeter to the 47 MHz (yellow) jack, J7. Measure the 47 MHz LO frequency and amplitude. If necessary, adjust A3A2C4 for a LO frequency of 46,700 ±5 kHz. Amplitude should be 145 mVrms ±45 mV.

46,695 _____ 46,705 kHz
100 _____ 190 mV rms

4. Turn analyzer off. Connect power supply in parallel with the DVM to XA5-2.

5. Turn the analyzer on, and adjust the power supply voltage for —30 ±0.2 Vdc. Monitor the supply voltage with the digital voltmeter.

CHECKS AND ADJUSTMENTS (cont'd)

5-37. 47 MHz Local Oscillator Check and Adjustment (cont'd)

6. Check the 47 MHz LO frequency. With −30 Vdc applied to XA5-2, oscillator frequency should be 47,300 ±5 kHz. If necessary, adjust TUNING RANGE control A5R42.

47,295 _____ 47,305 kHz

Amplitude of the LO output at J7 (yellow) should be 145 mVrms ±45 mV.

100 _____ 190 mVrms

NOTE

The 47 MHz local oscillator adjustments interact. Repeat A3A2C4 and A5R42 adjustments until both frequency limits are within ±5 kHz.

7. Reduce the power supply voltage to 0 Vdc. Using the table below, increase the voltage in −5 volt increments and check the 47 MHz local oscillator frequencies:

Adjustment	Voltage at XA5-2	47 MHz LO Frequency
A3A2C4 47 MHz ADJ	0 ±0.2 Vdc	46,700 ± 5 kHz _____
	− 5 ±0.2 Vdc	46,800 ±10 kHz _____
	−10 ±0.2 Vdc	46,900 ±10 kHz _____
	−15 ±0.2 Vdc	47,000 ±10 kHz _____
	−20 ±0.2 Vdc	47,100 ±10 kHz _____
	−25 ±0.2 Vdc	47,200 ±10 kHz _____
A5R42 TUNING RANGE	−30 ±0.2 Vdc	47,300 ± 5 kHz _____

8. Turn the analyzer off, remove ground lead from XA5-5 and remove test equipment connections from the analyzer.

5-38. 50 MHz IF Bandpass Check and Adjustment.

REFERENCE: Schematic 3.

DESCRIPTION: The 50 MHz IF bandpass is checked by manually sweeping the 47 MHz Local Oscillator over a 200 kHz range and viewing the analyzer display for flatness. For adjustment, the 50 MHz IF is swept using a flat external source. The output is detected, filtered and displayed on an oscilloscope. The bandpass filter is adjusted for frequency, amplitude, width and flatness.

CHECKS AND ADJUSTMENTS (cont'd)

5-38. 50 MHz IF Bandpass Check and Adjustment (cont'd)

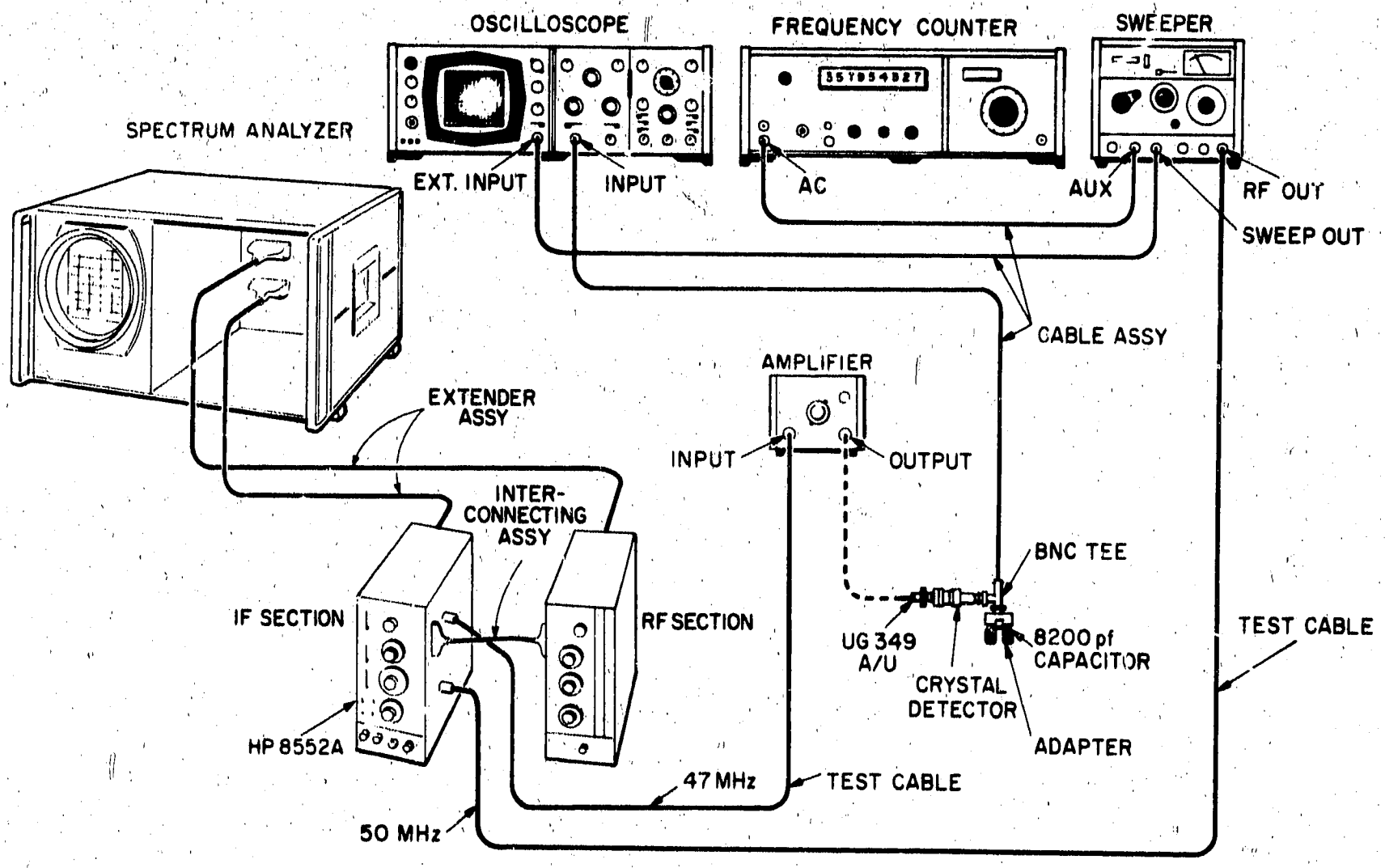


Figure 5-14. 50 MHz IF Bandpsss Adjustment Test Setup

EQUIPMENT:

Generator/Sweeper	HP 8601A
Oscilloscope with 1801A/1821A Plug-ins	HP 180A
Frequency Counter	HP 5245L
Amplifier	HP 461A
Crystal Detector	HP 423A
Cable Assembly	HP 10501A
Cable Assembly (3)	HP 10503A
Test Cable	HP 11592-60001
Extender Assembly	HP 11592-60015
Interconnecting Assembly	HP 11592-60014
Adapter	HP 10110A
Adapter	UG-201A/U
BNC Tee	UG-274B/U
Adapter	UG-349A/U
Capacitor	8200 PF (approx.)

1. Connect the test setup as shown in Figure 5-14. Make the following control settings:

ANALYZER:
3 MHz Amplifier Assembly A2 removed.

8601A:

FREQUENCY	50 MHz
RANGE	110
SWEEP	SYM
OUTPUT LEVEL	−10 dBm
SWEEP MODE	LINE-FAST
1 kHz MODE	OFF

CHECKS AND ADJUSTMENTS (cont'd)

5-38. 50 MHz IF Bandpass Check and Adjustment (cont'd)

461A:
GAIN (dB) 20

180A/1801A:
MAGNIFIER X5
POSITION . . . . . (see Figure 3-15)
VOLTS/DIV (Channel A) 05
POLARITY . . . . . UP
INPUT . . . . . DC
DISPLAY . . . . . A

5245L:
SAMPLE RATE . . . . . 9 o'clock
SENSITIVITY (volts rms) 0.1
TIME BASE . . . . . 10 ms
FUNCTION . . . . . FREQUENCY

2. Adjust Generator/Sweeper and oscilloscope to display a 10 MHz swept signal centered on 50 MHz. (See Figure 5-15A).

3. If the bandpass is not flat at least 0.3 MHz on either side of 50 MHz, adjust A3C5, 6, 9 and 10 for maximum amplitude and flatness.

4. Select 3 MHz sweep width on the HP 8601A and observe oscilloscope display for a bandpass as shown in Figure 5-15B. Repeat Step 3 as required to obtain desired bandpass.

5. Remove power from display section and install 3 MHz Amplifier Assembly A2.

6. Remove cable assembly from Generator/Sweeper.

7. Perform 44 MHz Rejection Check, Paragraph 5-39. If capacitors A3C11, 14 or 19 are adjusted, repeat steps 1 through 4 above.

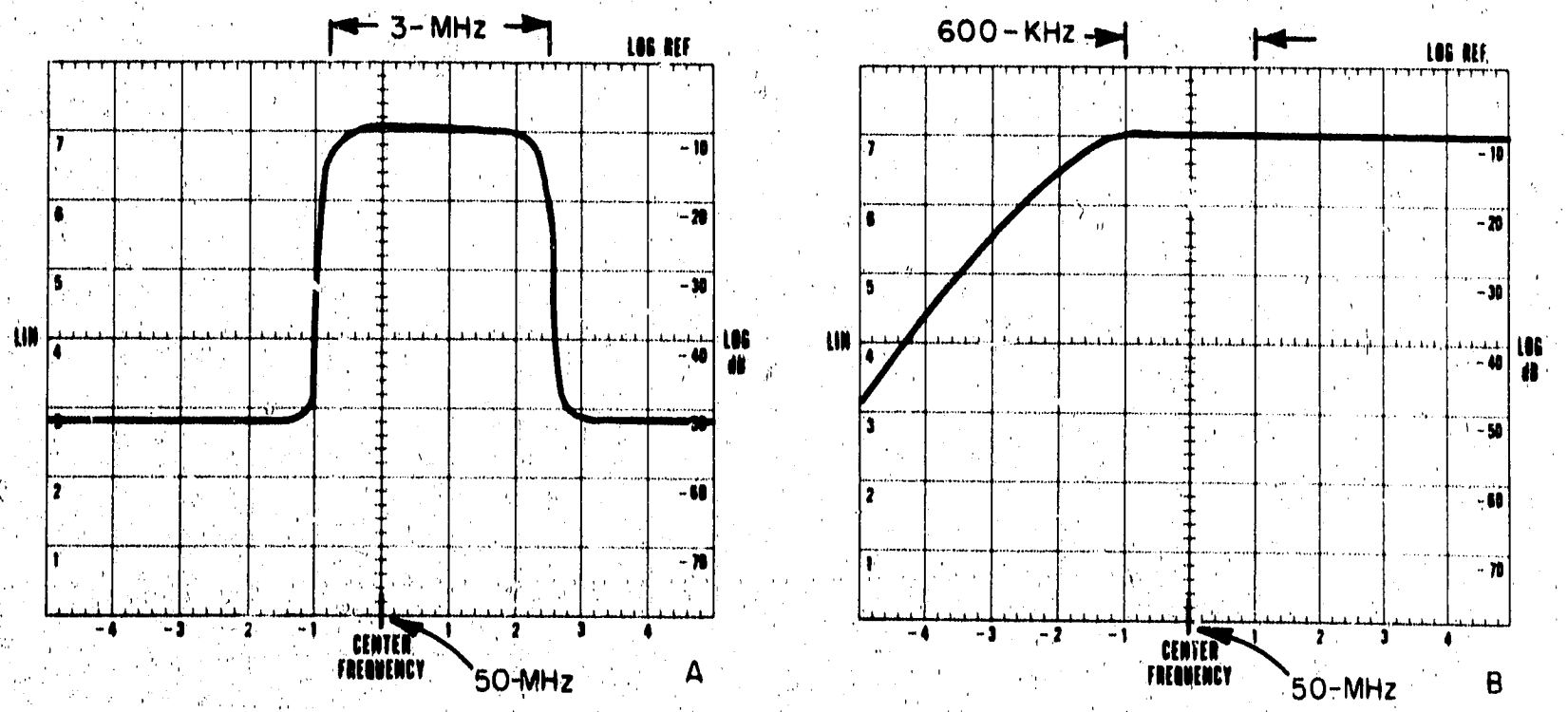


Figure 5-15. 50 MHz Bandpass Display for 10 MHz and 3 MHz Sweeps

CHECKS AND ADJUSTMENTS (cont'd)

5-38. 50 MHz IF Bandpass Check and Adjustment (cont'd)

8. Connect a test cable from CAL OUTPUT to RF INPUT and make the following control settings:

ANALYZER:

FREQUENCY	30 MHz
FINE TUNE	Full cw
INPUT ATTENUATION	0 dB
TUNING STABILIZER	OFF
BANDWIDTH	10 kHz
SCAN WIDTH	PER DIVISION
SCAN WIDTH PER DIVISION	100 kHz
BASE LINE CLIPPER	Max ccw
SCAN TIME PER DIVISION	.2 MILLISECONDS
LINEAR SENSITIVITY	Set for full scale display
VIDEO FILTER	OFF
SCAN MODE	INT
SCAN TRIGGER	LINE
LOG/LINEAR	LINEAR

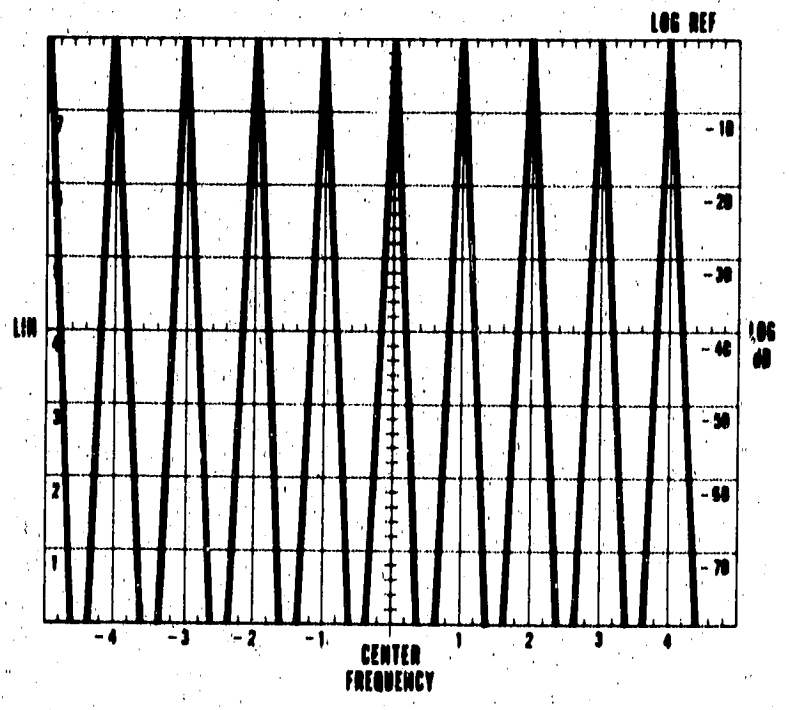


Figure 5-16. 50 MHz Bandpass Flatness Display

9. Tune FREQUENCY for display indicated in Figure 5-16 when FINE TUNE is rotated in 100 kHz steps.

10. Reduce LINEAR SENSITIVITY Vernier to a seven division vertical deflection. Rotate FINE TUNE through its range while observing display for flatness. Display should be flat ±0.2 division across the 1.0 MHz FINE TUNE range.

−0.2 _____ +0.2 div

5-39. 44 MHz Rejection Adjustment.

REFERENCE: Schematic 3.

DESCRIPTION: A 50 MHz reference is established, then 44 MHz is fed into the 47 MHz converter and nulled 70 dB below the reference level. The 50 MHz IF Bandpass Check and Adjustment must be repeated after the 44 MHz rejection controls are adjusted.

CHECKS AND ADJUSTMENTS (cont'd)

5-39. 44 MHz Rejection Adjustment (cont'd)

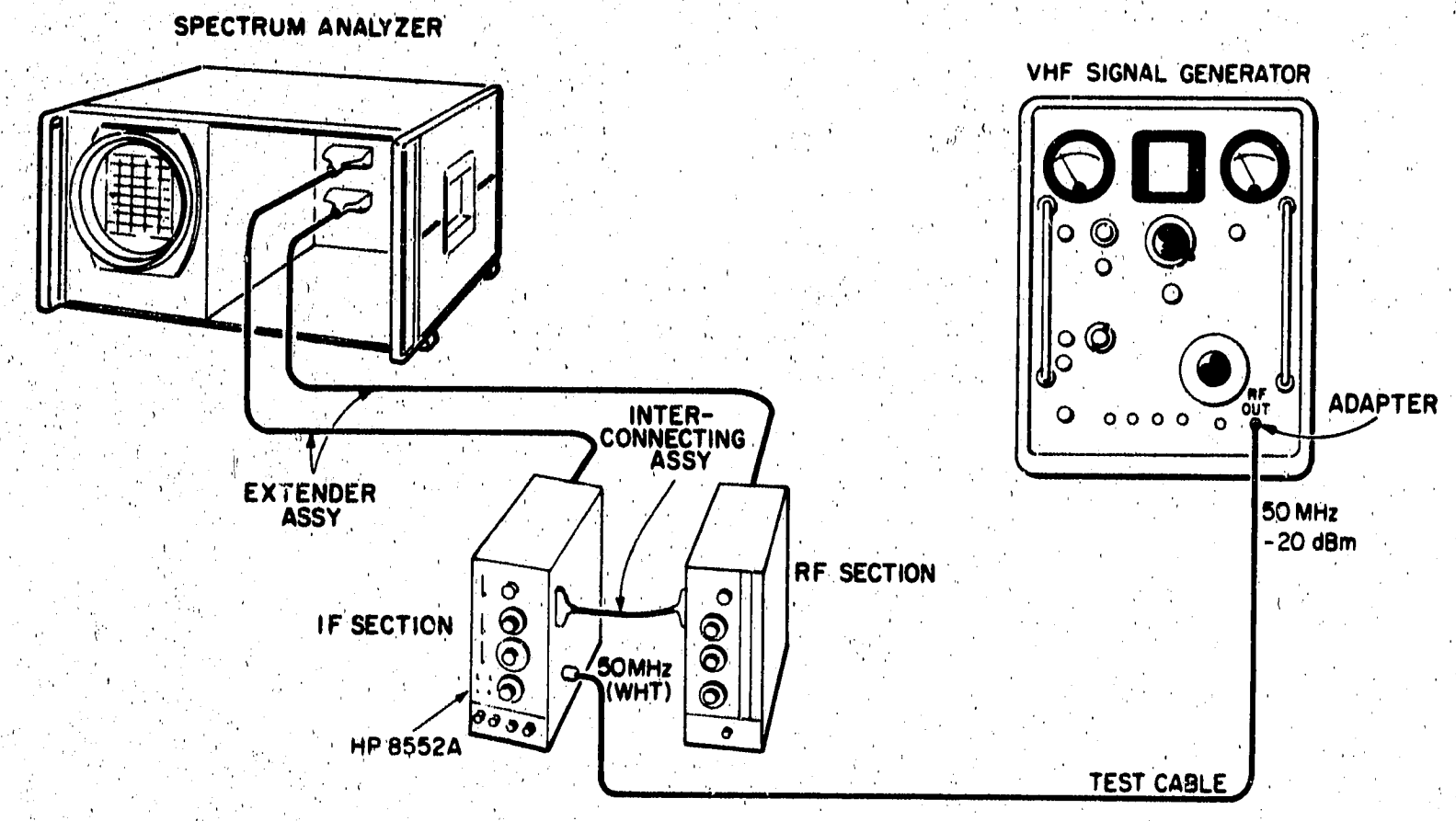


Figure 5-17. 44 MHz Rejection Adjustment Test Setup

EQUIPMENT:

Signal Generator	HP 608F
Test Cable	HP 11592-60001
Interconnecting Assembly	HP 11592-60014
Extender Assembly	HP 11592-60015
Adapter	UG-201A/U

1. Connect the test setup shown in Figure 5-17 and make the following control settings:

ANALYZER:

INPUT ATTENUATION	0 dB
FINE TUNE	Centered
TUNING STABILIZER	OFF
BANDWIDTH	10 kHz
SCAN WIDTH	PER DIVISION
SCAN WIDTH PER DIVISION	20 kHz
BASE LINE CLIPPER	Max ccw
SCAN TIME PER DIVISION	2 MILLISECONDS
LOG REF LEVEL controls	See text
VIDEO FILTER	OFF
SCAN MODE	INT
SCAN TRIGGER	LINE
LOG/LINEAR	LOG

608F:

MODULATION	CW
ATTENUATION	−20 dBm
MEGACYCLES	50

CHECKS AND ADJUSTMENTS (cont'd)

5-39. 44 MHz Rejection Adjustment (cont'd)

608F: (cont'd)

AMPL TRIMMER . . . . . Press & peak meter reading
FREQUENCY RANGE C

2. Adjust LOG REF LEVEL controls for a full-scale signal display. Use the signal generator frequency control to center the display.

3. Establish a reference by observing the position of the LOG REF LEVEL control with reference to the lit indicator light.

4. Tune the signal generator to 44 MHz and peak the AMPL TRIMMER. Use the LOG REF LEVEL control to once more get an on-screen display, but without disturbing the vernier. If necessary, use the signal generator frequency control to center the display.

5. Increase the signal level on the display while keeping track of the number of LOG REF LEVEL 10-dB steps. Use LOG REF LEVEL vernier for the final small adjustment.

6. Add up total attenuation. The level of the 44 MHz signal in step 5 should be at least 70 dB below the level in step 2.

44 MHz Rejection: 70 dB _____

7. If the rejection is not at least 70 dB, adjust the 44 MHz capacitors A3C11, 14, and 19 on the A3 50 MHz Converter assembly for minimum 44 MHz signal indication on the analyzer display.

8. When the 44 MHz rejection adjustment is completed, repeat the check and adjustment procedure in the 50 MHz IF Bandpass Check and Adjustment, Paragraph 5-38.

CHECKS AND ADJUSTMENTS (cont'd)

5-40. 30 MHz Calibration Oscillator Check and Adjustment.

REFERENCE: Schematic 15.

DESCRIPTION: The CAL OUTPUT at the front panel is measured and adjusted for 30 MHz at −30 dBm. The amplitude is measured with a HP 8405A Vector Voltmeter, while the frequency is compared against a comb generator with highly accurate output frequency signals.

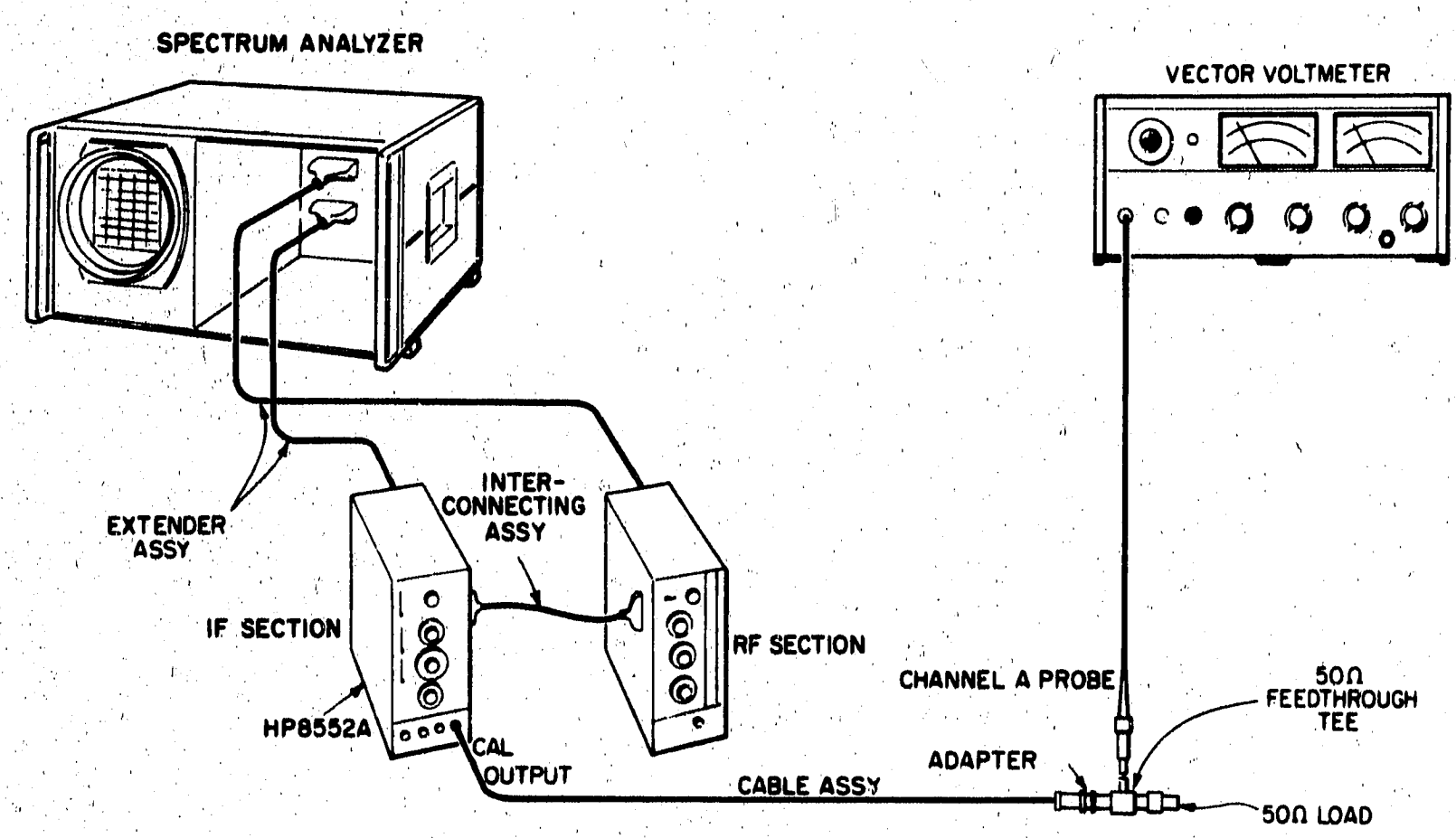


Figure 5-18. 30 MHz Calibration Amplitude Adjustment Setup

EQUIPMENT:

Vector Voltmeter	HP 8405A
Comb Generator	HP 8406A
Cable Assembly (2)	HP 10503A
Extender Assembly	HP 11592-60015
Interconnecting Assembly	HP 11592-60014
50-Ohm Load	HP 908A
50-Ohm Tee	HP 11536A
Adapter	UG-201A/U
BNC Tee	UG-274B/U

1. Connect the equipment shown in Figure 5-18 and make the following control settings:

   8405A:

FREQUENCY RANGE - MHz	20—40
CHANNEL	A
AMPLITUDE RANGE - dB	−30

2. Read amplitude directly on the HP 8405A Vector Voltmeter. It should be between −29.7 dBm and −30.3 dBm (6.83 mV to 7.32 mV).

   −29.7 _____ −30.3 dBm

3. If amplitude is out of tolerance, adjust A6R54 CAL LEVEL.

CHECKS AND ADJUSTMENTS (cont'd)

5-40. 30 MHz Calibration Oscillator Check and Adjustment (cont'd)

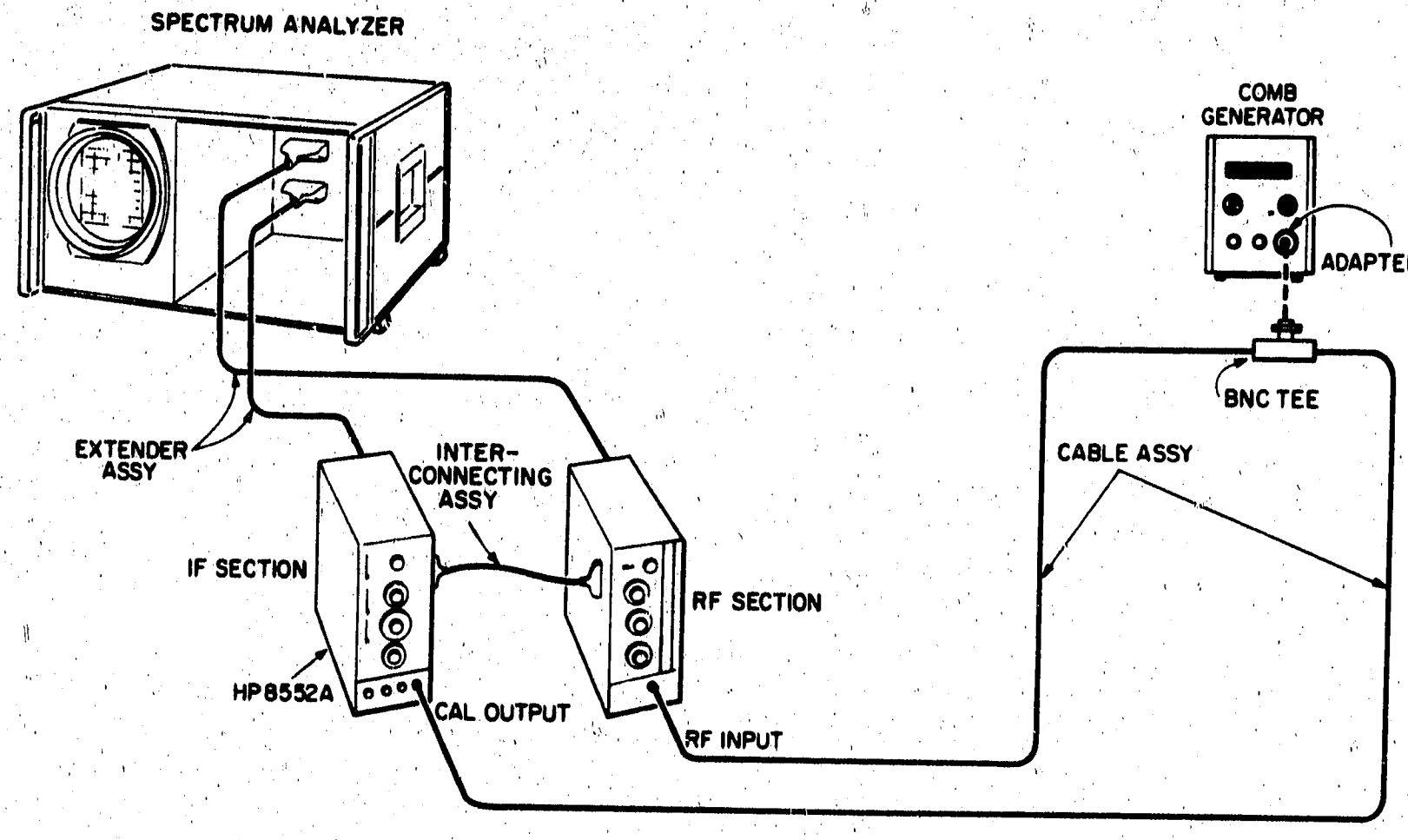


Figure 5-19. 30 MHz Calibration Frequency Adjustment Test Setup

4. Connect the equipment shown in Figure 5-19 and make the following control settings:

ANALYZER:

FREQUENCY	30 MHz
BANDWIDTH	10 kHz
SCAN WIDTH	PER DIVISION
SCAN WIDTH PER DIVISION	100 kHz
INPUT ATTENUATION	10 dB
SCAN TIME PER DIVISION	10 MILLISECONDS
LOG REF LEVEL	-30 dBm
LOG/LINEAR	LOG
VIDEO FILTER	OFF
SCAN MODE	INT
SCAN TRIGGER	AUTO

8406A:

COMB FREQUENCY - MC	10
INTERPOLATION AMPLITUDE - 1 Mc	OFF
OUTPUT AMPLITUDE - cw	3 o'clock

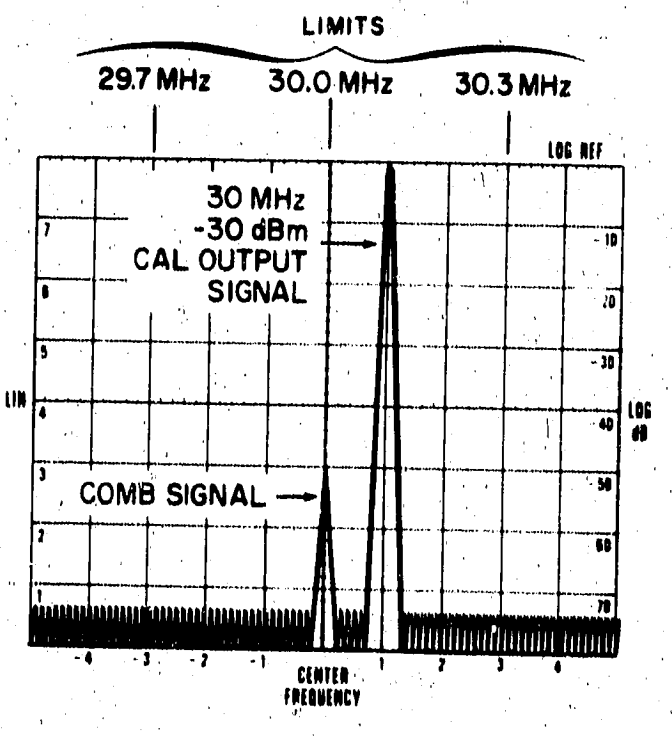


Figure 5-20. Calibrator Frequency Measurement

5. Adjust FREQUENCY to center comb generator 30 MHz comb signal on the display.

6. Connect CAL OUTPUT to BNC Tee and display calibrator signal simultaneously with comb signal. The calibrator signal should be between 29.7 MHz and 30.3 MHz (between −3 and +3 on display). See Figure 5-20.

29.7 _____ 30.3 MHz

7. If frequency is out of tolerance, adjust A6C15, CAL FREQ.

CHECKS AND ADJUSTMENTS (cont'd)

5-41. Analogic Test and Adjustment.

REFERENCE: Schematic 15.

DESCRIPTION: The A5R75 THRESH control is adjusted so that under the conditions specified in this test, the DISPLAY UNCAL light comes on. Check the remaining positions of the switches in the table to verify operation of the DISPLAY UNCAL switch matrix.

1. Install the analyzer plug-ins on the two extender cable assemblies, and make the following control settings:

ANALYZER:

VIDEO FILTER . . . . . OFF
SCAN TIME PER DIVISION . . . . . 1 MILLISECOND
SCAN WIDTH . . . . . PER DIVISION
SCAN WIDTH PER DIVISION . . . . . 1 MHz
BANDWIDTH . . . . . 30 kHz

2. With the controls set as in step 1 above, the DISPLAY UNCAL light should be on. If not, adjust A5R75 THRESH control until the light just comes on.

3. Use Table 5-2 below to complete adjusting the THRESH control:

Table 5 2. Analogic Threshold Adjustment

SCAN TIME PER DIVISION	BANDWIDTH	SCAN WIDTH PER DIVISION	DISPLAY UNCAL Light
1 ms	30 kHz	1 MHz	On
2 ms	30 kHz	1 MHz	Off
10 s	1 kHz	10 MHz	On
10 s	1 kHz	5 MHz	Off

4. Check operation of DISPLAY UNCAL light using Table 5-3. When the table indicates the DISPLAY UNCAL light to be "off", it is acceptable for light to be "on" if the light subsequently goes "off" when either the SCAN TIME PER DIVISION or the SCAN WIDTH PER DIVISION control is switched one position counterclockwise.

CHECKS AND ADJUSTMENTS (cont'd)

5-41. Analogic Test and Adjustment (cont'd)

Table 5-3. Display Calibration Conditions

SCAN TIME PER DIVISION	BANDWIDTH	SCAN WIDTH PER DIVISION	DISPLAY UNCAL Light
1 ms	300 kHz	10 MHz	Off
1 ms	100 kHz	10 MHz	On
1 ms	100 kHz	5 MHz	Off
1 ms	30 kHz	5 MHz	On
5 ms	30 kHz	2 MHz	Off
5 ms	10 kHz	2 MHz	On
20 ms	10 kHz	1 MHz	Off
20 ms	3 kHz	1 MHz	On
0.1 s	3 kHz	0.5 MHz	Off
0.1 s	1 kHz	0.5 MHz	On
0.5 s	1 kHz	0.2 MHz	Off
0.5 s	0.3 kHz	0.2 MHz	On
2 s	0.3 kHz	0.1 MHz	Off
2 s	0.1 kHz	0.1 MHz	On
10 s	0.1 kHz	.05 MHz	Off
10 s	.05 kHz	.05 MHz	On
5 s	0.1 kHz	20 kHz	Off
2 s	0.1 kHz	20 kHz	On
2 s	0.1 kHz	10 kHz	Off
1 s	0.1 kHz	10 kHz	On
1 s	0.1 kHz	5 kHz	Off
0.5 s	0.1 kHz	5 kHz	On
0.5 s	0.1 kHz	2 kHz	Off
0.2 s	0.1 kHz	2 kHz	On
0.2 s	0.1 kHz	1 kHz	Off
0.1 s	0.1 kHz	1 kHz	On
0.1 s	0.1 kHz	0.5 kHz	Off
50 ms	0.1 kHz	0.5 kHz	On
50 ms	0.1 kHz	0.2 kHz	Off
20 ms	0.1 kHz	0.2 kHz	On

Table 5-4. CHECK AND ADJUSTMENT TEST RECORD

Hewlett-Packard Model 8552
Spectrum Analyzer IF Section

Test Performed by _____
Date _____

Serial No. ___ - _____

Para. No.	Test Description	Measurement Unit	Min	Actual	Max
5-27	**Power Supply Checks and Adjustments**				
	103.5 —126.5 Line Voltage:				
	+20 Vdc supply	Vdc	+19.90	_____	+20.10
	Ripple	mV rms		_____	0.5
	—10 Vdc supply	Vdc	— 9.99	_____	—10.01
	Ripple	mV p-k		_____	0.02
5-28	**Horizontal Scan Checks and Adjustments**				
	SCAN IN/OUT voltage:				
	Rise Time	ms	50	_____	58
	SCAN TRIGGER . . . . . EXT	Vdc	—4.98	_____	—5.02
	Scan Amplitude	Vdc	+4.9	_____	+5.1
5-29.	**Final Scan Checks**				
	Scan Linearity Graticule:				
	—5	divisions	—0.1	_____	+0.1
	—4	divisions	—0.1	_____	+0.1
	—3	divisions	—0.1	_____	+0.1
	—2	divisions	—0.1	_____	+0.1
	—1	divisions	—0.1	_____	+0.1
	0	divisions	—0.1	_____	+0.1
	+1	divisions	—0.1	_____	+0.1
	+2	divisions	—0.1	_____	+0.1
	+3	divisions	—0.1	_____	+0.1
	+4	divisions	—0.1	_____	+0.1
	SCAN TRIGGER . . . . . EXT	V p-p	2	_____	20
	EXT SCAN MODE: voltage required for trace	V p-p	8	_____	
5-30.	**Vertical Deflection Amplifier Checks**				
	VERTICAL position check	divisions	—2	_____	+2
	VERTICAL GAIN control check: Full CW to Full CCW	divisions	2	_____	
	Base Line Clipper Check: full CW	divisions	2	_____	8

Table 5-4. Check and Adjustment Test Record (cont'd)

Para. No.	Test Description	Measurement Unit	Min	Actual	Max
5-31	**Log-Linear Amplifier Checks & Adjustments**				
	VERTICAL OUTPUT voltage: 7.07 div deflection	Vdc		_____	
	Input Level at XA4-14 / Output at XA8-14				
	−100 dBm <6 mVdc	mVdc		_____	−6
	+ 10 dBm 800 ±40	mVdc	−840	_____	−760
	0 dBm 700 ±40	mVdc	−740	_____	−660
	− 10 dBm 600 ±40	mVdc	−640	_____	−560
	− 20 dBm 500 ±40	mVdc	−540	_____	−460
	− 30 dBm 400 ±40	mVdc	−440	_____	−360
	− 40 dBm 300 ±40	mVdc	−340	_____	−260
	− 50 dBm 200 ±40	mVdc	−240	_____	−160
	− 60 dBm 100 ±40	mVdc	−140	_____	− 60
5-32	**3 MHz IF Bandwidth Checks**				
	100 kHz Bandwidth	kHz	80	_____	120
	30 kHz Bandwidth	kHz	23	_____	37
	10 kHz Bandwidth	kHz	9.4	_____	10.6
	3 kHz Bandwidth	Hz	2100	_____	3900
	1 kHz Bandwidth	Hz	700	_____	1300
	0.3 kHz Bandwidth	Hz	210	_____	390
	0.1 kHz Bandwidth	Hz	70	_____	130
	.05 kHz Bandwidth	Hz	36	_____	64
5-33	**LC Filter Adjustment**				
	300 kHz Bandwidth Reference; 10 kHz Bandwidth Gain: ±0.1 div	divisions	−0.1	_____	+0.1
	Gain Check:				
	300 kHz Reference				
	100 kHz ±0.4 div	divisions	−0.4	_____	+0.4
	30 kHz ±0.4 div	divisions	−0.4	_____	+0.4
	10 kHz ±0.4 div	divisions	−0.4	_____	+0.4
5-34	**Crystal Filter Adjustment**				
	Average gain value	divisions		_____	
5-35	**300-kHz Bandpass Filter Adjustment**				
	Bandwidth at 5.0 divisions	kHz	230	_____	350

Table 5-4. Check and Adjustment Test Record (cont'd)

Para. No.	Test Description	Measurement Unit	Min	Actual	Max
5-36	**3 MHz If Gain Log Adjustments**				
	LOG REF LEVEL vernier: − 1	Vdc	−0.96	_____	+1.04
	− 2	Vdc	−0:96	_____	+1.04
	− 4	Vdc	−0.96	_____	+1.04
	− 5	Vdc	−0.96	_____	+1.04
	− 6	Vdc	−0.96	_____	+1.04
	− 7	Vdc	−0.96	_____	+1.04
	− 8	Vdc	−0.96	_____	+1.04
	− 7	Vdc	−0.96	_____	+1.04
	− 8	Vdc	−0.96	_____	+1.04
	− 9	Vdc	−0.96	_____	+1.04
	−10	Vdc	−0.96	_____	+1.04
	−11	Vdc	−0.96	_____	+1.04
	−12	Vdc	−0.96	_____	+1.04
	VERTICAL OUTPUT voltage: 7.07 div deflection	Vdc		_____	
	Test Atten. / LOG REF LEVEL / Error Limit				
	10 dB / −10 dBm / ±2 mVdc	mVdc	−2	_____	+2
	20 dB / −20 dBm / ±2 mVdc	mVdc	−2	_____	+2
	30 dB / −30 dBm / ±2 mVdc	mVdc	−2	_____	+2
	40 dB / −40 dBm / ±2 mVdc	mVdc	−2	_____	+2
	50 dB / −50 dBm / ±2 mVdc	mVdc	−2	_____	+2
	VERTICAL OUTPUT reference voltage:	mVdc			
	Test Atten. / LINEAR SENSITIVITY / Error Limit				
	43 dB / 0.1 mV/DIV / ±15 mVdc	mVdc	−15	_____	+15
	33 dB / 0.2 mV/DIV / ±15 mVdc	mVdc	−15	_____	+15
	23 dB / 1 mV/DIV / ±15 mVdc	mVdc	−15	_____	+15
	13 dB / 2 mV/DIV / ±15 mVdc	mVdc	−15	_____	+15
	3 dB / 10 mV/DIV / ±15 mVdc	mVdc	−15	_____	+15
5-37	**47 MHz Local Oscillator Check & Adjustment**				
	No Input:				
	Input level at C2: 0 ±200 mVdc	mVdc	−200	_____	+200
	Third LO frequency: 46,700 ±5 kHz	kHz	46,695	_____	46,705
	Third LO amplitude: 145 ±45 mVrms	mVrms	100	_____	190
	−30 Vdc Input:				
	Third LO frequency: 47,300 ±5 kHz	kHz	47,295	_____	46,705
	Third LO amplitude: 145 ±45 mVrms	mVrms	100	_____	190

Table 5-4. Check and Adjustment Test Record (cont'd)

Para. No.	Test Description	Measurement Unit	Min	Actual	Max
5-37	**47 MHz Local Oscillator Check & Adjustment**				
	Oscillator Frequency Checks:				
	Voltage at XA5-2 — Third LO				
	0 ±0.2 Vdc 46,7000 ±5 kHz	kHz	46,695	_____	46,705
	−5 ±0.2 Vdc 46,800 ±10 kHz	kHz	46,790	_____	46,810
	−10 ±0.2 Vdc 46,900 ±10 kHz	kHz	46,890	_____	46,910
	−15 ±0.2 Vdc 47,000 ±10 kHz	kHz	46,990	_____	47,010
	−20 ±0.2 Vdc 47,100 ±10 kHz	kHz	47,090	_____	47,110
	−25 ±0.2 Vdc 47,200 ±10 kHz	kHz	47,190	_____	47,210
	−30 ±0.2 Vdc 47,300 ±5 kHz	kHz	47,295	_____	47,305
5-38	**50 MHz IF Bandpass Check & Adjustment**				
	Flatness: ±0.2 vertical divisions over 2 horizontal divisions	divisions	−0.2	_____	+0.2
5-39	**44 MHz Rejection Adjustment**				
	44 MHz Rejection >70 dB	dB	70	_____	
5-40	**30 MHz Calibration Oscillator Check and Adjustment**				
	30 MHz amplitude: −30 ±0.3 dBm Adjust A6R54	dBm	−29.7	_____	−30.3
	30 MHz frequency: 30 ±0.2 MHz Adjust A6C15	MHz	29.7	_____	30.2
5-41	**Analogic Check and Adjustment**				
	SCAN TIME / SCAN WIDTH / BAND-WIDTH / DISPLAY UNCAL				
	1 ms / 1 MHz / 30 kHz / ON	(√)		_____	
	2 ms / 1 MHz / 30 kHz / OFF	(√)		_____	
	10 s / 10 MHz / 1 kHz / ON	(√)		_____	
	10 s / 5 MHz / 1 kHz / OFF	(√)		_____	

PARTS LIST

SECTION VI
REPLACEABLE PARTS

6-1. INTRODUCTION.

6-2. This section contains information relative to ordering replacement parts and assemblies. Table 6-1 lists correct stock numbers for use when ordering printed circuit board assemblies on an exchange basis. Table 6-2 lists reference designations and abbreviations used in the preparation of manuals by Hewlett-Packard. Tables 6-3 and 6-4 list component descriptions, part numbers and other required ordering information. Table 6-5 lists code number identification of manufacturers.

6-3. ORDERING INFORMATION

6-4. To obtain replacement parts, address order or inquiry to your local Hewlett-Packard sales and service office (see list at rear of this manual). Identify parts by HP Part Number.

6-5. To obtain a part not listed, include instrument model number, serial number, description of part and function and location of part.

Table 6-1. Part Numbers for Assy Exchange Orders

Assembly 8552A:	Stock No.	Exch. Board Stock No.
A1 LC Filter	08552- 6005	08552-6054
A2 3 MHz Amplifier	6046	6053
A3 50 MHz Converter	6003	6052
A4 Crystal Filter	6045	6055
A5 Power Supply	6002	6051
A6 Scan Generator	6047	6050
A7 Deflection Amplifier	6008	6057
A8 Log Amplifier	6007	6056

Table 6-2. Reference Designations and Abbreviations

REFERENCE DESIGNATORS

A	= assembly	F	= fuse	P	= plug	V	= vacuum tube, neon bulb, photocell, etc.
B	= motor	FL	= Filter	Q	= transistor		
BT	= battery	J	= jack	R	= resistor		
C	= capacitor	K	= relay	RT	= thermistor	VR	= voltage regulator
CP	= coupler	L	= inductor	S	= switch		
CR	= diode	LS	= loud speaker	T	= transformer	W	= cable
DL	= delay line	M	= meter	TB	= terminal board	X	= socket
DS	= device signaling (lamp)	MK	= microphone	TP	= test point	Y	= crystal
E	= misc electronic part	MP	= mechanical part	U	= integrated circuit	Z	= tuned cavity, network

ABBREVIATIONS

A	= amperes	H	= henries	N/O	= normally open	RMO	= rack mount only
AFC	= automatic frequency control	HDW	= hardware	NOM	= nominal	RMS	= root-mean square
		HEX	= hexagonal	NPO	= negative positive zero (zero temperature coefficient)	RWV	= reverse working voltage
AMPL	= amplifier	HG	= mercury				
		HR	= hour(s)			S-B	= slow-blow
BFO	= beat frequency oscillator	Hz	= Hertz			SCR	= screw
				NPN	= negative-positive-negative	SE	= selenium
BE CU	= beryllium copper	IF	= intermediate freq			SECT	= section(s)
BH	= binder head	IMPG	= impregnated	NRFR	= not recommended for field replacement	SEMICON	= semiconductor
BP	= bandpass	INCD	= incandescent			SI	= silicon
BRS	= brass	INCL	= include(s)			SIL	= silver
BWO	= backward wave oscillator	INS	= insulation(ed)	NSR	= not separately replaceable	SL	= slide
		INT	= internal			SPG	= spring
						SPL	= special
CCW	= counterclockwise	K	= kilo = 1000	OBD	= order by description	SST	= Stainless steel
CER	= ceramic					SR	= split ring
CMO	= cabinet mount only			OH	= oval head	STL	= steel
COEF	= coefficient	LH	= left hand	OX	= oxide		
COM	= common	LIN	= linear taper				
COMP	= composition	LK WASH	= lock washer	P	= peak	TA	= tantalum
COMPL	= complete	LOG	= logarithmic taper	PC	= printed circuit	TD	= time delay
CONN	= connector	LPF	= low pass filter	PF	= picofarads = 10^{-12} farads	TGL	= toggle
CP	= cadmium plate					THD	= thread
CRT	= cathode-ray tube			PH BRZ	= phosphor bronze	TI	= titanium
CW	= clockwise	M	= milli = 10^{-3}	PHL	= Phillips	TOL	= tolerance
		MEG	= meg = 10^{6}	PIV	= peak inverse voltage	TRIM	= trimmer
DEPC	= deposited carbon	MET FLM	= metal film			TWT	= traveling wave tube
DR	= drive	MET OX	= metallic oxide	PNP	= positive-negative-positive		
		MFR	= manufacturer				
ELECT	= electrolytic	MHz	= mega Hertz	P/O	= part of		
ENCAP	= encapsulated	MINAT	= miniature	POLY	= polystrene	μ	= micro = 10^{-6}
EXT	= external	MOM	= momentary	PORC	= porcelain		
		MOS	= metalized substrate	POS	= position(s)	VAR	= variable
F	= farads			POT	= potentiometer	VDCW	= dc working volts
FH	= flat head	MTG	= mounting	PP	= peak-to-peak		
FIL H	= Fillister head	MY	= "mylar"	PT	= point		
FXD	= fixed			PWV	= peak working voltage	W/	= with
		N	= nano (10^{-9})			W	= watts
G	= giga (10^{9})	N/C	= normally closed	RECT	= rectifier	WIV	= working inverse voltage
GE	= germanium	NE	= neon	RF	= radio frequency		
GL	= glass	NI PL	= nickel plate	RH	= round head or right hand	WW	= wirewound
GRD	= ground(ed)					W/O	= without

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A1	08552-6005	BOARD ASSY:LC FILTER	
A1C1	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C2	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C3	0160-3024	C:FXD MICA 1700 PF 1% 100VDCW	
A1C4	0121-0105	C:VAR CER 9-35 PF NPO 1ST FILTER PEAK	
A1C5	0160-3132	C:FXD CER 200 PF 10% 500VDCW	
A1C6	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C7	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C8	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C9	0160-3024	C:FXD MICA 1700 PF 1% 100VDCW	
A1C10	0121-0105	C:VAR CER 9-35 PF NPO 2ND FILTER PEAK	
A1C11	0160-3132	C:FXD CER 200 PF 10% 500VDCW	
A1C12	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C13	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C14	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C15	0160-3024	C:FXD MICA 1700 PF 1% 100VDCW	
A1C16	0121-0105	C:VAR CER 9-35 PF NPO 3RD FILTER PEAK	
A1C17	0160-3132	C:FXD CER 200 PF 10% 500VDCW	
A1C18	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C19	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C20	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C21	0160-3024	C:FXD MICA 1700 PF 1% 100VDCW	
A1C22	0121-0105	C:VAR CER 9-35 PF NPO 4TH FILTER PEAK	
A1C23	0160-3132	C:FXD CER 200 PF 10% 500VDCW	
A1C24	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C25	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A1C26	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A1C27	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C28	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C29	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C30	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C31	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C32	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C33	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C34	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C35	0160-2201	C:FXD MICA 51 PF 5%	
A1C36	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C37	0160-2204	C:FXD MICA 100PF 5%	
A1C38	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A1C39	0150-0121	C:FXD CER 0.1 UF +80-20% 50VDCW	
A1CR1	1901-0040	DIODE:SILICON 30MA 30WV	

See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A1CR2	1901-0040	DIODE:SILICON 30MA 30WV	
A1CR3	1901-0040	DIODE:SILICON 30MA 30WV	
A1CR4	1901-0040	DIODE:SILICON 30MA 30WV	
A1CR5	1901-0040	DIODE:SILICON 30MA 30WV	
A1CR6	1901-0040	DIODE:SILICON 30MA 30WV	
A1CR7	1901-0040	DIODE:SILICON 30MA 30WV	
A1CR8	1901-0040	DIODE:SILICON 30MA 30WV	
A1CR9	1901-0040	DIODE:SILICON 30MA 30WV	
A1CR10	1901-0040	DIODE:SILICON 30MA 30WV	
A1CR11	1901-0040	DIODE:SILICON 30MA 30WV	
A1CR12	1901-0040	DIODE:SILICON 30MA 30WV	
A1CR13	1901-0040	DIODE:SILICON 30MA 30WV	
A1CR14	1901-0040	DIODE:SILICON 30MA 30WV	
A1CR15	1901-0040	DIODE:SILICON 30MA 30WV	
A1CR16	1901-0040	DIODE:SILICON 30MA 30WV	
A1CR17	1901-0040	DIODE:SILICON 30MA 30WV	
A1L1	9140-0237	COIL:FXD 200 UH 5%	
A1L2	9140-0237	COIL:FXD 200 UH 5%	
A1L3	08552-6025	INDUCTOR:LC FILTER 1 TUNE	
A1L4	08552-6025	INDUCTOR:LC FILTER 2 TUNE	
A1L5	08552-6025	INDUCTOR:LC FILTER 3 TUNE	
A1L6	08552-6025	INDUCTOR:LC FILTER 4 TUNE	
A1L7	9140-0137	COIL:FXD RF 1000 UH 5%	
A1L8	9100-1630	COIL/CHOKE 51.0 UH 5%	
A1L9	9100-1613	COIL:FXD 0.47 UH 20%	
A1L10	9140-0237	COIL:FXD 200 UH 5%	
A1Q1	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A1Q2	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A1Q3	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A1Q4	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A1Q5	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A1Q6	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A1R1	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A1R2	0757-0428	R:FXD MET FLM 1.62K 1% 1/8W	
A1R3	0757-0428	R:FXD MET FLM 1.62K 1% 1/8W	
A1R4	0757-0434	R:FXD MET FLM 3.65K OHM 1% 1/8W	
A1R5	0698-3445	R:FXD MET FLM 348 OHM 1% 1/8W	
A1R6	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A1R7	0757-0422	R:FXD MET FLM 909 OHM 1% 1/8W	
A1R8	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A1R9	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A1R10	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A1R11	0757-0428	R:FXD MET FLM 1.62K 1% 1/8W	
A1R12	0757-0434	R:FXD MET FLM 3.65K OHM 1% 1/8W	
A1R13	0757-0428	R:FXD MET FLM 1.62K 1% 1/8W	
A1R14	0698-3445	R:FXD MET FLM 348 OHM 1% 1/8W	
A1R15	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A1R16	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W FACTORY SELECTED PART	
A1R17	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A1R18	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A1R19	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A1R20	0757-0428	R:FXD MET FLM 1.62K 1% 1/8W	
A1R21	0757-0434	R:FXD MET FLM 3.65K OHM 1% 1/8W	
A1R22	0757-0428	R:FXD MET FLM 1.62K 1% 1/8W	
A1R23	0698-3445	R:FXD MET FLM 348 OHM 1% 1/8W	
A1R24	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A1R25	0757-0422	R:FXD MET FLM 909 OHM 1% 1/8W	
A1R26	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A1R27	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A1R28	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A1R29	0757-0428	R:FXD MET FLM 1.62K 1% 1/8W	
A1R30	0757-0434	R:FXD MET FLM 3.65K OHM 1% 1/8W	
A1R31	0757-0428	R:FXD MET FLM 1.62K 1% 1/8W	
A1R32	0757-0420	R:FXD MET FLM 750 OHM 1% 1/8W	
A1R33	0698-3445	R:FXD MET FLM 348 OHM 1% 1/8W	
A1R34	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A1R35	2100-1757	R:VAR WW 500 OHM 5% TYPE V 1W 10 KHZ ADJ	
A1R36	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A1R37	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A1R38	0757-0394	R:FXD MET FLM 51.1 OHM 1% 1/8W FACTORY SELECTED PART	
A1R39	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A1R40	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A1R41	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A1R42	0757-0440	R:FXD MET FLM 7.50K 1% 1/8W	
A1R43	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A1R44	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A1R45	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A1R46	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A1R47	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A1R48	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A1R49	0757-0289	R:FXD MET FLM 13.3K OHM 1% 1/8W	
A1R50	0698-3160	R:FXD MET FLM 31.6K 1% 1/8W	
A1R51	0698-3445	R:FXD MET FLM 348 OHM 1% 1/8W	
A1R52	0757-0316	R:FXD MET FLM 42.2 OHM 1% 1/8W	
A1R53	0757-0440	R:FXD MET FLM 7.50K 1% 1/8W	
A1R54	0757-0276	R:FXD MET FLM 61.9 OHM 1% 1/8W	
A1R55	0757-0422	R:FXD MET FLM 909 OHM 1% 1/8W	
A1TH1	08552-2005	BOARD:BLANK PC	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A2	08552-6045	BOARD ASSY:3 MHZ AMPLIFIER	
A2C1	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A2C2	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A2C3	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C4	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C5	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C6	0160-3046	C:FXD MICA 250 PF 1% 100VDCW	
A2C7	0160-3047	C:FXD MICA 3280 PF 1% 100VDCW	
A2C8	0160-3045	C:FXD MICA 53.8 PF 1% 100VDCW	
A2C9	0160-3048	C:FXD MICA 8000 PF 1% 100VDCW	
A2C10	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C11	0180-0291	C:FXD ELECT 1.0 UF 10% 35VDCW	
A2C12	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C13	0122-0221	C:VOLTAGE VAR 100 PF 10% 30VDCW	
A2C14	0140-0205	C:FXD MICA 62 PF 5%	
A2C15	0122-0211	C:VOLTAGE VAR 39 PF 1N4810A	
A2C16	0122-0221	C:VOLTAGE VAR 100 PF 10% 30VDCW	
A2C17	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C18	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C19	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C20	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C21	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C22	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C23	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C24	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C25	0140-0205	C:FXD MICA 62 PF 5%	
A2C26	0160-2257	C:FXD CER 10 PF 5% 500VDCW	
A2C27	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C28	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C29	0140-0205	C:FXD MICA 62 PF 5%	
A2C30	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C31	0122-0043	C:VOLTAGE VAR 39-17.95PF 2% 4-25VDCW	
A2C32	0122-0044	C:VOLTAGE VAR 100-45.9PF 2% 4-25VDCW	
A2C33	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C34	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C35	0180-0291	C:FXD ELECT 1.0 UF 10% 35VDCW	
A2C36	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C37		NOT ASSIGNED	
A2C38	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C39	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C40	0122-0043	C:VOLTAGE VAR 39-17.95PF 2% 4-25VDCW	
A2C41	0122-0044	C:VOLTAGE VAR 100-45.9PF 2% 4-25VDCW	
A2C42	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C43	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2CR1	1901-0040	DIODE:SILICON 30MA 30WV	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A2CR2	1901-0040	DIODE:SILICON 30MA 30WV	
A2CR3	1901-0040	DIODE:SILICON 30MA 30WV	
A2CR4	1901-0040	DIODE:SILICON 30MA 30WV	
A2CR5	1901-0040	DIODE:SILICON 30MA 30WV	
A2CR6	1901-0040	DIODE:SILICON 30MA 30WV	
A2CR7	1901-0040	DIODE:SILICON 30MA 30WV	
A2CR8	1901-0040	DIODE:SILICON 30MA 30WV	
A2CR9	1901-0040	DIODE:SILICON 30MA 30WV	
A2CR10	1901-0040	DIODE:SILICON 30MA 30WV	
A2CR11	1901-0040	DIODE:SILICON 30MA 30WV	
A2CR12	1901-0040	DIODE:SILICON 30MA 30WV	
A2L1	9140-0237	COIL:FXD 200 UH 5%	
A2L2	9140-0237	COIL:FXD 200 UH 5%	
A2L3	9140-0237	COIL:FXD 200 UH 5%	
A2L4	9140-0237	COIL:FXD 200 UH 5%	
A2L5	9140-0237	COIL:FXD 200 UH 5%	
A2L6	9100-2744	COIL/CHOKE 7.8 UH 2%	
A2L7	08552-6011	INDUCTOR:300 KHZ FILTER #1 ADJ 2	
A2L8	9100-2476	COIL/CHOKE 52.3 UH 1%	
A2L9	08552-6012	INDUCTOR:300 KHZ FILTER #2 ADJ 1	
A2L10	9100-1611	COIL:FXD 0.22 UH 20%	
A2L11	9100-1636	COIL/CHOKE 110 UH 5%	
A2L12	9140-0137	COIL:FXD RF 1000 UH 5%	
A2L13	9100-1611	COIL:FXD 0.22 UH 20%	
A2Q1	1854-0092	Q:SI NPN	
A2Q2	1853-0010	Q:SI PNP(SELECTED FROM 2N3251)	
A2Q3	1853-0010	Q:SI PNP(SELECTED FROM 2N3251)	
A2Q4	1854-0092	Q:SI NPN	
A2Q5	1853-0010	Q:SI PNP(SELECTED FROM 2N3251)	
A2Q6	1853-0010	Q:SI PNP(SELECTED FROM 2N3251)	
A2Q7	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A2Q8	1853-0010	Q:SI PNP(SELECTED FROM 2N3251)	
A2Q9	1853-0010	Q:SI PNP(SELECTED FROM 2N3251)	
A2Q10	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A2R1	2100-1755	R:VAR WW 100 OHM 5% TYPE V 1W IMP ADJ	
A2R2	0698-3151	R:FXD MET FLM 2.87K OHM 1% 1/8W	
A2R3	0757-0199	R:FXD MET FLM 21.5K OHM 1% 1/8W	
A2R4	0757-0447	R:FXD MET FLM 16.2K OHM 1% 1/8W	
A2R5	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A2R6	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A2R7	0698-3162	R:FXD MET FLM 46.4K OHM 1% 1/8W	
A2R8	0757-1094	R:FXD MET FLM 1.47K OHM 1% 1/8W	
A2R9	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A2R10	0757-0279	R:FXD MET FLM 3.16K OHM 1% 1/8W	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A2R11	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A2R12	0698-3446	R:FXD MET FLM 383 OHM 1% 1/8W	
A2R13	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A2R14	0698-3428	R:FXD MET FLM 14.7 OHM 1% 1/8W	
A2R15	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A2R16	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A2R17	0757-0199	R:FXD MET FLM 21.5K OHM 1% 1/8W	
A2R18	0757-0460	R:FXD MET FLM 61.9K OHM 1% 1/8W	
A2R19	0757-1094	R:FXD MET FLM 1.47K OHM 1% 1/8W	
A2R20	0757-0418	R:FXD MET FLM 619 OHM 1% 1/8W	
A2R21	2100-1757	R:VAR WW 500 OHM 5% TYPE V 1W 30 DB ADJ	
A2R22	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A2R23	0698-3441	R:FXD MET FLM 215 OHM 1% 1/8W	
A2R24	2100-1755	R:VAR WW 100 OHM 5% TYPE V 1W 40 DB ADJ	
A2R25	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A2R26	0757-0276	R:FXD MET FLM 61.9 OHM 1% 1/8W	
A2R27	2100-1754	R:VAR WW 50 OHM 5% TYPE V 1W 50 DB ADJ	
A2R28	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A2R29	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A2R30	0698-3441	R:FXD MET FLM 215 OHM 1% 1/8W	
A2R31	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A2R32	0698-3446	R:FXD MET FLM 383 OHM 1% 1/8W	
A2R33	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A2R34	0757-0420	R:FXD MET FLM 750 OHM 1% 1/8W	
A2R35	0757-0199	R:FXD MET FLM 21.5K OHM 1% 1/8W	
A2R36	0757-0460	R:FXD MET FLM 61.9K OHM 1% 1/8W	
A2R37	0757-1094	R:FXD MET FLM 1.47K OHM 1% 1/8W	
A2R38	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A2R39	0698-3446	R:FXD MET FLM 383 OHM 1% 1/8W	
A2R40	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A2R41	0698-3428	R:FXD MET FLM 14.7 OHM 1% 1/8W	
A2R42	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A2R43	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A2R44	2100-1760	R:VAR WW 5K OHM 5% TYPE V 1W 12 DB ADJ	
A2R45	0757-0199	R:FXD MET FLM 21.5K OHM 1% 1/8W	
A2R46	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A2R47	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A2R48	0757-0288	R:FXD MET FLM 9.09K OHM 1% 1/8W	
A2R49	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A2R50	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A2R51	2100-1758	R:VAR WW 1K OHM 5% TYPE V 1W 0 DB ADJ	
A2R52	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A2R53	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A2R54	0757-0199	R:FXD MET FLM 21.5K OHM 1% 1/8W	
A2R55	0698-3162	R:FXD MET FLM 46.4K OHM 1% 1/8W	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A2R56	0698-3162	R:FXD MET FLM 46.4K OHM 1% 1/8W	
A2R57	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A2R58	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A2R59		NOT ASSIGNED	
A2R60	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A2R61	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A2TB1	08552-2004	BOARD:BLANK PC	
A3	08552-6003	BOARD ASSY:50 MHZ CONVERTER	
A3C1	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A3C2	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A3C3	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A3C4	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A3C5	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A3C6	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A3C7	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A3C8	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A3C9	0160-2142	C:FXD CER 1500 PF +100-0% 500VDCW	
A3C10	0160-2307	C:FXD MICA 47 PF 5%	
A3C11	0121-0059	C:VAR CER 2-8 PF 300VDCW 44 MHZ ADJ	
A3C12	0160-2254	C:FXD CER 7.5-0.25 PF 500VDCW	
A3C13	0160-2254	C:FXD CER 7.5-0.25 PF 500VDCW	
A3C14	0121-0059	C:VAR CER 2-8 PF 300VDCW 44 MHZ ADJ	
A3C15	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A3C16	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A3C17	0160-2201	C:FXD MICA 51 PF 5%	
A3C18	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A3C19	0121-0059	C:VAR CER 2-8 PF 300VDCW 44 MHZ ADJ	
A3C20	0160-2254	C:FXD CER 7.5-0.25 PF 500VDCW	
A3CR1	1901-0050	DIODE:SILICON 75V	
A3CR2	1901-0050	DIODE:SILICON 75V	
A3CR3	1901-0050	DIODE:SILICON 75V	
A3CR4	1901-0050	DIODE:SILICON 75V	
A3L1	9140-0114	COIL:FXD RF 10 UH	
A3L2	9140-0129	COIL:FXD RF 220 UH	
A3L3	9140-0129	COIL:FXD RF 220 UH	
A3L4	9100-0346	COIL:FXD 0.05 UH 20%	
A3L5	9140-0096	COIL:FXD RF 1 UH	
A3L6	9140-0096	COIL:FXD RF 1 UH	
A3L7	9140-0114	COIL:FXD RF 10 UH	
A3L8	9140-0096	COIL:FXD RF 1 UH	
A3L9	9140-0096	COIL:FXD RF 1 UH	
A3MP1	08552-0028	PLATE:CONVERTER	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A3Q1	1854-0247	Q:SI NPN	
A3Q2	1853-0089	Q:SI PNP	
A3R1	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A3R2	0698-3155	R:FXD MET FLM 4.64K 1% 1/8W	
A3R3	0757-0420	R:FXD MET FLM 750 OHM 1% 1/8W	
A3R4	0757-0159	R:FXD MET FLM 1000 OHM 1% 1/2W	
A3R5	0698-3429	R:FXD MET FLM 19.6 OHM 1% 1/8W	
A3R6	0698-3441	R:FXD MET FLM 215 OHM 1% 1/8W	
A3R7	0757-1092	R:FXD MET FLM 287 OHM 1% 1/2W	
A3R8	0698-3438	R:FXD MET FLM 147 OHM 1% 1/8W FACTORY SELECTED PART	
A3R9	0698-3431	R:FXD MET FLM 23.7 OHM 1% 1/8W FACTORY SELECTED PART	
A3R10	0757-0180	R:FXD MET FLM 31.6 OHM 1% 1/8W	
A3R11	0757-0394	R:FXD MET FLM 51.1 OHM 1% 1/8W	
A3R12	0757-0394	R:FXD MET FLM 51.1 OHM 1% 1/8W	
A3R13	0757-0394	R:FXD MET FLM 51.1 OHM 1% 1/8W	
A3R14	0757-0394	R:FXD MET FLM 51.1 OHM 1% 1/8W	
A3R15	0757-0398	R:FXD MET FLM 75 OHM 1% 1/8W	
A3R16	0698-0082	R:FXD MET FLM 464 OHM 1% 1/8W	
A3T1	08552-6018	TRANSFORMER:RF(CODE=RED)	
A3T2	08552-6044	TRANSFORMER:RF (5 PIN)	
A3T3	08552-6018	TRANSFORMER:RF(CODE=RED)	
A3T4	08552-6044	TRANSFORMER:RF (5 PIN)	
A3TB1	08552-2003	BOARD:BLANK PC	
A3A1	08552-6009	FILTER ASSY:50 MHZ A3A1 IS A SEALED UNIT, NOT RECOMMENDED FOR FIELD REPLACEMENT	
A3A1C1	0160-0778	C:FXD CER 56 PF 10% 500VDCW	
A3A1C2	0160-2236	C:FXD CER 1.0-0.25 PF 500VDCW	
A3A1C3	0160-0145	C:FXD MICA 82PF 2% 100VDCW	
A3A1C4	0160-2258	C:FXD CER 11 PF 5% 500VDCW	
A3A1C5	0121-0036	C:VAR CER 5.5-18 PF	
A3A1C6	0121-0036	C:VAR CER 5.5-18 PF	
A3A1C7	0160-2258	C:FXD CER 11 PF 5% 500VDCW	
A3A1C8	0160-2258	C:FXD CER 11 PF 5% 500VDCW	
A3A1C9	0121-0036	C:VAR CER 5.5-18 PF	
A3A1C10	0121-0036	C:VAR CER 5.5-18 PF	
A3A1C11	0160-2258	C:FXD CER 11 PF 5% 500VDCW	
A3A1C12	0160-0145	C:FXD MICA 82PF 2% 100VDCW	
A3A1C13	0160-0778	C:FXD CER 56 PF 10% 500VDCW	
A3A1J1	1250-0829	CONNECTOR:RF	

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Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	HP Part No.	Description #	Note
A3A1L1	08552-6023	INDUCTOR ASSY:AIR CORE	
A3A1L2	08552-6017	INDUCTOR ASSY:50 MHZ	
A3A1L3	08552-6023	INDUCTOR ASSY:AIR CORE	
A3A1MP1	08552-0021	SHIELD CAN:50 MHZ FILTER	
A3A1MP2	08552-0022	SHIELD COVER:47 MHZ OSC	
A3A1MP3	08552-0023	INSULATOR:47 MHZ OSC	
A3A1TB1	08552-6042	BOARD ASSY:50 MHZ FILTER	
	08552-2042	BOARD:BLANK PC	
A3A1Z1	0590-0060	NUT:HEX 12-32 UNEF-2B	
A3A1Z2	2190-0057	WASHER:LOCK FOR #12 HDW	
A3A1Z3	0380-0810	STANDOFF:0.437" LG	
A3A2	08552-6010	OSCILLATOR ASSY:47 MHZ SEALED UNIT:NOT RECOMMENDED FOR FIELD REPLACEMENT	
A3A2C1	0180-0197	C:FXD ELECT 2.2 UF 10% 20VDCW	
A3A2C2	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A3A2C3	0160-3020	C:FXD CER 3.9+/-0.1 PF 500VDCW	
A3A2C4	0121-0457	C:VAR GL 0.8-8.5 PF 750VDCW 47 MHZ TUNE	
A3A2C5	0160-3022	C:FXD CER 16 PF 1% 500VDCW	
A3A2C6	0160-3090	C:FXD CER 22 PF 1% 500VDCW	
A3A2C7	0160-3090	C:FXD CER 22 PF 1% 500VDCW	
A3A2C8	0160-2206	C:FXD MICA 160 PF 5%	
A3A2C9	0160-0939	C: FXD MICA 430 PF 5% 300 VDCW	
A3A2C10	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A3A2C11	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A3A2C12	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A3A2C13	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A3A2C14	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A3A2C15	0122-0042	C:VOLTAGE VAR 15.9 PF +/-2% AT 6V	
A3A2CR1	1901-0033	DIODE:SILICON 100MA 180WV	
A3A2L1	9100-2465	INDUCTOR:FXD 0.70 UH 5%	
A3A2L2	9100-1621	COIL/CHOKE 18 UH 10%	
A3A2MP1	08552-0020	SHIELD CAN:47 MHZ OSC	
A3A2MP2	08552-0029	SHIELD:COVER 47 MHZ OSC.	
A3A2MP3	08552-0023	INSULATOR:47 MHZ OSC	
A3A2Q1	1854-0238	Q:SI NPN	
A3A2Q2	1853-0034	Q:SI PNP(SELECTED FROM 2N3251)	
A3A2Q3	1854-0019	Q:SI NPN(SELECTED FROM 2N2369)	
A3A2R1	0757-0465	R:FXD MET FLM 100K 1% 1/8W	

See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	HP Part No.	Description #	Note
A3A2R2	0757-0465	R:FXD MET FLM 100K 1% 1/8W	
A3A2R3	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A3A2R4	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A3A2R5	0757-0394	R:FXD MET FLM 51.1 OHM 1% 1/8W	
A3A2R6	0698-3150	R:FXD MET FLM 2.37K OHM 1% 1/8W	
A3A2R7	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A3A2R8	0757-0399	R:FXD MET FLM 82.5 OHM 1% 1/8W	
A3A2R9	0757-0821	R:FXD MET FLM 1.21K OHM 1% 1/2W	
A3A2R10	0757-0382	R:FXD MET FLM 16.2 OHM 1% 1/8W	
A3A2R11	0757-0400	R:FXD MET FLM 90.9 OHM 1% 1/8W	
A3A2R12	0698-3441	R:FXD MET FLM 215 OHM 1% 1/8W	
A3A2R13	0757-0398	R:FXD MET FLM 75 OHM 1% 1/8W	
A3A2R14	0757-0400	R:FXD MET FLM 90.9 OHM 1% 1/8W	
A3A2R15	0757-0294	R:FXD MET FLM 17.8 OHM 1% 1/8W	
A3A2R16	0757-0403	R:FXD MET FLM 121 OHM 1% 1/8W	
A3A2TB1	08552-6043	BOARD ASSY:47 MHZ OSCILLATOR	
	08552-2043	BOARD:BLANK PC	
A3A2	0340-0039	INSULATOR:BUSHING	
A3A2	0340-0038	FEEDTHRU:TERMINAL	
A3A2	0380-0810	STANDOFF:0.437" LG	
A4	08552-6045	CRYSTAL FILTER ASSY	
A4C1	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C2	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A4C3	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C4	0180-0291	C:FXD ELECT 1.0 UF 10% 35VDCW	
A4C5	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C6	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C7	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C8	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C9	0121-0059	C:VAR CER 2-8 PF 300VDCW	
A4C10	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C11	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C12	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C13	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C14	0160-2917	C:FXD CER 0.05 UF +80-20% 100VDCW	
A4C15	0121-0105	C:VAR CER 9-35 PF NPO	
A4C16	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C17	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C18	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C19	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C20	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C21	0160-2917	C:FXD CER 0.05 UF +80-20% 100VDCW	
A4C22	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C23	0121-0059	C:VAR CER 2-8 PF 300VDCW	
A4C24	0160-2917	C:FXD CER 0.05 UF +80-20% 100VDCW	
A4C25	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	

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Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A4C26	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C27	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C28	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C29	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C30	0121-0105	C:VAR CER 9-35 PF NPO	
A4C31	0160-2917	C:FXD CER 0.05 UF +80-20% 100VDCW	
A4C32	0160-2917	C:FXD CER 0.05 UF +80-20% 100VDCW	
A4C33	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C34	0160-2917	C:FXD CER 0.05 UF +80-20% 100VDCW	
A4C35	0160-2199	C:FXD MICA 30 PF 5%	
A4C36	0160-2199	C:FXD MICA 30 PF 5%	
A4C37	0160-2257	C:FXD CER 10 PF 5% 500VDCW	
A4C38	0121-0059	C:VAR CER 2-8 PF 300VDCW	
A4C39	0160-2917	C:FXD CER 0.05 UF +80-20% 100VDCW	
A4C40	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C41	0160-2917	C:FXD CER 0.05 UF +80-20% 100VDCW	
A4C42	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C43	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C44	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C45	0121-0105	C:VAR CER 9-35 PF NPO	
A4C46	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C47	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C48	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C49	0160-2101	C:FXD MICA 27PF 2% 300VDCW	
A4C50	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C51	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C52	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4CR1	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR2	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR3	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR4	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR5	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR6	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR7	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR8	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR9	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR10	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR11	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR12	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR13	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR14	1910-0016	DIODE:GERMANIUM 100MA/0.85V 60PIV	
A4CR15	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR16		NOT ASSIGNED	
A4CR17	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR18	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR19	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR20	1901-0040	DIODE:SILICON 30MA 30WV	

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Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A4CR21	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR22	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR23	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR24	1901-0040	DIODE:SILICON 30MA 30WV	
A4K1	0490-0743	RELAY:REED	
A4K2	0490-0743	RELAY:REED	
A4K3	0490-0743	RELAY:REED	
A4L1	9140-0237	COIL:FXD 200 UH 5%	
A4L2	9140-0237	COIL:FXD 200 UH 5%	
A4L3	9140-0237	COIL:FXD 200 UH 5%	
A4L4	9140-0237	COIL:FXD 200 UH 5%	
A4L5	9100-1622	COIL/CHOKE 24.0 UH 5%	
A4L6	9100-1622	COIL/CHOKE 24.0 UH 5%	
A4L7	9100-1622	COIL/CHOKE 24.0 UH 5%	
A4L8	9100-1622	COIL/CHOKE 24.0 UH 5%	
A4L9	9140-0237	COIL:FXD 200 UH 5%	
A4L10	9100-1622	COIL/CHOKE 24.0 UH 5%	
A4L11	9100-1622	COIL/CHOKE 24.0 UH 5%	
A4L12	9100-2475	COIL/CHOKE 11.3 UH 1%	
A401	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A402	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A403	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A404	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A405	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A406	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A407	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A408	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A409	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A4010	1853-0001	Q:SI PNP(SELECTED FROM 2N1132)	
A4011	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A4012	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A4013	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A4R1	0757-0403	R:FXD MET FLM 121 OHM 1% 1/8W	
A4R2	0757-0403	R:FXD MET FLM 121 OHM 1% 1/8W	
A4R3	0757-0458	R:FXD MET FLM 51.1K OHM 1% 1/8W	
A4R4	0698-3156	R:FXD MET FLM 14.7K OHM 1% 1/8W	
A4R5	0757-0394	R:FXD MET FLM 51.1 OHM 1% 1/8W	
A4R6	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A4R7	0757-0403	R:FXD MET FLM 121 OHM 1% 1/8W	
A4R8	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A4R9	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A4R10	0757-0403	R:FXD MET FLM 121 OHM 1% 1/8W	
A4R11	0757-0403	R:FXD MET FLM 121 OHM 1% 1/8W	

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Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A4R12	0698-3454	R:FXD MET FLM 215K OHM 1% 1/8W	
A4R13	0683-0275	R:FXD COMP 2.7 OHM 5% 1/4W	
A4R14	0757-0403	R:FXD MET FLM 121 OHM 1% 1/8W	
A4R15	0757-0274	R:FXD MET FLM 1.21K OHM 1% 1/8W	
A4R16	0698-3132	R:FXD FLM 261 OHM 1% 1/8W	
A4R17	0757-0274	R:FXD MET FLM 1.21K OHM 1% 1/8W	
A4R18	0757-0447	R:FXD MET FLM 16.2K OHM 1% 1/8W	
A4R19	0757-0403	R:FXD MET FLM 121 OHM 1% 1/8W	
A4R20	0757-0459	R:FXD MET FLM 56.2K OHM 1% 1/8W	
A4R21	0757-0422	R:FXD MET FLM 909 OHM 1% 1/8W	
A4R22	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R23	0757-0439	R:FXD MET FLM 6.81K OHM 1% 1/8W	
A4R24	0698-3558	R:FXD MET FLM 4.02K OHM 1% 1/8W	
A4R25	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R26	0757-0419	R:FXD MET FLM 681 OHM 1% 1/8W	
A4R27	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A4R28	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A4R29	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A4R30	2100-1754	R:VAR WW 50 OHM 5% TYPE V 1W 20 DB ADJ	
A4R31	0698-3454	R:FXD MET FLM 215K OHM 1% 1/8W	
A4R32	0757-0403	R:FXD MET FLM 121 OHM 1% 1/8W	
A4R33	0757-0274	R:FXD MET FLM 1.21K OHM 1% 1/8W	
A4R34	0698-3132	R:FXD FLM 261 OHM 1% 1/8W	
A4R35	0757-0274	R:FXD MET FLM 1.21K OHM 1% 1/8W	
A4R36	0757-0422	R:FXD MET FLM 909 OHM 1% 1/8W	
A4R37	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R38	0698-3558	R:FXD MET FLM 4.02K OHM 1% 1/8W	
A4R39	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R40	0683-0275	R:FXD COMP 2.7 OHM 5% 1/4W	
A4R41	0698-3157	R:FXD MET FLM 19.6K 1% 1/8W	
A4R42	0698-3161	R:FXD MET FLM 38.3K 1% 1/8W	
A4R43	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R44	0757-0394	R:FXD MET FLM 51.1 OHM 1% 1/8W	
A4R45	0698-3156	R:FXD MET FLM 14.7K OHM 1% 1/8W	
A4R46	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R47	0757-0274	R:FXD MET FLM 1.21K OHM 1% 1/8W	
A4R48	0698-3439	R:FXD MET FLM 178 OHM 1% 1/8W	
A4R49	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A4R50	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R51	0757-0403	R:FXD MET FLM 121 OHM 1% 1/8W	
A4R52	0757-0403	R:FXD MET FLM 121 OHM 1% 1/8W	
A4R53	0757-0422	R:FXD MET FLM 909 OHM 1% 1/8W	
A4R54	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A4R55	2100-1755	R:VAR WW 100 OHM 5% TYPE V 1W 10 DB ADJ	
A4R56	0757-0419	R:FXD MET FLM 681 OHM 1% 1/8W	
A4R57	0757-0403	R:FXD MET FLM 121 OHM 1% 1/8W	
A4R58	0757-0274	R:FXD MET FLM 1.21K OHM 1% 1/8W	
A4R59	0698-3132	R:FXD FLM 261 OHM 1% 1/8W	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A4R60	0757-0274	R:FXD MET FLM 1.21K OHM 1% 1/8W	
A4R61	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A4R62	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A4R63	0698-3156	R:FXD MET FLM 14.7K OHM 1% 1/8W	
A4R64	0757-0422	R:FXD MET FLM 909 OHM 1% 1/8W	
A4R65	1698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R66	0698-3454	R:FXD MET FLM 215K OHM 1% 1/8W	
A4R67	1698-3558	R:FXD MET FLM 4.02K OHM 1% 1/8W	
A4R68	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R69	0683-0275	R:FXD COMP 2.7 OHM 5% 1/4W	
A4R70	0698-3445	R:FXD MET FLM 348 OHM 1% 1/8W	
A4R71	0698-3161	R:FXD MET FLM 38.3K 1% 1/8W	
A4R72	0698-3157	R:FXD MET FLM 19.6K 1% 1/8W	
A4R73	0757-0274	R:FXD MET FLM 1.21K OHM 1% 1/8W	
A4R74	0757-0403	R:FXD MET FLM 121 OHM 1% 1/8W	
A4R75	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R76	0757-0274	R:FXD MET FLM 1.21K OHM 1% 1/8W	
A4R77	0698-0082	R:FXD MET FLM 464 OHM 1% 1/8W	
A4R78		NOT ASSIGNED	
A4R79	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R80	0757-0439	R:FXD MET FLM 6.81K OHM 1% 1/8W	
A4R81	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A4R82	0757-0441	R:FXD MET FLM 8.25K 1% 1/8W	
A4R83	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R84	0757-0274	R:FXD MET FLM 1.21K OHM 1% 1/8W	
A4R85	2100-1761	R:VAR WW 10K OHM 5% TYPE V 1W 100 HZ ADJ	
A4R86	0757-0274	R:FXD MET FLM 1.21K OHM 1% 1/8W	
A4R87	0757-0274	R:FXD MET FLM 1.21K OHM 1% 1/8W	
A4R88	2100-1760	R:VAR WW 5K OHM 5% TYPE V 1W 50 HZ ADJ	
A4TP1	08552-2045	BOARD:BLANK PC	
A4Y1	0410-0139	CRYSTAL:QUARTZ(MATCHED SET OF 3)	
A4Y2		PART OF Y1	
A4Y3		PART OF Y1	
A5	08552-6002	BOARD ASSY:POWER SUPPLY	
A5C1	0160-0163	C:FXD MY 0.033 UF 10% 200VDCW	
A5C2	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A5C3	0160-2208	C:FXD MICA 330 PF 5% 300VDCW	
A5C4	0180-1747	C:FXD ELECT 150 UF 20% 15VDCW	
A5C5	0160-0162	C:FXD MY 0.022 UF 10% 200VDCW	
A5C6	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A5C7	0180-1747	C:FXD ELECT 150 UF 20% 15VDCW	
A5C8	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A5C9	0160-0153	C:FXD MY 0.001 UF 10% 200VDCW	
A5C10	0180-0197	C:FXD ELECT 2.2 UF 10% 20VDCW	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A5C11	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A5C12	0160-2145	C:FXD CER 5000 PF +80-20% 100VDCW	
A5C13	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A5C14	0160-2143	C:FXD CER 2000 PF +80-20% 1000VDCW	
A5C15	0140-0192	C:FXD MICA 68 PF 5%	
A5C16	0180-0098	C:FXD ELECT 100 UF 20% 20VDCW	
A5C17	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A5C18	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A5CR1	1901-0416	DIODE:SILICON 200PIV 3A	
A5CR2	1902-3104	DIODE BREAKDOWN:5.62V 5%	
A5CR3	1901-0416	DIODE:SILICON 200PIV 3A	
A5CR4	1884-0012	RECTIFIER:SILICON CONTROLLED 2N3528	
A5CR5	1902-3268	DIODE BREAKDOWN:26.1V 5%	
A5CR6	1902-0033	DIODE:BREAKDOWN 6.2V	
A5CR7	1901-0416	DIODE:SILICON 200PIV 3A	
A5CR8	1901-0416	DIODE:SILICON 200PIV 3A	
A5CR9	1901-0416	DIODE:SILICON 200PIV 3A	
A5CR10	1884-0012	RECTIFIER:SILICON CONTROLLED 2N3528	
A5CR11	1902-3250	DIODE:BREAKDOWN SILICON 23.7V 5%	
A5CR12	1902-0040	DIODE BREAKDOWN:14.0V 5%	
A5CR13	1901-0416	DIODE:SILICON 200PIV 3A	
A5CR14	1902-0033	DIODE:BREAKDOWN 6.2V	
A5CR15	1901-0416	DIODE:SILICON 200PIV 3A	
A5CR16	1901-0040	DIODE:SILICON 30MA 30WV	
A5CR17	1901-0040	DIODE:SILICON 30MA 30WV	
A5CR18	1901-0039	DIODE:SILICON 200MA 50WV	
A5CR19	1901-0040	DIODE:SILICON 30MA 30WV	
A5CR20	1901-0040	DIODE:SILICON 30MA 30WV	
A5CR21	1901-0040	DIODE:SILICON 30MA 30WV	
A5CR22	1901-0040	DIODE:SILICON 30MA 30WV	
A5CR23	1901-0040	DIODE:SILICON 30MA 30WV	
A5CR24	1901-0040	DIODE:SILICON 30MA 30WV	
A5CR25	1901-0040	DIODE:SILICON 30MA 30WV	
A5CR26	1901-0040	DIODE:SILICON 30MA 30WV	
A5CR27	1901-0040	DIODE:SILICON 30MA 30WV	
A5CR28	1901-0040	DIODE:SILICON 30MA 30WV	
A5CR29	1902-3070	DIODE:BREAKDOWN 4.22V 5%	
A5CR30	1902-3070	DIODE:BREAKDOWN 4.22V 5%	
A5Q1	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A5Q2	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A5Q3	1854-0221	Q:SI NPN(REPLACEABLE BY 2N4044)	
A5Q4	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A5Q5	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A5Q6	1854-0221	Q:SI NPN(REPLACEABLE BY 2N4044)	
A5Q7	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A5Q8	1854-0022	Q:SI NPN	
A5Q9	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A5Q10	1853-0006	Q:SI PNP 2N3134	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A5Q11	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A5Q12	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A5Q13	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A5Q14	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A5Q15	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A5Q16	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A5Q17	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A5Q18	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A5Q19	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A5Q20	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A5Q21	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A5Q22	1854-0003	Q:SI NPN(SELECTED FROM 2N1711)	
A5Q23		CHASSIS MOUNTED SERIES REGULATORS(SEE Q23)	
A5Q24		CHASSIS MOUNTED SERIES REGULATORS(SEE Q24)	
A5Q25	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A5R1		NOT ASSIGNED	
A5R2	0698-3420	R:FXD MET FLM 34.8K OHM 1% 1/2W	
A5R3	0764-0018	R:FXD MET FLM 4700 OHM 5% 2W	
A5R4	0757-0276	R:FXD MET FLM 61.9 OHM 1% 1/8W	
A5R5	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A5R6	0757-0405	R:FXD MET FLM 162 OHM 1% 1/8W	
A5R7	0698-3408	R:FXD MET FLM 2.15 1% 1/2W	
A5R8	0699-0001	R:FXD COMP 2.7 OHM 10% 1/2W	
A5R9	0757-0278	R:FXD MET FLM 1.78K OHM 1% 1/8W	
A5R10	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A5R11	0757-0460	R:FXD MET FLM 61.9K OHM 1% 1/8W	
A5R12	0698-3150	R:FXD MET FLM 2.37K OHM 1% 1/8W	
A5R13	0698-3136	R:FXD MET FLM 17.8K OHM 1% 1/8W	
A5R14	0757-0460	R:FXD MET FLM 61.9K OHM 1% 1/8W	
A5R15	0698-0089	R:FXD MET FLM 1780 OHM 1% 1/2W	
A5R16	2100-1756	R:VAR WW 200 OHM 5% TYPE V 1W +20V ADJ	
A5R17	0757-0420	R:FXD MET FLM 750 OHM 1% 1/8W	
A5R18	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A5R19	0757-0276	R:FXD MET FLM 61.9 OHM 1% 1/8W	
A5R20	0698-3419	R:FXD MET FLM 31.6K OHM 1% 1/2W	
A5R21	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A5R22	0757-0405	R:FXD MET FLM 162 OHM 1% 1/8W	
A5R23	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A5R24	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A5R25	0757-0317	R:FXD MET FLM 1.33K OHM 1% 1/8W	
A5R26	0699-0001	R:FXD COMP 2.7 OHM 10% 1/2W	
A5R27	0757-0199	R:FXD MET FLM 21.5K OHM 1% 1/8W	
A5R28	0757-0441	R:FXD MET FLM 8.25K 1% 1/8W	
A5R29	0757-0418	R:FXD MET FLM 619 OHM 1% 1/8W	
A5R30	0757-0199	R:FXD MET FLM 21.5K OHM 1% 1/8W	
A5R31	0698-3446	R:FXD MET FLM 383 OHM 1% 1/8W	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A5R32	2100-1756	R:VAR WW 200 OHM 5% TYPE V 1W -10V ADJ	
A5R33	0757-0420	R:FXD MET FLM 750 OHM 1% 1/8W	
A5R34	0683-9145	R:FXD COMP 910K OHM 5% 1/4W	
A5R35	0757-0200	R:FXD MET FLM 5.62K OHM 1% 1/8W	
A5R36	0683-5145	R:FXD COMP 510K OHM 5% 1/4W	
A5R37	0757-0465	R:FXD MET FLM 100K 1% 1/8W	
A5R38	0757-0465	R:FXD MET FLM 100K 1% 1/8W	
A5R39	0757-0458	R:FXD MET FLM 51.1K OHM 1% 1/8W	
A5R40	0698-3158	R:FXD MET FLM 23.7K OHM 1% 1/8W	
A5R41	0757-0274	R:FXD MET FLM 1.21K OHM 1% 1/8W	
A5R42	2100-1760	R:VAR WW 5K OHM 5% TYPE V 1W TUNING RANGE ADJ	
A5R43	0698-3158	R:FXD MET FLM 23.7K OHM 1% 1/8W	
A5R44	0698-3260	R:FXD MET FLM 464K OHM 1% 1/8W	
A5R45	0757-0200	R:FXD MET FLM 5.62K OHM 1% 1/8W	
A5R46	0683-9145	R:FXD COMP 910K OHM 5% 1/4W	
A5R47	0757-0447	R:FXD MET FLM 16.2K OHM 1% 1/8W	
A5R48	0757-0274	R:FXD MET FLM 1.21K OHM 1% 1/8W	
A5R49	0764-0006	R:FXD MET OX 18K OHM 5% 2W	
A5R50	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A5R51	0757-0424	R:FXD MET FLM 1.10K OHM 1% 1/8W	
A5R52	0698-3150	R:FXD MET FLM 2.37K OHM 1% 1/8W	
A5R53	0757-0428	R:FXD MET FLM 1.62K 1% 1/8W	
A5R54	0757-0464	R:FXD MET FLM 90.9K OHM 1% 1/8W FACTORY SELECTED PART	
A5R55	0757-0464	R:FXD MET FLM 90.9K OHM 1% 1/8W FACTORY SELECTED PART	
A5R56	0757-0463	R:FXD MET FLM 82.5K 1% 1/8W FACTORY SELECTED PART	
A5R57	0757-0461	R:FXD MET FLM 68.1K OHM 1% 1/8W FACTORY SELECTED PART	
A5R58	0757-0460	R:FXD MET FLM 61.9K OHM 1% 1/8W FACTORY SELECTED PART	
A5R59	0757-0459	R:FXD MET FLM 56.2K OHM 1% 1/8W FACTORY SELECTED PART	
A5R60	0757-0458	R:FXD MET FLM 51.1K OHM 1% 1/8W FACTORY SELECTED PART	
A5R61	0698-3450	R:FXD MET FLM 42.2K OHM 1% 1/8W FACTORY SELECTED PART	
A5R62	0698-3161	R:FXD MET FLM 38.3K 1% 1/8W FACTORY SELECTED PART	
A5R63	0698-3161	R:FXD MET FLM 38.3K 1% 1/8W FACTORY SELECTED PART	
A5R64	0757-0816	R:FXD MET FLM 681 OHM 1% 1/2W	
A5R65	0698-3439	R:FXD MET FLM 178 OHM 1% 1/8W	
A5R66	0757-0405	R:FXD MET FLM 162 OHM 1% 1/8W	
A5R67	0757-0405	R:FXD MET FLM 162 OHM 1% 1/8W	
A5R68	0757-0405	R:FXD MET FLM 162 OHM 1% 1/8W	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A5R69	0757-0405	R:FXD MET FLM 162 OHM 1% 1/8W	
A5R70	0757-0405	R:FXD MET FLM 162 OHM 1% 1/8W	
A5R71	0757-0405	R:FXD MET FLM 162 OHM 1% 1/8W	
A5R72	0757-0405	R:FXD MET FLM 162 OHM 1% 1/8W	
A5R73	0757-0405	R:FXD MET FLM 162 OHM 1% 1/8W	
A5R74	0757-0453	R:FXD MET FLM 30.1K OHM 1% 1/8W	
A5R75	2100-2489	R:VAR FLM 5K OHM 10% LIN 1/2W THRESHOLD ADJ	
A5R76	0757-0122	R:FXD MET FLM 27.1K OHM 1% 1/8W	
A5R77	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A5R78	0757-0279	R:FXD MET FLM 3.16K OHM 1% 1/8W	
A5R79	0757-0795	R:FXD MET FLM 75 OHM 1% 1/2W	
A5R80	0757-0276	R:FXD MET FLM 61.9 OHM 1% 1/8W	
A5TB1	08552-2002	BOARD:BLANK PC	
A6	08552-6047	SCAN GENERATOR ASSY	
A6C1	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A6C2	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A6C3	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A6C4	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW FACTORY SELECTED PART	
A6C5	0180-2268	C:FXD ELECT 140 UF 10%	
A6C6	0160-0939	C: FXD MICA 430 PF 5% 300 VDCW	
A6C7	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A6C8	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A6C9	0180-1743	C:FXD ELECT 0.1 UF 10% 35VDCW	
A6C10	0160-2218	C:FXD MICA 1000 PF 5%	
A6C11	0160-0163	C:FXD MY 0.033 UF 10% 200VDCW	
A6C12	0140-0198	C:FXD MICA 200 PF 5%	
A6C13	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A6C14	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A6C15	0121-0036	C:VAR CER 5.5-18 PF	
A6C16	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A6C17	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A6C18	0160-2263	C:FXD CER 18 PF 5% 500VDCW	
A6C19	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A6C20	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A6C21	0160-0153	C:FXD MY 0.001 UF 10% 200VDCW	
A6CR1	1901-0025	DIODE:SILICON 100MA/1V	
A6CR2	1901-0025	DIODE:SILICON 100MA/1V	
A6CR3	1901-0025	DIODE:SILICON 100MA/1V	
A6CR4	1901-0025	DIODE:SILICON 100MA/1V	
A6CR5	1901-0025	DIODE:SILICON 100MA/1V	
A6CR6	1901-0025	DIODE:SILICON 100MA/1V	
A6CR7	1901-0025	DIODE:SILICON 100MA/1V	
A6CR8	1902-0202	DIODE BREAKDOWN: 15.0V 5% 1W	
A6CR9	1902-0556	DIODE:BREAKDOWN 20.0V 5% 1W	
A6CR10	1902-3171	DIODE BREAKDOWN:11.0V 5%	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	HP Part No.	Description #	Note
A6CR11	1901-0025	DIODE:SILICON 100MA/1V	
A6CR12	1901-0025	DIODE:SILICON 100MA/1V	
A6CR13	1901-0025	DIODE:SILICON 100MA/1V	
A6CR14	1902-0785	DIODE BREAKDOWN: 9.09V 5%	
A6CR15	1901-0025	DIODE:SILICON 100MA/1V	
A6CR16	1901-0025	DIODE:SILICON 100MA/1V	
A6CR17	1902-0052	DIODE BREAKDOWN:6.81V	
A6L1	9140-0210	COIL:FXD RF 100 UH 5%	
A6L2	9140-0210	COIL:FXD RF 100 UH 5%	
A6L3	9140-0210	COIL:FXD RF 100 UH 5%	
A6L4	9100-2267	COIL/CHOKE 18 UH	
A6L5	9100-2267	COIL/CHOKE 18 UH	
A6L6	9100-2267	COIL/CHOKE 18 UH	
A6MP1	0360-1514	TERMINAL PIN:SQUARE	
A6MP2	08552-0024	SHIELD:CAN,SCAN GENERATOR	
A6Q1	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A6Q2	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A6Q3	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A6Q4	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A6Q5	1854-0039	Q:SI NPN	
A6Q6	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A6Q7	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A6Q8	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A6Q9	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A6Q10	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A6Q11	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A6Q12	1854-0232	Q:SI NPN(SELECTED FROM 2N3440)	
A6Q13	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A6Q14	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A6Q15	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A6Q16	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A6Q17	1854-0019	Q:SI NPN(SELECTED FROM 2N2369)	
A6Q18	1854-0019	Q:SI NPN(SELECTED FROM 2N2369)	
A6R1	0698-3136	R:FXD MET FLM 17.8K OHM 1% 1/8W	
A6R2	0757-0441	R:FXD MET FLM 8.25K 1% 1/8W	
A6R3	0698-3455	R:FXD MET FLM 261K OHM 1% 1/8W	
A6R4	0757-0290	R:FXD MET FLM 6.19K OHM 1% 1/8W	
A6R5	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A6R6	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A6R7	0757-0465	R:FXD MET FLM 100K 1% 1/8W	
A6R8	0698-3454	R:FXD MET FLM 215K OHM 1% 1/8W	
A6R9	0698-3136	R:FXD MET FLM 17.8K OHM 1% 1/8W	
A6R10	0698-3158	R:FXD MET FLM 23.7K OHM 1% 1/8W	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A6R11	0698-3162	R:FXD MET FLM 46.4K OHM 1% 1/8W	
A6R12	0757-0418	R:FXD MET FLM 619 OHM 1% 1/8W	
A6R13	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A6R14	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A6R15	2100-1759	R:VAR WW 2K OHM 5% TYPE V 1W	
A6R16	0698-3154	R:FXD MET FLM 4.22K OHM 1% 1/8W	
A6R17	0698-3451	R:FXD MET FLM 133K OHM 1% 1/8W	
A6R18	0757-0123	R:FXD MET FLM 34.8K OHM 1% 1/8W	
A6R19	0698-3136	R:FXD MET FLM 17.8K OHM 1% 1/8W	
A6R20	0698-3451	R:FXD MET FLM 133K OHM 1% 1/8W	
A6R21	0757-0290	R:FXD MET FLM 6.19K OHM 1% 1/8W	
A6R22	0757-0123	R:FXD MET FLM 34.8K OHM 1% 1/8W	
A6R23	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A6R24	0698-3156	R:FXD MET FLM 14.7K OHM 1% 1/8W	
A6R25	0698-3454	R:FXD MET FLM 215K OHM 1% 1/8W	
A6R26	0757-0290	R:FXD MET FLM 6.19K OHM 1% 1/8W	
A6R27	0757-0123	R:FXD MET FLM 34.8K OHM 1% 1/8W	
A6R28	0698-3154	R:FXD MET FLM 4.22K OHM 1% 1/8W	
A6R29	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A6R30	0757-0465	R:FXD MET FLM 100K 1% 1/8W	
A6R31	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A6R32	0698-3154	R:FXD MET FLM 4.22K OHM 1% 1/8W	
A6R33	0698-3451	R:FXD MET FLM 133K OHM 1% 1/8W	
A6R34	0698-0083	R:FXD MET FLM 1.96K OHM 1% 1/8W	
A6R35	0698-3136	R:FXD MET FLM 17.8K OHM 1% 1/8W	
A6R36	0757-0461	R:FXD MET FLM 68.1K OHM 1% 1/8W	
A6R37	0757-0418	R:FXD MET FLM 619 OHM 1% 1/8W	
A6R38	0757-0463	R:FXD MET FLM 82.5K 1% 1/8W	
A6R39	2100-1758	R:VAR WW 1K OHM 5% TYPE V 1W	
A6R40	0757-0418	R:FXD MET FLM 619 OHM 1% 1/8W	
A6R41	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A6R42	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A6R43	0757-0410	R:FXD MET FLM 511 OHM 1% 1/8W	
A6R44	0698-3152	R:FXD MET FLM 3.48K 1% 1/8W	
A6R45	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A6R46	0757-0418	R:FXD MET FLM 619 OHM 1% 1/8W	
A6R47	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A6R48	0757-0289	R:FXD MET FLM 13.3K OHM 1% 1/8W	
A6R49	2100-1757	R:VAR WW 500 OHM 5% TYPE V 1W	
A6R50	0698-3160	R:FXD MET FLM 31.6K 1% 1/8W	
A6R51	0698-0085	R:FXD MET FLM 2.61K OHM 1% 1/8W	
A6R52	0698-0085	R:FXD MET FLM 2.61K OHM 1% 1/8W	
A6R53	0698-0083	R:FXD MET FLM 1.96K OHM 1% 1/8W	
A6R54	2100-1756	R:VAR WW 200 OHM 5% TYPE V 1W	
A6R55	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A6R56	0698-7215	R:FXD FLM 133 OHM 2% 1/8W	
A6R57	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A6R58	0757-0279	R:FXD MET FLM 3.16K OHM 1% 1/8W	
A6R59	0698-7216	R:FXD MET FLM 147 OHM 2% 1/8W	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A6R60	0757-0278	R:FXD MET FLM 1.78K OHM 1% 1/8W	
A6R61	0757-0394	R:FXD MET FLM 51.1 OHM 1% 1/8W	
A6R62	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A6R63	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A6TB1	08552-2047	BOARD:BLANK PC	
A6U1	1820-0216	INTEGRATED CIRCUIT:OPERATIONAL AMPL.	
A6U2	1820-0216	INTEGRATED CIRCUIT:OPERATIONAL AMPL.	
A7	08552-6008	BOARD ASSY:DEFLECTION AMPLIFIER	
A7C1	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A7C2	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A7C3	0160-2265	C:FXD CER 22 PF 5% 500VDCW	
A7C4	0160-0380	C:FXD MY 0.22 UF 10% 200VDCW	
A7C5	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A7C6	0140-0194	C:FXD MICA 110 PF 5%	
A7C7	0140-0194	C:FXD MICA 110 PF 5%	
A7C8	0180-1746	C:FXD ELECT 15 UF 10% 20VDCW	
A7C9	0140-0194	C:FXD MICA 110 PF 5%	
A7C10	0160-2144	C:FXD CER 3300 PF +80-20% 1KV	
A7C11	0160-2246	C:FXD CER 3.6+/-0.25 PF 500VDCW	
A7C12	0160-2246	C:FXD CER 3.6+/-0.25 PF 500VDCW	
A7C13	0160-2144	C:FXD CER 3300 PF +80-20% 1KV	
A7C14	0160-2246	C:FXD CER 3.6+/-0.25 PF 500VDCW	
A7C15	0160-2246	C:FXD CER 3.6+/-0.25 PF 500VDCW	
A7C16	0160-0153	C:FXD MY 0.001 UF 10% 200VDCW	
A7CR1	1901-0096	DIODE:SILICON 120V	
A7CR2	1901-0081	DIODE:SILICON 50 VOLTS WORKING	
A7CR3	1901-0096	DIODE:SILICON 120V	
A7CR4	1901-0081	DIODE:SILICON 50 VOLTS WORKING	
A7CR5	1901-0081	DIODE:SILICON 50 VOLTS WORKING	
A7CR6	1901-0081	DIODE:SILICON 50 VOLTS WORKING	
A7CR7	1901-0081	DIODE:SILICON 50 VOLTS WORKING	
A7CR8	1901-0081	DIODE:SILICON 50 VOLTS WORKING	
A7CR9	1901-0096	DIODE:SILICON 120V	
A7CR10	1901-0081	DIODE:SILICON 50 VOLTS WORKING	
A7CR11	1901-0081	DIODE:SILICON 50 VOLTS WORKING	
A7CR12	1901-0081	DIODE:SILICON 50 VOLTS WORKING	
A7CR13	1901-0081	DIODE:SILICON 50 VOLTS WORKING	
A7CR14	1901-0081	DIODE:SILICON 50 VOLTS WORKING	
A7CR15	1901-0081	DIODE:SILICON 50 VOLTS WORKING	
A7CR16	1901-0096	DIODE:SILICON 120V	
A7CR17	1902-0683	DIODE BREAKDOWN:100V 2%	
A7CR18	1901-0081	DIODE:SILICON 50 VOLTS WORKING	
A7CR19	1901-0081	DIODE:SILICON 50 VOLTS WORKING	
A7CR20	1902-0683	DIODE BREAKDOWN:100V 2%	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A7L1	9140-0129	COIL:FXD RF 220 UH	
A7L2	9140-0129	COIL:FXD RF 220 UH	
A701	1854-0232	Q:SI NPN(SELECTED FROM 2N3440)	
A702	1853-0050	Q:SI PNP	
A703	1854-0232	Q:SI NPN(SELECTED FROM 2N3440)	
A704	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A705	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A706	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A707	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A708	1854-0234	Q:SI NPN	
	1205-0011	HEAT DISSIPATOR:FOR TO-5 AND TO-9 CASES	
A709	1853-0050	Q:SI PNP	
A7010	1854-0232	Q:SI NPN(SELECTED FROM 2N3440)	
A7011	1854-0232	Q:SI NPN(SELECTED FROM 2N3440)	
A7012	1854-0232	Q:SI NPN(SELECTED FROM 2N3440)	
A7013	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A7014	1854-0232	Q:SI NPN(SELECTED FROM 2N3440)	
A7015	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A7016	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A7017	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A7018	1854-0234	Q:SI NPN	
	1205-0011	HEAT DISSIPATOR:FOR TO-5 AND TO-9 CASES	
A7019	1854-0232	Q:SI NPN(SELECTED FROM 2N3440)	
A7020	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A7021	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A7022	1854-0232	Q:SI NPN(SELECTED FROM 2N3440)	
A7023	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A7R1	0757-0447	R:FXD MET FLM 16.2K OHM 1% 1/8W	
A7R2	0757-0443	R:FXD MET FLM 11.0K OHM 1% 1/8W	
A7R3	0698-3152	R:FXD MET FLM 3.48K 1% 1/8W	
A7R4	0698-0082	R:FXD MET FLM 464 OHM 1% 1/8W	
A7R5	0757-0464	R:FXD MET FLM 90.9K OHM 1% 1/8W	
A7R6	0698-3152	R:FXD MET FLM 3.48K 1% 1/8W	
A7R7	0698-3444	R:FXD MET FLM 316 OHM 1% 1/8W	
A7R8	0698-3418	R:FXD MET FLM 26.1K OHM 1% 1/2W	
A7R9	0757-0443	R:FXD MET FLM 11.0K OHM 1% 1/8W	
A7R10	0698-3418	R:FXD MET FLM 26.1K OHM 1% 1/2W	
A7R11	0757-0835	R:FXD MET FLM 6.81K OHM 1% 1/2W	
A7R12	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A7R13	0698-3444	R:FXD MET FLM 316 OHM 1% 1/8W	
A7R14	0698-0083	R:FXD MET FLM 1.96K OHM 1% 1/8W	
A7R15	0698-3154	R:FXD MET FLM 4.22K OHM 1% 1/8W	
A7R16	0757-0400	R:FXD MET FLM 90.9 OHM 1% 1/8W	
A7R17	0757-0279	R:FXD MET FLM 3.16K OHM 1% 1/8W	
A7R18	0698-3444	R:FXD MET FLM 316 OHM 1% 1/8W	
A7R19	0698-3444	R:FXD MET FLM 316 OHM 1% 1/8W	
A7R20	0698-3157	R:FXD MET FLM 19.6K 1% 1/8W	
A7R21		NOT ASSIGNED	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A7R22	0698-3444	R:FXD MET FLM 316 OHM 1% 1/8W	
A7R23	0757-0833	R:FXD MET FLM 5.11K OHM 1% 1/2W	
A7R24	0698-3157	R:FXD MET FLM 19.6K 1% 1/8W	
A7R25	0757-0443	R:FXD MET FLM 11.0K OHM 1% 1/8W	
A7R26	0757-0420	R:FXD MET FLM 750 OHM 1% 1/8W	
A7R27	0698-3157	R:FXD MET FLM 19.6K 1% 1/8W	
A7R28	0757-0443	R:FXD MET FLM 11.0K OHM 1% 1/8W	
A7R29	0757-0394	R:FXD MET FLM 51.1 OHM 1% 1/8W	
A7R30	0757-0420	R:FXD MET FLM 750 OHM 1% 1/8W	
A7R31	0698-3412	R:FXD MET FLM 3.83K OHM 1% 1/2W	
A7R32	0757-0858	R:FXD MET FLM 90.9K OHM 1% 1/2W	
A7R33	0757-0464	R:FXD MET FLM 90.9K OHM 1% 1/8W	
A7R34	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A7R35	0683-1555	R:FXD COMP 1.5 MEGOHM 5% 1/4W	
A7R36	0698-3647	R:FXD MET OX 15K OHM 5% 2W	
A7R37	0698-3444	R:FXD MET FLM 316 OHM 1% 1/8W	
A7R38	0698-3416	R:FXD MET FLM 21.5K OHM 1% 1/2W	
A7R39	0764-0020	R:FXD MET FLM 5600 OHM 5% 2W	
A7R40	0698-3153	R:FXD MET FLM 3.83K 1% 1/8W	
A7R41	0764-0006	R:FXD MET OX 18K OHM 5% 2W	
A7R42	0698-3444	R:FXD MET FLM 316 OHM 1% 1/8W	
A7R43	0698-3416	R:FXD MET FLM 21.5K OHM 1% 1/2W	
A7R44	0757-0858	R:FXD MET FLM 90.9K OHM 1% 1/2W	
A7R45	0683-1555	R:FXD COMP 1.5 MEGOHM 5% 1/4W	
A7R46	0757-0309	R:FXD MET FLM 61.9K OHM 1% 1/2W	
A7R47	0757-0130	R:FXD MET FLM 162K OHM 1% 1/2W	
A7R48	0698-3444	R:FXD MET FLM 316 OHM 1% 1/8W	
A7R49	0698-3455	R:FXD MET FLM 261K OHM 1% 1/8W	
A7R50	0698-3158	R:FXD MET FLM 23.7K OHM 1% 1/8W	
A7R51	0698-3421	R:FXD MET FLM 38.3K OHM 1% 1/2W	
A7R52	0757-0309	R:FXD MET FLM 61.9K OHM 1% 1/2W	
A7R53	0757-0063	R:FXD MET FLM 196K OHM 1% 1/2W	
A7R54	0757-0279	R:FXD MET FLM 3.16K OHM 1% 1/8W	
A7R55	0698-3444	R:FXD MET FLM 316 OHM 1% 1/8W	
A7R56	0698-3455	R:FXD MET FLM 261K OHM 1% 1/8W	
A7TB1	08552-2008	BOARD:BLANK PC	
A7VR1	1940-0021	TUBE:ELECTRON 103V REF TYPE	
A7VR2	1940-0021	TUBE:ELECTRON 103V REF TYPE	
A8	08552-6007	BOARD ASSY:LOG AMPLIFIER	
A8C1	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C2	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C3	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C4	0160-0162	C:FXD MY 0.022 UF 10% 200VDCW	
A8C5	0160-0162	C:FXD MY 0.022 UF 10% 200VDCW	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A8C6	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C7	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C8	0160-0339	C:FXD MICA 534 PF 1%	
A8C9	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C10	0160-2207	C:FXD MICA 300 PF 5%	
A8C11	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C12	0160-2207	C:FXD MICA 300 PF 5%	
A8C13	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C14	0160-2207	C:FXD MICA 300 PF 5%	
A8C15	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C16	0160-2207	C:FXD MICA 300 PF 5%	
A8C17	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C18	0160-2207	C:FXD MICA 300 PF 5%	
A8C19	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C20	0160-0162	C:FXD MY 0.022 UF 10% 200VDCW	
A8C21	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C22	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C23	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C24	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C25	0160-2207	C:FXD MICA 300 PF 5%	
A8C26	0160-0162	C:FXD MY 0.022 UF 10% 200VDCW	
A8C27	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C28	0160-2207	C:FXD MICA 300 PF 5%	
A8C29	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C30	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C31	0160-3048	C:FXD MICA 8000 PF 1% 100VDCW	
A8C32	0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	
A8C33	0160-2207	C:FXD MICA 300 PF 5%	
A8C34	0180-0197	C:FXD ELECT 2.2 UF 10% 20VDCW	
A8C35	0150-0121	C:FXD CER 0.1 UF +80-20% 50VDCW	
A8C36	0160-2199	C:FXD MICA 30 PF 5%	
A8C37	0140-0194	C:FXD MICA 110 PF 5%	
A8C38	0140-0193	C:FXD MICA 82 PF 5%	
A8CR1	1901-0050	DIODE:SILICON 75V	
A8CR2	1901-0050	DIODE:SILICON 75V	
A8CR3	1901-0179	DIODE:SILICON 15WV	
A8CR4	1901-0179	DIODE:SILICON 15WV	
A8CR5	1901-0028	DIODE:SILICON 0.75A 400PIV	
A8L1	9100-2474	COIL/CHOKE 5.6 UH 1%	
A8L2	9100-1641	COIL:MOLDED CHOKE 240.0 UH	
A8L3	9100-1641	COIL:MOLDED CHOKE 240.0 UH	
A8L4	9100-1641	COIL:MOLDED CHOKE 240.0 UH	
A8L5	9100-1641	COIL:MOLDED CHOKE 240.0 UH	
A8L6	9100-1641	COIL:MOLDED CHOKE 240.0 UH	
A8L7	9100-1641	COIL:MOLDED CHOKE 240.0 UH	
A8L8	9100-1641	COIL:MOLDED CHOKE 240.0 UH	
A8L9	9100-1641	COIL:MOLDED CHOKE 240.0 UH	
A8L10	9100-1641	COIL:MOLDED CHOKE 240.0 UH	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A8L11	9100-1641	COIL:MOLDED CHOKE 2400 UH	
A8L12	08552-6013	INDUCTOR ASSY:VAR IOT FREQUENCY ADJ	
A8L13	9100-1636	COIL/CHOKE 110 UH 5%	
A8L14	9100-1644	COIL/CHOKE 330 UH 5%	
A8Q1	1854-0351	Q:SI NPN	
A8Q2	1854-0351	Q:SI NPN	
A8Q3	1854-0351	Q:SI NPN	
A8Q4	1854-0351	Q:SI NPN	
A8Q5	1854-0351	Q:SI NPN	
A8Q6	1854-0351	Q:SI NPN	
A8Q7	1854-0351	Q:SI NPN	
A8Q8	1854-0351	Q:SI NPN	
A8Q9	1854-0351	Q:SI NPN	
A8Q10	1854-0351	Q:SI NPN	
A8Q11	1854-0351	Q:SI NPN	
A8Q12	1854-0351	Q:SI NPN	
A8Q13	1854-0351	Q:SI NPN	
A8Q14	1854-0351	Q:SI NPN	
A8Q15	1854-0351	Q:SI NPN	
A8Q16	1854-0351	Q:SI NPN	
A8Q17	1854-0351	Q:SI NPN	
A8Q18	1854-0351	Q:SI NPN	
A8Q19	1854-0351	Q:SI NPN	
A8Q20	1854-0351	Q:SI NPN	
A8Q21	1854-0351	Q:SI NPN	
A8Q22	1854-0351	Q:SI NPN	
A8Q23	1854-0351	Q:SI NPN	
A8Q24	1854-0351	Q:SI NPN	
A8Q25	1853-0010	Q:SI PNP(SELECTED FROM 2N3251)	
A8Q26	1854-0039	Q:SI NPN	
A8Q27	1854-0351	Q:SI NPN	
A8Q28	1853-0010	Q:SI PNP(SELECTED FROM 2N3251)	
A8Q29	1853-0010	Q:SI PNP(SELECTED FROM 2N3251)	
A8R1	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A8R2	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A8R3	0698-0083	R:FXD MET FLM 1.96K OHM 1% 1/8W FACTORY SELECTED PART	
A8R4	0698-3440	R:FXD MET FLM 196 OHM 1% 1/8W	
A8R5	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A8R6	0698-3419	R:FXD MET FLM 31.6K OHM 1% 1/2W	
A8R7	0698-6694	R:FXD MET FLM 178 OHM 0.25% 1/8W	
A8R8	0698-3419	R:FXD MET FLM 31.6K OHM 1% 1/2W	
A8R9	0698-6696	R:FXD MET FLM 619 OHM 0.25% 1/8W	
A8R10	0757-0279	R:FXD MET FLM 3.16K OHM 1% 1/8W	
A8R11	0757-0279	R:FXD MET FLM 3.16K OHM 1% 1/8W	
A8R12	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A8R13	0757-0280	R:FXD MET FLM 1K OHM [illegible] 8W	
A8R14	0698-3419	R:FXD MET FLM 31.6K OHM 1% 1/2W	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A8R15	0698-6694	R:FXD MET FLM 178 OHM 0.25% 1/8W	
A8R16	0698-3419	R:FXD MET FLM 31.6K OHM 1% 1/2W	
A8R17	0698-6696	R:FXD MET FLM 619 OHM 0.25% 1/8W	
A8R18	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A8R19	0757-0440	R:FXD MET FLM 7.50K 1% 1/8W	
A8R20	0757-0279	R:FXD MET FLM 3.16K OHM 1% 1/8W	
A8R21	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A8R22	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A8R23	0698-3419	R:FXD MET FLM 31.6K OHM 1% 1/2W	
A8R24	0698-6694	R:FXD MET FLM 178 OHM 0.25% 1/8W	
A8R25	0698-3419	R:FXD MET FLM 31.6K OHM 1% 1/2W	
A8R26	0698-6696	R:FXD MET FLM 619 OHM 0.25% 1/8W	
A8R27	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A8R28	0757-0440	R:FXD MET FLM 7.50K 1% 1/8W	
A8R29	0757-0279	R:FXD MET FLM 3.16K OHM 1% 1/8W	
A8R30	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A8R31	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A8R32	0698-3419	R:FXD MET FLM 31.6K OHM 1% 1/2W	
A8R33	0698-6694	R:FXD MET FLM 178 OHM 0.25% 1/8W	
A8R34	0698-3419	R:FXD MET FLM 31.6K OHM 1% 1/2W	
A8R35	0698-6696	R:FXD MET FLM 619 OHM 0.25% 1/8W	
A8R36	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A8R37	0757-0440	R:FXD MET FLM 7.50K 1% 1/8W	
A8R38	0757-0279	R:FXD MET FLM 3.16K OHM 1% 1/8W	
A8R39	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A8R40	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A8R41	0698-3419	R:FXD MET FLM 31.6K OHM 1% 1/2W	
A8R42	0698-6694	R:FXD MET FLM 178 OHM 0.25% 1/8W	
A8R43	0698-3419	R:FXD MET FLM 31.6K OHM 1% 1/2W	
A8R44	0698-6696	R:FXD MET FLM 619 OHM 0.25% 1/8W	
A8R45	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A8R46	0757-0440	R:FXD MET FLM 7.50K 1% 1/8W	
A8R47	0698-3446	R:FXD MET FLM 383 OHM 1% 1/8W	
A8R48	0757-0279	R:FXD MET FLM 3.16K OHM 1% 1/8W	
A8R49	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A8R50	0698-3446	R:FXD MET FLM 383 OHM 1% 1/8W	
A8R51	0698-3440	R:FXD MET FLM 196 OHM 1% 1/8W	
A8R52	2100-2413	R:VAR FLM 200 OHM 10% LIN 1/2W LINEAR GAIN	
A8R53	0698-3417	R:FXD MET FLM 23.7K OHM 1% 1/2W	
A8R54	0698-6696	R:FXD MET FLM 619 OHM 0.25% 1/8W	
A8R55	0698-6694	R:FXD MET FLM 178 OHM 0.25% 1/8W	
A8R56	0698-3419	R:FXD MET FLM 31.6K OHM 1% 1/2W	
A8R57	0698-3419	R:FXD MET FLM 31.6K OHM 1% 1/2W	
A8R58	0698-3417	R:FXD MET FLM 23.7K OHM 1% 1/2W	
A8R59	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A8R60	0757-0440	R:FXD MET FLM 7.50K 1% 1/8W	
A8R61	0698-3446	R:FXD MET FLM 383 OHM 1% 1/8W	
A8R62	0698-3440	R:FXD MET FLM 196 OHM 1% 1/8W	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A8R63	2100-1755	R:VAR WW 100 OHM 5% TYPE V 1W 4DB ADJ	
A8R64	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A8R65	0698-3159	R:FXD MET FLM 26.1K OHM 1% 1/8W	
A8R66	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A8R67	0698-3152	R:FXD MET FLM 3.48K 1% 1/8W	
A8R68	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A8R69	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A8R70	0698-6696	R:FXD MET FLM 619 OHM 0.25% 1/8W	
A8R71	0698-6694	R:FXD MET FLM 178 OHM 0.25% 1/8W	
A8R72	0698-3419	R:FXD MET FLM 31.6K OHM 1% 1/2W	
A8R73	0698-3419	R:FXD MET FLM 31.6K OHM 1% 1/2W	
A8R74	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A8R75	0757-0440	R:FXD MET FLM 7.50K 1% 1/8W	
A8R76	0757-0279	R:FXD MET FLM 3.16K OHM 1% 1/8W	
A8R77	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A8R78	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A8R79	0757-0420	R:FXD MET FLM 750 OHM 1% 1/8W	
A8R80	0698-6694	R:FXD MET FLM 178 OHM 0.25% 1/8W	
A8R81	0698-3419	R:FXD MET FLM 31.6K OHM 1% 1/2W	
A8R82	0698-3419	R:FXD MET FLM 31.6K OHM 1% 1/2W	
A8R83	0757-0279	R:FXD MET FLM 3.16K OHM 1% 1/8W	
A8R84	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A8R85	0698-3446	R:FXD MET FLM 383 OHM 1% 1/8W	
A8R86	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A8R87	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A8R88	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A8R89	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A8R90	0698-3450	R:FXD MET FLM 42.2K OHM 1% 1/8W	
A8R91	0698-3154	R:FXD MET FLM 4.22K OHM 1% 1/8W	
A8R92	0698-3156	R:FXD MET FLM 14.7K OHM 1% 1/8W	
A8R93	0764-0012	R:FXD MET FLM 6800 OHM 5% 2W	
A8R94	0757-0394	R:FXD MET FLM 51.1 OHM 1% 1/8W	
A8R95	0757-0424	R:FXD MET FLM 1.10K OHM 1% 1/8W	
A8R96	0757-0440	R:FXD MET FLM 7.50K 1% 1/8W	
A8R97	0698-3154	R:FXD MET FLM 4.22K OHM 1% 1/8W	
A8T81	08552-2007	BOARD:BLANK PC	
A9	08552-6021	SWITCH ASSY:SCAN TIME	
	08552-0015	DIAL-KNOB ASSY:SCAN TIME	
	0370-0432	KNOB:BLACK LEVER	
A9C1	0180-2125	C:FXD ELECT 15 UF 5% 20VDCW	
A9C2	0180-2126	C:FXD ELECT 1.5 UF 5% 35VDCW	
A9C3	0180-2127	C:FXD ELECT 0.15 UF 5% 35VDCW	
A9C4	0160-3017	C:FXD MY 0.015 UF 5% 200VDCW	
A9R1	0757-0459	R:FXD MET FLM 56.2K OHM 1% 1/8W	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A9R2	0698-3449	R:FXD MET FLM 28.7K OHM 1% 1/8W	
A9R3	0757-0443	R:FXD MET FLM 11.0K OHM 1% 1/8W	
A9R4	0757-0443	R:FXD MET FLM 11.0K OHM 1% 1/8W	
A9R5	0757-0467	R:FXD MET FLM 121K OHM 1% 1/8W	
A9R6	0686-2055	R:FXD COMP 2 MEGOHM 5% 1/2W	
A9R7	0698-3271	R:FXD MET FLM 115K OHM 1% 1/8W	
A9R8	0698-3271	R:FXD MET FLM 115K OHM 1% 1/8W	
A9R9	0698-3157	R:FXD MET FLM 19.6K 1% 1/8W	
A9R10	0698-3157	R:FXD MET FLM 19.6K 1% 1/8W	
A9R11	0698-3271	R:FXD MET FLM 115K OHM 1% 1/8W	
A9R12	0698-3271	R:FXD MET FLM 115K OHM 1% 1/8W	
A9R13	0698-3271	R:FXD MET FLM 115K OHM 1% 1/8W	
A9R14	0698-3271	R:FXD MET FLM 115K OHM 1% 1/8W	
A9R15	0698-3260	R:FXD MET FLM 464K OHM 1% 1/8W	
A9R16	0698-3260	R:FXD MET FLM 464K OHM 1% 1/8W	
A9R17	0698-3260	R:FXD MET FLM 464K OHM 1% 1/8W	
A9R18	0698-3260	R:FXD MET FLM 464K OHM 1% 1/8W	
A9R19	0698-3260	R:FXD MET FLM 464K OHM 1% 1/8W	
A9R20	0698-3260	R:FXD MET FLM 464K OHM 1% 1/8W	
A9S1	3100-2093	SWITCH:ROTARY	

See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designator

Reference Designation	Part No.	Description #	Note
A10	08552-6020	SWITCH ASSY:REFERENCE LEVEL	
	08552-0016	DIAL-KNOB ASSY:LOG REF. FINE	
	0370-0432	KNOB:BLACK LEVER	
	08552-4006	INDICATOR UNIT:IF GAIN	
A10L1	9100-1630	COIL/CHOKE 51.0 UH 5%	
A10R1	0698-6310	R:FXD MET FLM 78.41 OHM 0.25% 1/8W	
A10R2	0698-5401	R:FXD MET FLM 247.50 OHM 0.25% 1/8W	
A10R3	0698-6311	R:FXD MET FLM 139.8 OHM 0.25% 1/8W	
A10R4	0698-0082	R:FXD MET FLM 464 OHM 1% 1/8W	
A10R5	0757-1094	R:FXD MET FLM 1.47K OHM 1% 1/8W	
A10R6	0698-6941	R:FXD MET FLM 114.6 OHM 0.25% 1/8W	
A10R7	0757-0440	R:FXD MET FLM 7.50K 1% 1/8W	
A10R8	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W(FACTORY SELECTED PART)	
A10R9	0698-3160	R:FXD MET FLM 31.6K 1% 1/8W(FACTORY SELECTED PART)	
A10S1	3100-2092	SWITCH:ROTARY LOG REF LEVEL	
A11	08552-6022	SWITCH ASSY:VIDEO FILTER	
A11C1	0180-0291	C:FXD ELECT 1.0 UF 10% 35VDCW	
A11C2	0160-0161	C:FXD MY 0.01 UF 10% 200VDCW	
A11R1	0698-4207	R:FXD MET FLM 44.2K OHM 1% 1/8W	
A11R2	0698-4507	R:FXD MET FLM 76.8K OHM 1% 1/8W	
A11S1	3100-2096	SWITCH:LEVER	
C1	0160-2049	C:FXD CER 5000 PF 80/20%	
C2	0160-2049	C:FXD CER 5000 PF 80/20%	
C3	0160-2049	C:FXD CER 5000 PF 80/20%	
C4	0150-0093	C:FXD CER 0.01 UF +80-20% 100VDCW	
C5	0160-3219	C:FXD FEED-THRU 100 PF	
CR1	1901-0416	DIODE:SILICON 200PIV 3A	
DS1	2140-0058	LAMP:INCANDESCENT 10V	
DS2	2140-0058	LAMP:INCANDESCENT 10V	
DS3	2140-0058	LAMP:INCANDESCENT 10V	
DS4	2140-0058	LAMP:INCANDESCENT 10V	
DS5	2140-0058	LAMP:INCANDESCENT 10V	
DS6	2140-0058	LAMP:INCANDESCENT 10V	
DS7	2140-0258	LAMP:INCANDESCENT 10V	
	5040-0235	BASE:LAMPHOLDER	
	08552-8001	LAMPHOLDER:PLUS	
DS8	2140-0258	LAMP:INCANDESCENT 10V	
	5040-0235	BASE:LAMPHOLDER	
	08552-8002	LAMPHOLDER:TIMES	
DS9	2140-0022	LAMP:GLOW NEON NE-2E 90V	
DS9	5040-0234	LAMPHOLDER	
DS9	5040-0235	BASE:LAMPHOLDER	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designation

Reference Designation	Part No.	Description #	Note
F1	2110-0661	FUSE:CARTRIDGE 1A 250V FAST-BLOW	
F1	2110-0281	FUSEHOLDER:DUAL,CLIP	
F2	2110-0661	FUSE:CARTRIDGE 1A 250V FAST-BLOW	
F2	2110-0281	FUSEHOLDER:DUAL,CLIP	
J1	1250-0118	CONNECTOR:BNC	
J1	1250-0102	CONNECTOR:BNC	
J2	1250-0118	CONNECTOR:BNC	
J3	1251-2080	CONNECTOR:41 FEMALE CONTACT	
J4	1250-0830	CONNECTOR:RF	
J4		PART OF W6 CABLE ASSY	
J5	1250-0830	CONNECTOR:RF	
L1	9140-0142	COIL:FXD RF 2.2 UH	
L2	9140-0142	COIL:FXD RF 2.2 UH	
L3	9140-0142	COIL:FXD RF 2.2 UH	
L4	9100-1615	COIL/CHOKE FXD 1.20 UH 10%	
MP1	08552-0001	PANEL:FRONT	
MP2	08552-0002	PANEL:SUB	
MP3	08552-0003	PANEL:REAR	
MP4	08552-0008	COVER:BOTTOM	
MP5	08552-0009	COVER:SHIELD	
MP6	08552-0009	COVER:SHIELD	
MP7	08552-00104	PLATE:CONNECTOR	
MP8	08552-0013	BRACKET:POT	
MP9	08552-2044	BAR LATCH	
P1	1251-0055	CONNECTOR:MALE 24 CONTACTS	
Q23	1853-0052	Q:SI PNP	
Q23	0340-0162	INSULATOR:TRANSISTOR	
Q23	1200-0168	SOCKET:TRANSISTOR	
Q24	1854-0237	Q:SI NPN	
Q24	0340-0162	INSULATOR:TRANSISTOR	
Q24	1200-0168	SOCKET:TRANSISTOR	
R1	0811-2501	R:FXD WW 180 OHM 3% 50W	
R2	0683-3315	R:FXD COMP 330 OHM 5% 1/4W	
R3	0683-3315	R:FXD COMP 330 OHM 5% 1/4W	
R4	2100-2492	R:VAR COMP 5K OHM 20% LIN 1/2W	
R4		HORIZONAL POSITION	
R5	2100-2488	R:VAR COMP 10K OHM 20% LIN 1/2W	
R5		HORIZONAL GAIN	
R6	0757-0441	R:FXD MET FLM 8.25K 1% 1/8W	
R7	0767-0010	R:FXD MET FLM 15K OHM 5% 3W	
R8	0767-0010	R:FXD MET FLM 15K OHM 5% 3W	
R9	0757-0461	R:FXD MET FLM 68.1K OHM 1% 1/8W	
R10	2100-2564	R:VAR COMP 2.5K OHM 20% LIN 2.25W	
R10		BASE LINE CLIPPER	
R10	08552-0014	DIAL-KNOB ASSY:IF LEVEL	
R10	0370-0103	KNOB:BLK W/ARROW 5/8" OD 1/4" SHAFT	
R11	2100-2661	R:VAR COMP 1K OHM 20% LIN 1/2W	
R11		VERTICAL GAIN	

 # See introduction to this section for ordering information

Table 6-3. Parts List Indexed by Reference Designation

Reference Designation	Part No.	Description #	Note
R12	2100-2501	R:VAR WW 2K OHM 20% LIN 1.5W	
R12		LOG REF LEVEL VERNIER	
R12	0370-0432	KNOB:BLACK LEVER	
R13	0698-3400	R:FXD MET FLM 147 OHM 1% 1/2W	
R14	0698-3400	R:FXD MET FLM 147 OHM 1% 1/2W	
R15	2100-2488	R:VAR COMP 10K OHM 20% LIN 1/2W	
R15		VERTICAL POSITION	
R16	0687-2731	R:FXD COMP 27K OHM 10% 1/2W	
R17	0812-0100	R:FXD WW 2K OHM 5% 5W	
R18	0811-1666	R:FXD WW 1.0 OHM 5% 2W	
R19	0683-1045	R:FXD COMP 100K OHMS 5% 1/4W	
S1	3101-1338	SWITCH:SLIDE DPDT 0.5A 125V AC/DC	
		LOG LINEAR	
S2	3101-0052	SWITCH:PUSHBUTTON SPST	
		SINGLE SCAN	
S3	08552-6062	SWITCH ASSY:SCAN MODE	
S4	08552-6061	SWITCH ASSY:SCAN TRIGGER	
W1	8120-1110	CABLE:RF(GREEN)	
W2	8120-1111	CABLE:RF(BLUE)	
W3	08552-6015	CABLE ASSY:GRAY	
W4	08552-6027	CABLE ASSY:CAL. OUTPUT	
W4	1250-0050	NUT:CLAMP	
W4	1250-0051	PIN:CONNECTOR	
W4	1250-0252	BODY:RF CONNECTOR BULKHEAD RECEPTACLE	
W5	08552-6028	CABLE ASSY:RED	
W6	08552-6037	CABLE ASSY:VERT. OUTPUT	
W6	1250-0118	CONNECTOR:BNC	
W7	08552-6038	CABLE ASSY:50 MHZ	
W7	1250-0824	CONNECTOR:RF FOR RG-188U CABLE	
W7	1251-0180	INSERT:R & P CONNECTOR	
W8	08552-6039	CABLE ASSY:47 MHZ(YELLOW STRIPE)	
W8	1250-0824	CONNECTOR:RF FOR RG-188U CABLE	
W8	1251-0180	INSERT:R & P CONNECTOR	
		MISCELLANEOUS	
	0403-0026	GLIDE:NYLON	
	0510-0048	FASTENER:6-32 THREADED HOLE	
	0590-0159	NUT:HEX FOR 0160-3219 CAPACITOR	
	1400-0093	CLAMP:CABLE	
	1460-0931	SPRING:EXTENSION	
	1490-0838	STUD:LATCHING #8-32 THREAD	
	1600-0110	STAMPING:METAL	
	2190-0057	WASHER:LOCK FOR #12 HDW	
	3050-0381	WASHER:THRUST(DELRIN)	
	03950-4001	EXTRACTOR:TOOL	
	08552-0018	BRACKET:SHIELD	
	08552-0025	INSULATOR:VERTICAL	
	08552-0026	BRACE	
	08552-2016	RETAINER:BULB	
	08552-4001	HANDLE:LATCH	

 # See introduction to this section for ordering information

Table 6-4. Parts Indexed by HP Part Number

Part No.	Description #	Mfr.	Mfr. Part No.	TQ
0121-0036	C:VAR CER 5.5-18 PF	28480	0121-0036	5
0121-0059	C:VAR CER 2-8 PF 300VDCW	28480	0121-0059	6
0121-0105	C:VAR CER 9-35 PF NPO	28480	0121-0105	7
0121-0457	C:VAR GL 0.8-8.5 PF 750VDCW	28480	0121-0457	1
0122-0042	C:VOLTAGE VAR 15.9 PF +/-2% AT 6V	28480	0122-0042	1
0122-0043	C:VOLTAGE VAR 39-17.95PF 2% 4-25VDCW	28480	0122-0043	2
0122-0044	C:VOLTAGE VAR 100-45.9PF 2% 4-25VDCW	28480	0122-0044	2
0122-0211	C:VOLTAGE VAR 39 PF 1N4810A	28480	0122-0211	1
0122-0221	C:VOLTAGE VAR 100 PF 10% 30VDCW	28480	0122-0221	2
0140-0192	C:FXD MICA 68 PF 5%	28480	0140-0192	1
0140-0193	C:FXD MICA 82 PF 5%	28480	0140-0193	1
0140-0194	C:FXD MICA 110 PF 5%	72136	RDM15F111J3C	4
0140-0198	C:FXD MICA 200 PF 5%	72136	RDM15F201J3C	1
0140-0205	C:FXD MICA 62 PF 5%	28480	0140-0205	3
0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	56289	C067B102E102ZE19-CDH	19
0150-0093	C:FXD CER 0.01 UF +80-20% 100VDCW	91418	TA	1
0150-0121	C:FXD CER 0.1 UF +80-20% 50VDCW	56289	5C50BIS-CML	2
0160-0145	C:FXD MICA 82PF 2% 100VDCW	04062	RDM15E820G6S	2
0160-0153	C:FXD MY 0.001 UF 10% 200VDCW	56289	192P1C292-PTS	3
0160-0161	C:FXD MY 0.01 UF 10% 200VDCW	56289	192P10392-PTS	1
0160-0162	C:FXD MY 0.022 UF 10% 200VDCW	56289	192P22392-PTS	5
0160-0163	C:FXD MY 0.033 UF 10% 200VDCW	56289	192P33392-PTS	2
0160-0339	C:FXD MICA 534 PF 1%	28480	0160-0339	1
0160-0380	C:FXD MY 0.22 UF 10% 200VDCW	28480	0160-0380	1
0160-0778	C:FXD CER 56 PF 10% 500VDCW	01121	FB2B	2
0160-0939	C: FXD MICA 430 PF 5% 300 VDCW	28480	0160-0939	2
0160-2049	C:FXD CER 5000 PF 80/20%	28480	0160-2049	3
0160-2101	C:FXD MICA 27PF 2% 300VDCW	72136	RDM15E270G3C	1
0160-2142	C:FXD CER 1500 PF +100-0% 500VDCW	91418	TYPE SM	1
0160-2143	C:FXD CER 2000 PF +80-20% 1000VDCW	91418	TYPE B	1
0160-2144	C:FXD CER 3300 PF +80-20% 1KV	91418	TYPE B	2
0160-2145	C:FXD CER 5000 PF +80-20% 100VDCW	91418	TA	1
0160-2199	C:FXD MICA 30 PF 5%	28480	0160-2199	3
0160-2201	C:FXD MICA 51 PF 5%	72136	RDM15E510J1C	2
0160-2204	C:FXD MICA 100PF 5%	72136	RDM15F101J3C	1
0160-2206	C:FXD MICA 160 PF 5%	28480	0160-2206	1
0160-2207	C:FXD MICA 300 PF 5%	28480	0160-2207	8
0160-2208	C:FXD MICA 330 PF 5% 300VDCW	28480	0160-2208	1
0160-2218	C:FXD MICA 1000 PF 5%	28480	0160-2218	1
0160-2236	C:FXD CER 1.0-0.25 PF 500VDCW	72982	301-000-COKO-109C	1
0160-2246	C:FXD CER 3.6+/-0.25 PF 500VDCW	72982	301-000-COJO-369C	4
0160-2254	C:FXD CER 7.5-0.25 PF 500VDCW	72982	301-000-COHO-759C	3
0160-2257	C:FXD CER 10 PF 5% 500VDCW	72982	301-000-COHO-100J	2
0160-2258	C:FXD CER 11 PF 5% 500VDCW	72982	301-000-COGO-110J	4
0160-2263	C:FXD CER 18 PF 5% 500VDCW	72982	301-000-COGO-180J	1
0160-2265	C:FXD CER 22 PF 5% 500VDCW	72982	301-NPO-22PF	1
0160-2307	C:FXD MICA 47 PF 5%	28480	0160-2307	1
0160-2917	C:FXD CER 0.05 UF +80-20% 100VDCW	84411	TYPE TA	8
0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	91418	TA	85
0160-3017	C:FXD MY 0.015 UF 5% 200VDCW	28480	0160-3017	1
0160-3020	C:FXD CER 3.9+/-0.1 PF 500VDCW	72982	301-000-COJO-399B	1
0160-3022	C:FXD CER 16 PF 1% 500VDCW	72982	301-000-COGO 160F	1
0160-3024	C:FXD MICA 1700 PF 1% 100VDCW	28480	0160-3024	4
0160-3045	C:FXD MICA 53.8 PF 1% 100VDCW	28480	0160-3045	1

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Table 6-4. Parts Indexed by HP Part Number

Part No.	Description #	Mfr.	Mfr. Part No.	TQ
0160-3046	C:FXD MICA 250 PF 1% 100VDCW	28480	0160-3046	1
0160-3047	C:FXD MICA 3280 PF 1% 100VDCW	28480	0160-3047	1
0160-3048	C:FXD MICA 8000 PF 1% 100VDCW	28480	0160-3048	2
0160-3090	C:FXD CER 22 PF 1% 500VDCW	72982	301-000-S2H0-220F	2
0160-3132	C:FXD CER 200 PF 10% 500VDCW	71590	CC32-TCN 200	4
0160-3208	C:FXD CER 0.025 UF +80-20% 100VDCW	84411	TA	19
0160-3219	C:FXD FEED-THRU 100 PF	28480	0160-3219	1
0180-0098	C:FXD ELECT 100 UF 20% 20VDCW	56289	150D107X0020S2-DYS	1
0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	28480	0180-0116	17
0180-0197	C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS	3
0180-0291	C:FXD ELECT 1.0 UF 10% 35VDCW	56289	150D105X9035A2-DYS	4
0180-1743	C:FXD ELECT 0.1 UF 10% 35VDCW	56289	150D104X9035A2-DYS	1
0180-1746	C:FXD ELECT 15 UF 10% 20VDCW	28480	0180-1746	1
0180-1747	C:FXD ELECT 150 UF 20% 15VDCW	28480	0180-1747	2
0180-2125	C:FXD ELECT 15 UF 5% 20VDCW	28480	0180-2125	1
0180-2126	C:FXD ELECT 1.5 UF 5% 35VDCW	28480	0180-2126	1
0180-2127	C:FXD ELECT 0.15 UF 5% 35VDCW	28480	0180-2127	1
0180-2268	C:FXD ELECT 140 UF 10%	28480	0180-2288	1
0340-0038	FEEDTHRU:TERMINAL	28480	0340-0038	1
0340-0039	INSULATOR:BUSHING	28480	0340-0039	5
0340-0162	INSULATOR:TRANSISTOR	28480	0340-0162	2
0360-1514	TERMINAL PIN:SQUARE	28480	0360-1514	1
0370-0103	KNOB:BLK W/ARROW 5/8" OD 1/4" SHAFT	28480	0370-0103	1
0370-0432	KNOB:BLACK LEVER	28480	0370-0432	3
0380-0810	STANDOFF:0.437" LG	08145	153087/16-11	2
0403-0026	GLIDE:NYLON	28480	0403-0026	1
0410-0139	CRYSTAL:QUARTZ(MATCHED SET OF 3)	28480	0410-0139	1
0490-0743	RELAY:REED	28480	0490-0743	3
0510-0048	FASTENER:6-32 THREADED HOLE	16585	T71C065-632	1
0590-0060	NUT:HEX 12-32 UNEF-2B	01121	M-6377	1
0590-0159	NUT:HEX FOR 0160-3219 CAPACITOR	72982	2499-202	1
0683-0275	R:FXD COMP 2.7 OHM 5% 1/4W	01121	CB 27G5	3
0683-1045	R:FXD COMP 100K OHMS 5% 1/4W	01121	CB 1045	1
0683-1555	R:FXD COMP 1.5 MEGOHM 5% 1/4W	01121	CB 1555	2
0683-3315	R:FXD COMP 330 OHM 5% 1/4W	01121	CB 3315	2
0683-5145	R:FXD COMP 510K OHM 5% 1/4W	01121	CB 5145	1
0683-9145	R:FXD COMP 910K OHM 5% 1/4W	01121	CB 9145	2
0686-2055	R:FXD COMP 2 MEGOHM 5% 1/2W	01121	EB 2055	1
0687-2731	R:FXD COMP 27K OHM 10% 1/2W	01121	EB 2731	1
0698-0082	R:FXD MET FLM 464 OHM 1% 1/8W	14674	C4	4
0698-0083	R:FXD MET FLM 1.96K OHM 1% 1/8W	14674	C4	4
0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	14674	C4	25
0698-0085	R:FXD MET FLM 2.61K OHM 1% 1/8W	14674	C4	2
0698-0089	R:FXD MET FLM 1780 OHM 1% 1/2W	28480	0698-0089	1
0698-3132	R:FXD FLM 261 OHM 1% 1/8W	28480	0698-3132	3
0698-3136	R:FXD MET FLM 17.8K OHM 1% 1/8W	14674	C4	5
0698-3150	R:FXD MET FLM 2.37K OHM 1% 1/8W	28480	0698-3150	3
0698-3151	R:FXD MET FLM 2.87K OHM 1% 1/8W	28480	0698-3151	1
0698-3152	R:FXD MET FLM 3.48K 1% 1/8W	14674	C4	4
0698-3153	R:FXD MET FLM 3.83K 1% 1/8W	91637	MFF-1/10-32	1
0698-3154	R:FXD MET FLM 4.22K OHM 1% 1/8W	28480	0698-3154	6
0698-3155	R:FXD MET FLM 4.64K 1% 1/8W	91637	MFF-1/10-32	1
0698-3156	R:FXD MET FLM 14.7K OHM 1% 1/8W	14674	C4	5
0698-3157	R:FXD MET FLM 19.6K 1% 1/8W	14674	C4	7

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Table 6-4. Parts Indexed by HP Part Number

Part No.	Description #	Mfr.	Mfr. Part No.	TQ
0698-3158	R:FXD MET FLM 23.7K OHM 1% 1/8W	28480	0698-3158	4
0698-3159	R:FXD MET FLM 26.1K OHM 1% 1/8W	75042	CEA	1
0698-3160	R:FXD MET FLM 31.6K 1% 1/8W	14674	C4	3
0698-3161	R:FXD MET FLM 38.3K 1% 1/8W	14674	C4	4
0698-3162	R:FXD MET FLM 46.4K OHM 1% 1/8W	28480	0698-3162	4
0698-3260	R:FXD MET FLM 464K OHM 1% 1/8W	91637	CMF-1/10-32	7
0698-3271	R:FXD MET FLM 115K OHM 1% 1/8W	28480	0698-3271	6
0698-3400	R:FXD MET FLM 147 OHM 1% 1/2W	28480	0698-3400	2
0698-3408	R:FXD MET FLM 2.15 1% 1/2W	91637	MFF-1/2-10	1
0698-3412	R:FXD MET FLM 3.83K OHM 1% 1/2W	91637	MFF-1/2-10	1
0698-3416	R:FXD MET FLM 21.5K OHM 1% 1/2W	28480	0698-3416	2
0698-3417	R:FXD MET FLM 23.7K OHM 1% 1/2W	28480	0698-3417	2
0698-3418	R:FXD MET FLM 26.1K OHM 1% 1/2W	28480	0698-3418	2
0698-3419	R:FXD MET FLM 31.6K OHM 1% 1/2W	28480	0698-3419	17
0698-3420	R:FXD MET FLM 34.8K OHM 1% 1/2W	28480	0698-3420	1
0698-3421	R:FXD MET FLM 38.3K OHM 1% 1/2W	28480	0698-3421	1
0698-3428	R:FXD MET FLM 14.7 OHM 1% 1/8W	28480	0698-3428	2
0698-3429	R:FXD MET FLM 19.6 OHM 1% 1/8W	28480	0698-3429	1
0698-3431	R:FXD MET FLM 23.7 OHM 1% 1/8W	28480	0698-3431	1
0698-3438	R:FXD MET FLM 147 OHM 1% 1/8W	28480	0698-3438	1
0698-3439	R:FXD MET FLM 178 OHM 1% 1/8W	14674	C4	2
0698-3440	R:FXD MET FLM 196 OHM 1% 1/8W	91637	MF-1/10-32	3
0698-3441	R:FXD MET FLM 215 OHM 1% 1/8W	91637	MF-1/10-32	4
0698-3444	R:FXD MET FLM 316 OHM 1% 1/8W	28480	0698-3444	9
0698-3445	R:FXD MET FLM 348 OHM 1% 1/8W	14674	C4	6
0698-3446	R:FXD MET FLM 383 OHM 1% 1/8W	14674	C4	8
0698-3449	R:FXD MET FLM 28.7K OHM 1% 1/8W	14674	C4	1
0698-3450	R:FXD MET FLM 42.2K OHM 1% 1/8W	28480	0698-3450	2
0698-3451	R:FXD MET FLM 133K OHM 1% 1/8W	28480	0698-3451	3
0698-3454	R:FXD MET FLM 215K OHM 1% 1/8W	28480	0698-3454	5
0698-3455	R:FXD MET FLM 261K OHM 1% 1/8W	28480	0698-3455	3
0698-3558	R:FXD MET FLM 4.02K OHM 1% 1/8W	28480	0698-3558	3
0698-3647	R:FXD MET OX 15K OHM 5% 2W	28480	0698-3647	1
0698-4207	R:FXD MET FLM 44.2K OHM 1% 1/8W	28480	0698-4207	1
0698-4507	R:FXD MET FLM 76.8K OHM 1% 1/8W	28480	0698-4507	1
0698-5401	R:FXD MET FLM 247.50 OHM 0.25% 1/8W	28480	0698-5401	1
0698-6310	R:FXD MET FLM 78.41 OHM 0.25% 1/8W	28480	0698-6310	1
0698-6311	R:FXD MET FLM 139.8 OHM 0.25% 1/8W	28480	0698-6311	1
0698-6694	R:FXD MET FLM 178 OHM 0.25% 1/8W	28480	0698-6694	8
0698-6696	R:FXD MET FLM 619 OHM 0.25% 1/8W	28480	0698-6696	7
0698-6941	R:FXD MET FLM 114.6 OHM 0.25% 1/8W	28480	0698-6941	1
0698-7215	R:FXD FLM 133 OHM 2% 1/8W	28480	0698-7215	1
0698-7216	R:FXD MET FLM 147 OHM 2% 1/8W	28480	0698-7216	1
0699-0001	R:FXD COMP 2.7 OHM 10% 1/2W	01121	EB 27G1	2
0757-0063	R:FXD MET FLM 196K OHM 1% 1/2W	28480	0757-0063	1
0757-0122	R:FXD MET FLM 27.1K OHM 1% 1/8W	28480	0757-0122	1
0757-0123	R:FXD MET FLM 34.8K OHM 1% 1/8W	91637	MF-1/10-32	3
0757-0130	R:FXD MET FLM 162K OHM 1% 1/2W	28480	0757-0130	1
0757-0159	R:FXD MET FLM 1000 OHM 1% 1/2W	28480	0757-0159	1
0757-0180	R:FXD MET FLM 31.6 OHM 1% 1/8W	28480	0757-0180	1
0757-0199	R:FXD MET FLM 21.5K OHM 1% 1/8W	14674	C4	7
0757-0200	R:FXD MET FLM 5.62K OHM 1% 1/8W	14674	C4	2
0757-0274	R:FXD MET FLM 1.21K OHM 1% 1/8W	28480	0757-0274	14
0757-0276	R:FXD MET FLM 61.9 OHM 1% 1/8W	28480	0757-0276	5

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Table 6-4. Parts Indexed by HP Part Number

Part No.	Description #	Mfr.	Mfr. Part No.	TQ
0757-0278	R:FXD MET FLM 1.78K OHM 1% 1/8W	28480	0757-0278	2
0757-0279	R:FXD MET FLM 3.16K OHM 1% 1/8W	14674	C4	13
0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	14674	C4	32
0757-0288	R:FXD MET FLM 9.09K OHM 1% 1/8W	14674	C4	1
0757-0289	R:FXD MET FLM 13.3K OHM 1% 1/8W	28480	0757-0289	2
0757-0290	R:FXD MET FLM 6.19K OHM 1% 1/8W	28480	0757-0290	3
0757-0294	R:FXD MET FLM 17.8 OHM 1% 1/8W	28480	0757-0294	1
0757-0309	R:FXD MET FLM 61.9K OHM 1% 1/2W	28480	0757-0309	2
0757-0316	R:FXD MET FLM 42.2 OHM 1% 1/8W	28480	0757-0316	1
0757-0317	R:FXD MET FLM 1.33K OHM 1% 1/8W	28480	0757-0317	1
0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	28480	0757-0346	12
0757-0382	R:FXD MET FLM 16.2 OHM 1% 1/8W	28480	0757-0382	1
0757-0394	R:FXD MET FLM 51.1 OHM 1% 1/8W	14674	C4	11
0757-0398	R:FXD MET FLM 75 OHM 1% 1/8W	28480	0757-0398	2
0757-0399	R:FXD MET FLM 82.5 OHM 1% 1/8W	28480	0757-0399	1
0757-0400	R:FXD MET FLM 90.9 OHM 1% 1/8W	01295	MC550	3
0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	14674	C4	24
0757-0403	R:FXD MET FLM 121 OHM 1% 1/8W	14674	C4	13
0757-0405	R:FXD MET FLM 162 OHM 1% 1/8W	28480	0757-0405	10
0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	14674	C4	17
0757-0418	R:FXD MET FLM 619 OHM 1% 1/8W	14674	C4	6
0757-0419	R:FXD MET FLM 681 OHM 1% 1/8W	14674	C4	2
0757-0420	R:FXD MET FLM 750 OHM 1% 1/8W	14674	C4	8
0757-0422	R:FXD MET FLM 909 OHM 1% 1/8W	28480	0757-0422	7
0757-0424	R:FXD MET FLM 1.10K OHM 1% 1/8W	28480	0757-0424	2
0757-0428	R:FXD MET FLM 1.62K 1% 1/8W	14674	C4	9
0757-0434	R:FXD MET FLM 3.65K OHM 1% 1/8W	28480	0757-0434	4
0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	14674	C4	15
0757-0439	R:FXD MET FLM 6.81K OHM 1% 1/8W	28480	0757-0439	2
0757-0440	R:FXD MET FLM 7.50K 1% 1/8W	14674	C4	10
0757-0441	R:FXD MET FLM 8.25K 1% 1/8W	14674	C4	4
0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	14674	C4	11
0757-0443	R:FXD MET FLM 11.0K OHM 1% 1/8W	91637	MF-1/10-32	6
0757-0447	R:FXD MET FLM 16.2K OHM 1% 1/8W	28480	0757-0447	4
0757-0453	R:FXD MET FLM 30.1K OHM 1% 1/8W	28480	0757-0453	1
0757-0458	R:FXD MET FLM 51.1K OHM 1% 1/8W	91637	MF-1/10-32	3
0757-0459	R:FXD MET FLM 56.2K OHM 1% 1/8W	91637	MF-1/10-32	3
0757-0460	R:FXD MET FLM 61.9K OHM 1% 1/8W	28480	0757-0460	5
0757-0461	R:FXD MET FLM 68.1K OHM 1% 1/8W	91637	MF-1/10-32	3
0757-0463	R:FXD MET FLM 82.5K 1% 1/8W	14674	C4	2
0757-0464	R:FXD MET FLM 90.9K OHM 1% 1/8W	28480	0757-0464	4
0757-0465	R:FXD MET FLM 100K 1% 1/8W	14674	C4	6
0757-0467	R:FXD MET FLM 121K OHM 1% 1/8W	28480	0757-0467	1
0757-0795	R:FXD MET FLM 75 OHM 1% 1/2W	28480	0757-0795	1
0757-0816	R:FXD MET FLM 681 OHM 1% 1/2W	28480	0757-0816	1
0757-0821	R:FXD MET FLM 1.21K OHM 1% 1/2W	28480	0757-0821	1
0757-0833	R:FXD MET FLM 5.11K OHM 1% 1/2W	91637	MF-1/10-32	1
0757-0835	R:FXD MET FLM 6.81K OHM 1% 1/2W	28480	0757-0835	1
0757-0858	R:FXD MET FLM 90.9K OHM 1% 1/2W	28480	0757-0858	2
0757-1092	R:FXD MET FLM 287 OHM 1% 1/2W	28480	0757-1092	1
0757-1094	R:FXD MET FLM 1.47K OHM 1% 1/8W	28480	0757-1094	4
0764-0006	R:FXD MET OX 18K OHM 5% 2W	28480	0764-0006	2
0764-0012	R:FXD MET FLM 6800 OHM 5% 2W	28480	0764-0012	1
0764-0018	R:FXD MET FLM 4700 OHM 5% 2W	28480	0764-0018	1

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Table 6-4. Parts Indexed by HP Part Number

Part No.	Description #	Mfr.	Mfr. Part No.	TQ
0764-0020	R:FXD MET FLM 5600 OHM 5% 2W	28480	0764-0020	1
0767-0010	R:FXD MET FLM 15K OHM 5% 3W	28480	0767-0010	2
0811-1666	R:FXD WW 1.0 OHM 5% 2W	28480	0811-1666	1
0811-2501	R:FXD WW 180 OHM 3% 50W	28480	0811-2501	1
0812-0100	R:FXD WW 2K OHM 5% 5W	28480	0812-0100	1
1200-0168	SOCKET:TRANSISTOR	28480	1200-0168	2
1205-0011	HEAT DISSIPATOR:FOR TO-5 AND TO-9 CASES	98978	TXBF-032-025B	2
1250-0050	NUT:CLAMP	28480	1250-0050	1
1250-0051	PIN:CONNECTOR	28480	1250-0051	1
1250-0102	CONNECTOR:BNC	28480	1250-0102	1
1250-0118	CONNECTOR:BNC	24931	28JR 128-1	3
1250-0252	BODY:RF CONNECTOR BULKHEAD RECEPTACLE	28480	1250-0252	1
1250-0824	CONNECTOR:RF FOR RG-188U CABLE	98291	50-024-0000	2
1250-0829	CONNECTOR:RF	98291	50-045-0000	1
1250-0830	CONNECTOR:RF	98291	50-047-0000	2
1251-0055	CONNECTOR:MALE 24 CONTACTS	28480	1251-0055	1
1251-0180	INSERT:R & P CONNECTOR	08718	DM-53742-5001	2
1251-2080	CONNECTOR:41 FEMALE CONTACT	83148	DDMF-43W2S	1
1400-0093	CLAMP:CABLE	CCOAH	4-7-1	1
1460-0931	SPRING:EXTENSION	00000	OBD	1
1490-0838	STUD:LATCHING #8-32 THREAD	28480	1490-0838	1
1600-0110	STAMPING:METAL	28480	1600-0110	1
1820-0216	INTEGRATED CIRCUIT:OPERATIONAL AMPL.	07263	SL8941	2
1853-0001	Q:SI PNP(SELECTED FROM 2N1132)	28480	1853-0001	1
1853-0006	Q:SI PNP 2N3134	02735	2N3134	1
1853-0010	Q:SI PNP(SELECTED FROM 2N3251)	28480	1853-0010	9
1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	28480	1853-0020	27
1853-0034	Q:SI PNP(SELECTED FROM 2N3251)	28480	1853-0034	1
1853-0050	Q:SI PNP	28480	1853-0050	2
1853-0052	Q:SI PNP	04713	2N3740	1
1853-0089	Q:SI PNP	07263	2N4917	1
1854-0003	Q:SI NPN(SELECTED FROM 2N1711)	28480	1854-0003	1
1854-0019	Q:SI NPN(SELECTED FROM 2N2369)	28480	1854-0019	3
1854-0022	Q:SI NPN	07263	S17843	1
1854-0039	Q:SI NPN	04713	2N3053	2
1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	28480	1854-0071	36
1854-0092	Q:SI NPN	07263	2N3563	2
1854-0221	Q:SI NPN(REPLACEABLE BY 2N4044)	28480	1854-0221	2
1854-0232	Q:SI NPN(SELECTED FROM 2N3440)	28480	1854-0232	9
1854-0234	Q:SI NPN	02735	2N3440	2
1854-0237	Q:SI NPN	04713	2N3738	1
1854-0238	Q:SI NPN	02735	2N3933	1
1854-0247	Q:SI NPN	28480	1854-0247	1
1854-0351	Q:SI NPN	04713	2N3904	25
1884-0012	RECTIFIER:SILICON CONTROLLED 2N3528	02735	2N3528	2
1901-0025	DIODE:SILICON 100MA/1V	07263	FD 2387	12
1901-0028	DIODE:SILICON 0.75A 400PIV	04713	SR1358-9	1
1901-0033	DIODE:SILICON 100MA 180WV	07263	FD3369	1
1901-0039	DIODE:SILICON 200MA 50WV	28480	1901-0039	1
1901-0040	DIODE:SILICON 30MA 30WV	07263	FDG1088	63
1901-0050	DIODE:SILICON 75V	14433	S270	6
1901-0081	DIODE:SILICON 50 VOLTS WORKING	07263	FD1415	14
1901-0096	DIODE:SILICON 120V	28480	1901-0096	4
1901-0179	DIODE:SILICON 15WV	28480	1901-0179	2

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Table 6-4. Parts Indexed by HP Part Number

Part No.	Description #	Mfr.	Mfr. Part No.	TQ
1901-0416	DIODE:SILICON 200PIV 3A	28480	1901-0416	8
1902-0033	DIODE:BREAKDOWN 6.2V	04713	1N823	2
1902-0040	DIODE BREAKDOWN:14.0V 5%	28480	1902-0040	1
1902-0052	DIODE BREAKDOWN:6.81V	28480	1902-0052	1
1902-0202	DIODE BREAKDOWN:15.0V 5% 1W	28480	1902-0202	1
1902-0556	DIODE:BREAKDOWN 20.0V 5% 1W	28480	1902-0556	1
1902-0683	DIODE BREAKDOWN:100V 2%	28480	1902-0683	2
1902-0785	DIODE BREAKDOWN:9.09V 5%	04713	1N936	1
1902-3070	DIODE:BREAKDOWN 4.22V 5%	04713	SZ10939-74	2
1902-3104	DIODE BREAKDOWN:5.62V 5%	28480	1902-3104	1
1902-3171	DIODE BREAKDOWN:11.0V 5%	28480	1902-3171	1
1902-3256	DIODE:BREAKDOWN SILICON 23.7V 5%	28480	1902-3256	1
1902-3268	DIODE BREAKDOWN:26.1V 5%	28480	1902-3268	1
1910-0016	DIODE:GERMANIUM 100MA/0.85V 60PIV	93332	D2361	1
1940-0021	TUBE:ELECTRON 103V REF TYPE	74276	Z103R2	2
2100-1754	R:VAR WW 50 OHM 5% TYPE V 1W	28480	2100-1754	2
2100-1755	R:VAR WW 100 OHM 5% TYPE V 1W	28480	2100-1755	4
2100-1756	R:VAR WW 200 OHM 5% TYPE V 1W	28480	2100-1756	3
2100-1757	R:VAR WW 500 OHM 5% TYPE V 1W	28480	2100-1757	3
2100-1758	R:VAR WW 1K OHM 5% TYPE V 1W	28480	2100-1758	2
2100-1759	R:VAR WW 2K OHM 5% TYPE V 1W	28480	2100-1759	1
2100-1760	R:VAR WW 5K OHM 5% TYPE V 1W	28480	2100-1760	3
2100-1761	R:VAR WW 10K OHM 5% TYPE V 1W	28480	2100-1761	1
2100-2413	R:VAR FLM 200 OHM 10% LIN 1/2W	28480	2100-2413	1
2100-2488	R:VAR COMP 10K OHM 20% LIN 1/2W	28480	2100-2488	2
2100-2489	R:VAR FLM 5K OHM 10% LIN 1/2W	28480	2100-2489	1
2100-2492	R:VAR COMP 5K OHM 20% LIN 1/2W	28480	2100-2492	1
2100-2501	R:VAR WW 2K OHM 20% LIN 1.5W	28480	2100-2501	1
2100-2564	R:VAR COMP 2.5K OHM 20% LIN 2.25W	28480	2100-2564	1
2100-2661	R:VAR COMP 1K OHM 20% LIN 1/2W	28480	2100-2661	1
2110-0001	FUSE:CARTRIDGE 1A 250V FAST-BLOW	71400	AGC-1	2
2110-0281	FUSEHOLDER:DUAL,CLIP	28480	2110-0281	2
2140-0022	LAMP:GLOW NEON NE-2E 90V	24455	NE-2E	1
2140-0058	LAMP:INCANDESCENT 10V	24455	367	6
2140-0258	LAMP:INCANDESCENT 10V	71744	CM-2107	2
2190-0057	WASHER:LOCK FOR #12 HDW	00000	OBD	5
3050-0381	WASHER:THRUST(DELRIN)	28480	3050-0381	4
3100-2092	SWITCH:ROTARY	28480	3100-2092	1
3100-2093	SWITCH:ROTARY	28480	3100-2093	1
3100-2096	SWITCH:LEVER	28480	3100-2096	1
3101-0052	SWITCH:PUSHBUTTON SPST	82389	961 LESS HWD	1
3101-1338	SWITCH:SLIDE DPDT 0.5A 125V AC/DC	79727	G126-0017	1
5040-0234	LAMPHOLDER	28480	5040-0234	1
5040-0235	BASE:LAMPHOLDER	28480	5040-0235	3
8120-1110	CABLE:RF(GREEN)	28480	8120-1110	1
8120-1111	CABLE:RF(BLUE)	28480	8120-1111	1
9100-0346	COIL:FXD 0.05 UH 20%	36196	H-10886	1
9100-1611	COIL:FXD 0.22 UH 20%	28480	9100-1611	2
9100-1613	COIL:FXD 0.47 UH 20%	28480	9100-1613	1
9100-1615	COIL/CHOKE FXD 1.20 UH 10%	28480	9100-1615	1
9100-1621	COIL/CHOKE 18 UH 10%	28480	9100-1621	1
9100-1622	COIL/CHOKE 24.0 UH 5%	28480	9100-1622	6
9100-1630	COIL/CHOKE 51.0 UH 5%	28480	9100-1630	2

See introduction to this section for ordering information

Table 6-4. Parts Indexed by HP Part Number

Part No.	Description #	Mfr.	Mfr. Part No.	TQ
9100-1636	COIL/CHOKE 110 UH 5%	28480	9100-1636	2
9100-1641	COIL:MOLDED CHOKE 240.0 UH	28480	9100-1641	10
9100-1644	COIL/CHOKE 330 UH 5%	28480	9100-1644	1
9100-2267	COIL/CHOKE 18 UH	28480	9100-2267	3
9100-2465	INDUCTOR:FXD 0.70 UH 5%	73899	LF5W070	1
9100-2474	COIL/CHOKE 5.6 UH 1%	82142	10133-4	1
9100-2475	COIL/CHOKE 11.3 UH 1%	82142	10132-15	1
9100-2476	COIL/CHOKE 52.3 UH 1%	82142	10176-40	1
9100-2744	COIL/CHOKE 7.8 UH 2%	82142	10132-17	1
9140-0096	COIL:FXD RF 1 UH	28480	9140-0096	4
9140-0114	COIL:FXD RF 10 UH	28480	9140-0114	2
9140-0129	COIL:FXD RF 220 UH	28480	9140-0129	4
9140-0137	COIL:FXD RF 1000 UH 5%	76493	9220-28	2
9140-0142	COIL:FXD RF 2.2 UH	28480	9140-0142	3
9140-0210	COIL:FXD RF 100 UH 5%	71895	1537-76	3
9140-0237	COIL:FXD 200 UH 5%	28480	9140-0237	13
03950-4001	EXTRACTOR:TOOL	28480	03950-4001	1
08552-0001	PANEL:FRONT	28480	08552-0001	1
08552-0002	PANEL:SUB	28480	08552-0002	1
08552-0003	PANEL:REAR	28480	08552-0003	1
08552-0008	COVER:BOTTOM	28480	08552-0008	1
08552-0009	COVER:SHIELD	28480	08552-0009	2
08552-00104	PLATE:CONNECTOR	28480	08552-00104	1
08552-0013	BRACKET:PCT	28480	08552-0013	1
08552-0014	DIAL-KNOB ASSY:IF LEVEL	28480	08552-0014	1
08552-0015	DIAL-KNOB ASSY:SCAN TIME	28480	08552-0015	1
08552-0016	DIAL-KNOB ASSY:LOG REF. FINE	28480	08552-0016	1
08552-0018	BRACKET:SHIELD	28480	08552-0018	1
08552-0020	SHIELD CAN:47 MHZ OSC	28480	08552-0020	1
08552-0021	SHIELD CAN:50 MHZ FILTER	28480	08552-0021	1
08552-0022	SHIELD COVER:47 MHZ OSC	28480	08552-0022	1
08552-0023	INSULATOR:47 MHZ OSC	28480	08552-0023	2
08552-0024	SHIELD:CAN,SCAN GENERATOR	28480	08552-0024	1
08552-0025	INSULATOR:VERTICAL	28480	08552-0025	1
08552-0026	BRACE	28480	08552-0026	1
08552-0028	PLATE:CONVERTER	28480	08552-0028	1
08552-0029	SHIELD:COVER 47 MHZ OSC.	28480	08552-0029	1
08552-2002	BOARD:BLANK PC	28480	08552-2002	1
08552-2003	BOARD:BLANK PC	28480	08552-2003	1
08552-2004	BOARD:BLANK PC	28480	08552-2004	1
08552-2005	BOARD:BLANK PC	28480	08552-2005	1
08552-2007	BOARD:BLANK PC	28480	08552-2007	1
08552-2008	BOARD:BLANK PC	28480	08552-2008	1
08552-2016	RETAINER:BULB	28480	08552-2016	1
08552-2042	BOARD:BLANK PC	28480	08552-2042	1
08552-2043	BOARD:BLANK PC	28480	08552-2043	1
08552-2044	BAR LATCH	28480	08552-2044	1
08552-2045	BOARD:BLANK PC	28480	08552-2045	1
08552-2047	BOARD:BLANK PC	28480	08552-2047	1
08552-4001	HANDLE:LATCH	28480	08552-4001	1
08552-4006	INDICATOR UNIT:IF GAIN	28480	08552-4006	1
08552-6002	BOARD ASSY:POWER SUPPLY	28480	08552-6002	1
08552-6003	BOARD ASSY:50 MHZ CONVERTER	28480	08552-6003	1
08552-6005	BOARD ASSY:LC FILTER	28480	08552-6005	1
08552-6007	BOARD ASSY:LOG AMPLIFIER	28480	08552-6007	1

 # See introduction to this section for ordering information

Table 6-4. Parts Indexed by HP Part Number

Part No.	Description #	Mfr.	Mfr. Part No.	TQ
08552-6008	BOARD ASSY:DEFLECTION AMPLIFIER	28480	08552-6008	1
08552-6009	FILTER ASSY:50 MHZ	28480	08552-6009	1
08552-6010	OSCILLATOR ASSY:47 MHZ	28480	08552-6010	1
08552-6011	INDUCTOR:300 KHZ FILTER #1	28480	08552-6011	1
08552-6012	INDUCTOR:300 KHZ FILTER #2	28480	08552-6012	1
08552-6013	INDUCTOR ASSY:VAR 10T	28480	08552-6013	1
08552-6015	CABLE ASSY:GRAY	28480	08552-6015	1
08552-6017	INDUCTOR ASSY:50 MHZ	28480	08552-6017	1
08552-6018	TRANSFORMER:RF(CODE=RED)	28480	08552-6018	101
08552-6020	SWITCH ASSY:REFERENCE LEVEL	28480	08552-6020	1
08552-6021	SWITCH ASSY:SCAN TIME	28480	08552-6021	1
08552-6022	SWITCH ASSY:VIDEO FILTER	28480	08552-6022	1
08552-6023	INDUCTOR ASSY:AIR CORE	28480	08552-6023	2
08552-6025	INDUCTOR:LC FILTER	28480	08552-6025	4
08552-6027	CABLE ASSY:CAL. OUTPUT	28480	08552-6027	1
08552-6028	CABLE ASSY:RED	28480	08552-6028	1
08552-6037	CABLE ASSY:VERT. OUTPUT	28480	08552-6037	1
08552-6038	CABLE ASSY:50 MHZ	28480	08552-6038	1
08552-6039	CABLE ASSY:47 MHZ(YELLOW STRIPE)	28480	08552-6039	1
08552-6042	BOARD ASSY:50 MHZ FILTER	28480	08552-6042	1
08552-6043	BOARD ASSY:47 MHZ OSCILLATOR	28480	08552-6043	1
08552-6044	TRANSFORMER:RF (5 PIN)	28480	08552-6044	2
08552-6045	CRYSTAL FILTER ASSY	28480	08552-6045	1
08552-6046	BOARD ASSY:3 MHZ AMPLIFIER	28480	08552-6046	1
08552-6047	SCAN GENERATOR ASSY	28480	08552-6047	1
08552-6061	SWITCH ASSY:SCAN TRIGGER	28480	08552-6061	1
08552-6062	SWITCH ASSY:SCAN MODE	28480	08552-6062	1
08552-8001	LAMPHOLDER:PLUS	28480	08552-8001	1
08552-8002	LAMPHOLDER:TIMES	28480	08552-8002	1

 # See introduction to this section for ordering information

Table 6-5. Manufacturer's Code List

The following code numbers are from the Federal Supply Code for Manufacturers Cataloging Handbooks H4-1 (Name to Code) and H4-2 (Code to Name) and their latest supplements. The date of revision and the date of the supplements used appear at the bottom of each page. Alphabetical codes have been arbitrarily assigned to suppliers not appearing in the H4 Handbooks.

Code No.	Manufacturer	Address
00000	U.S.A Common	Any supplier of U.S.
00136	McCoy Electronics	Mount Holly Springs, Pa.
00213	Sage Electronics Corp.	Rochester, N.Y.
00287	Cemco, Inc.	Danielson, Conn
00334	Humidial	Colton, Calif.
00348	Mictron, Co., Inc.	Valley Stream, N.Y.
00373	Garlock Inc.	Cherry Hill, N.J.
00656	Aerovox Corp.	New Bedford, Mass.
00779	Amp. Inc.	Harrisburg, Pa.
00781	Aircraft Radio Corp.	Boonton, N.J.
00809	Croven,Ltd.	Whitby, Ontario, Canada
00815	Northern Engineering Laboratories, Inc.	Burlington, Wis.
00853	Sangamo Electric Co., Pickens Div.	Pickens, S.C.
00866	Goe Engineering Co.	City of Industry, Cal.
00891	Carl E. Holmes Corp.	Los Angeles, Cal.
00929	Microlab Inc.	Livingston, N.J.
01002	General Electric Co., Capacitor Dept.	Hudson Falls, N.Y.
01009	Alden Products Co.	Brockton, Mass.
01121	Allen Bradley Co.	Milwaukee, Wis.
01255	Litton Industries, Inc.	Beverly Hills, Cal.
01281	TRW Semiconductors, Inc.	Lawndale, Cal.
01295	Texas Instruments, Inc., Transistor Products Div.	Dallas, Texas
01349	The Alliance Mfg. Co.	Alliance, Ohio
01538	Small Parts Inc.	Los Angeles, Cal.
01589	Pacific Relays, Inc.	Van Nuys, Cal.
01670	Gudebrod Bros. Silk Co.	New York, N.Y.
01930	Amerock Corp.	Rockford, Ill
01960	Pulse Engineering Co.	Santa Clara, Cal.
02114	Ferroxcube Corp. of America	Saugerties, N.Y.
02116	Wheelock Signals, Inc.	Long Branch, N.J.
02286	Cole Rubber and Plastics Inc.	Sunnyvale, Cal.
02660	Amphenol-Borg Electronics Corp.	Broadview, Ill.
02735	Radio Corp. of America, Semiconductor and Materials Division	Somerville, N.J.
02771	Vocaline Co. of America, Inc.	Old Saybrook, Conn.
02777	Hopkins Engineering Co.	San Fernando, Cal.
02875	Hudson Tool & Die	Newark, N.J.
03508	G.E. Semiconductor Prod. Dept.	Syracuse, N.Y.
03705	Apex Machine & Tool Co.	Dayton, Ohio
03797	Eldema Corp.	Compton, Calif.
03818	Parker Seal Co.	Los Angeles, Cal.
03877	Transitron Electric Corp.	Wakefield, Mass.
03888	Pyrofilm Resistor Co., Inc.	Cedar Knolls, N.J.
03954	Singer Co., Diehl Div., Finderne Plant	Sumerville, N.J.
04009	Arrow, Hart and Hegeman Elect. Co.	Hartford, Conn.
04013	Taruus Corp.	Lambertville, N.J.
04062	Arco Electronic Inc.	Great Neck, N.Y.
04217	Essex Wire	Los Angeles, Cal.
04222	Hi-Q Division of Aerovox	Myrtle Beach, S.C.
04354	Precision Paper Tube Co.	Wheeling, Ill.
04404	Dymec Division of Hewlett-Packard Co.	Palo Alto, Cal.
04651	Sylvania Electric Products, Microwave Device Div.	Mountain View, Cal.
04673	Dakota Engr. Inc.	Culver City, Cal.
04713	Motorola Inc, Semiconductor Prod. Div.	Phoenix, Arizona
04732	Filtron Co., Inc. Western Div.	Culver City, Cal.
04773	Automatic Electric Co.	Northlake, Ill.
04796	Sequoia Wire Co.	Redwood City, Cal.
04811	Precision Coil Spring Co.	El Monte, Cal.
04870	P. M. Motor Company	Westchester, Ill.
04919	Component Mfg. Service Co.	W. Bridgewater, Mass.
05006	Twentieth Century Plastics, Inc.	Los Angeles, Cal.
05277	Westinghouse Electric Corp. Semiconductor Dept.	Youngwood, Pa.
05347	Ultronix, Inc.	San Mateo, Cal.
05397	Union Carbine Corp., Elect. Div.	New York, N.Y.
05574	Viking Ind. Inc.	Canoga Park, Cal.
05593	Icore Electro-Plastics Inc.	Sunnyvale, Cal.
05616	Cosmo Plastic (c/o Electrical Spec. Co.)	Cleveland, Ohio
05624	Barber Colman Co.	Rockford, Ill.
05728	Tiffen Optical Co.	Roslyn Heights, Long Island, N.Y.
05729	Metro-Tel Corp.	Westbury, N.Y.
05783	Stewart Engineering Co.	Santa Cruz, Cal.
05820	Wakefield Engineering Inc.	Wakefield, Mass.
06004	Bassick Co., Div. of Stewart Warner Corp.	Bridgeport, Conn.
06090	Raychem Corp.	Redwood City, Cal.
06175	Bausch and Lomb Optical Co.	Rochester, N.Y.
06402	E.T.A. Products Co. of America	Chicago, Ill.
06540	Amatom Electronic Hardware Co., Inc.	New Rochelle, N.Y.
06555	Beede Electrical Instrument Co., Inc.	Penacook, N.H.
06666	General Devices Co., Inc.	Indianapolis, Ind.
06751	Components Inc., Ariz. Div.	Phoenix, Arizona
06812	Torrington Mfg. Co., West Div.	Van Nuys, Cal.
06980	Varian Assoc. Etmac Div.	San Carlos, Cal.
07088	Kelvin Electric Co.	Van Nuys, Cal.
07126	Digitran Co.	Pasadena, Cal.
07137	Transistor Electronics Corp.	Minneapolis, Minn.
07138	Westinghouse Electric Corp., Electronic Tube Div.	Elmira, N.Y.
07149	Filmohm Corp.	New York, N.Y.
07233	Cinch-Graphik Co.	City of Industry, Cal.
07256	Silicon Transistor Corp.	Carle Place, N.Y.
07261	Avnet Corp.	Culver City, Cal.
07263	Fairchild Camera & Inst. Corp., Semiconductor Div.	Mountain View, Cal.
07322	Minnesota Rubber Co.	Minneapolis, Minn.
07387	Birtcher Corp, The	Monterey Park, Cal.
07397	Sylvania Elect. Prod. Inc., Mt. View Operations	Mountain View, Cal.
07700	Technical Wire Products Inc.	Cranford, N.J.
07829	Bodine Elect. Co.	Chicago, Ill.
07910	Continental Device Corp.	Hawthorne, Cal.
07933	Raytheon Mfg. Co., Semiconductor Div.	Mountain View, Cal.
07980	Hewlett-Packard Co., Boonton Radio Div.	Rockaway, N.J.
08145	U.S. Engineering Co.	Los Angeles, Cal.
08289	Blinn, Delbert Co.	Pomona, Cal.
08358	Burgess Battery Co.	Niagara Falls, Ontario, Canada
08524	Deutsch Fastener Corp.	Los Angeles, Cal.
08664	Bristol Co., The	Waterbury, Conn.
08717	Sloan Company	Sun Valley, Cal.
08718	ITT Cannon Electric Inc., Phoenix Div.	Phoenix, Arizona
08727	National Radio Lab. Inc.	Paramus, N.J.
08792	CBS Electronics Semiconductor Operations, Div. of CBS Inc.	Lowell, Mass.
08806	General Electric Co., Miniature Lamp Dept.	Cleveland, Ohio
08984	Mel-Rain	Indianapolis, Ind.
09026	Babcock Relays Div.	Costa Mesa, Cal.
09134	Texas Capacitor Co.	Houston, Texas
09145	Tech. Ind. Inc. Atohm Elect.	Burbank, Cal.
09250	Electro Assemblies, Inc.	Chicago, Ill.
09353	C & K Components Inc.	Newton, Mass.
09569	Mallory Battery Co. of Canada, Ltd.	Toronto, Ontario, Canada
09922	Burndy Corp.	Norwalk, Conn.
10214	General Transistor Western Corp.	Los Angeles, Cal.

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Revised: October 1969

From: Handbook Supplements
H4-1 Dated AUGUST 1966

Table 6-5. Manufacturer's Code List

Code No.	Manufacturer	Address
10411	Ti-Tal, Inc.	Berkeley, Cal.
10646	Carborundum Co.	Niagara Falls, N.Y.
11236	CTS of Berne, Inc.	Berne, Ind.
11237	Chicago Telephone of California, Inc.	So. Pasadena, Cal.
11242	Bay State Electronics Corp.	Waltham, Mass.
11312	Teledyne Inc., Microwave Div.	Palo Alto, Cal.
11314	National Seal	Downey, Cal.
11453	Precision Connector Corp.	Jamaica, N.Y.
11534	Duncan Electronics Inc.	Costa Mesa, Cal.
11711	General Instrument Corp., Semiconductor Division, Products Group	Newark, N.J.
11717	Imperial Electronic, Inc.	Buena Park, Cal.
11870	Melabs, Inc.	Palo Alto, Cal.
12136	Philadelphia Handle Co.	Camden, N.J.
12361	Grove Mfg. Co., Inc.	Shady Grove, Pa.
12574	Gulton Ind. Inc., Data System Div.	Albuquerque, N.M.
12697	Clarostat Mfg. Co.	Dover, N.H.
12728	Elmar Filter Corp.	W. Haven, Conn.
12859	Nippon Electric Co., Ltd.	Tokyo, Japan
12881	Metex Electronics Corp.	Clark, N.J.
12930	Delta Semiconductor Inc.	Newport Beach, Cal.
12954	Dickson Electronics Corp.	Scottsdale, Arizona
13019	Airco Supply Co., Inc.	Witchita, Kansas
13103	Thermolloy	Dallas, Texas
13396	Telefunken (GmbH)	Hanover, Germany
13835	Midland-Wright Div. of Pacific Industries, Inc.	Kansas City, Kansas
14099	Sem-Tech	Newbury Park, Cal.
14193	Calif. Resistor Corp.	Santa Monica, Cal.
14298	American Components, Inc.	Conshohocken, Pa.
14433	ITT Semiconductor, A Div. of Int. Telephone & Telegraph Corporation	West Palm Beach, Fla.
14493	Hewlett-Packard Company	Loveland, Colo.
14655	Cornell Dublier Electric Corp.	Newark, N.J.
14674	Corning Glass Works	Corning, N.Y.
14752	Electro Cube Inc.	San Gabriel, Cal.
14960	Williams Mfg. Co.	San Jose, Cal.
15106	The Sphere Co., Inc.	Little Falls, N.J.
15203	Webster Electronics Co.	New York, N.Y.
15287	Scionics Corp.	Northridge, Cal.
15291	Adjustable Bushing Co.	N. Hollywood, Cal.
15558	Micron Electronics	Garden City, Long Island, N.Y.
15566	Amprobe Inst. Corp.	Lynbrook, N.Y.
15631	Cabletronics	Costa Mesa, Cal.
15772	Twentieth Century Coil Spring Co.	Santa Clara, Cal.
15801	Fenwal Elect. Inc.	Framingham, Mass.
15818	Amelco Inc.	Mountain View, Cal.
16037	Spruce Pine Mica Co.	Spruce Pine, N.C.
16179	Omni-Spectra Inc.	Detroit, Ill.
16352	Computer Diode Corp.	Lodi, N.J.
16585	Boots Aircraft Nut Corp.	Pasadena, Cal.
16688	Ideal Prec. Meter Co., Inc., De Jur Meter Div.	Brooklyn, N.Y.
16758	Delco Radio Div. of G.M. Corp.	Kokoma, Ind.
17109	Thermonetics Inc.	Canoga Park, Cal.
17474	Tranex Company	Mountain View, Cal.
17675	Hamlin Metal Products Corp.	Akron, Ohio
17745	Angstrohm Prec. Inc.	No. Hollywood, Cal.
17856	Siliconix Inc.	Sunnyvale, Cal.
17870	McGraw-Edison Co.	Manchester, N.H.
18042	Power Design Pacific Inc.	Palo Alto, Cal.
18083	Clevite Corp., Semiconductor Div.	Palo Alto, Cal.
18324	Signetics Corp.	Sunnyvale, Cal.
18476	Ty-Car Mfg. Co., Inc.	Holliston, Mass.
18486	TRW Elect. Comp. Div.	Des Plaines, Ill.
18583	Curtis Instrument, Inc.	Mt. Kisco, N.Y.
18612	Vishay Instruments Inc.	Malvern, Pa.
18873	E.I. DuPont and Co., Inc.	Wilmington, Del.
18911	Durant Mfg. Co.	Milwaukee, Wis.
19315	The Bendix Corp., Navigation & Control Div.	Teterboro, N.J.
19500	Thomas A. Edison Industries, Div. of McGraw-Edison Co.	West Orange, N.J.
19589	Concoa	Baldwin Park, Cal.
19644	LRC Electronics	Horseheads, N.Y.
19701	Electra Mfg. Co.	Independence, Kansas
20183	General Atronics Corp.	Philadelphia, Pa.
21226	Executone, Inc.	Long Island City, N.Y.
21355	Fafnir Bearing Co., The	New Britian, Conn.
21520	Fansteel Metallurgical Corp.	N. Chicago, Ill.
23042	Texscan Corp.	Indianapolis, Ind.
23783	British Radio Electronics Ltd.	Washington, D.C.
24455	G.E. Lamp Division	Nela Park, Cleveland, Ohio
24655	General Radio Co.	West Concord, Mass.
24681	Memcor Inc., Comp. Div.	Huntington, Ind.
26365	Gries Reproducer Corp.	New Rochelle, N.Y.
26462	Grobert File Co. of America, Inc.	Carlstadt, N.J.
26851	Compac/Hollister Co.	Hollister, Cal.
26992	Hamilton Watch Co.	Lancaster, Pa.
28480	Hewlett-Packard Co.	Palo Alto, Cal.
28520	Heyman Mfg. Co.	Kenilworth, N.J.
30817	Instrument Specialties Co., Inc.	Little Falls, N.J.
33173	G.E. Receiving Tube Dept.	Owensboro, Ky.
35434	Lectrohm Inc.	Chicago, Ill.
36196	Stanwyck Coil Products, Ltd.	Hawkesbury, Ontario, Canada
36287	Cunningham, W.H. & Hill, Ltd.	Toronto, Ontario, Canada
37942	P.R. Mallory & Co., Inc.	Indianapolis, Ind.
39543	Mechanical Industries Prod. Co.	Akron, Ohio
40920	Miniature Precision Bearings, Inc.	Keene, N.H.
42190	Muter Co.	Chicago, Ill.
43990	C.A. Norgren Co.	Englewood, Colo.
44655	Ohmite Mfg. Co.	Skokie, Ill.
46384	Penn Eng. & Mfg. Corp.	Doylestown, Pa.
47904	Polaroid Corp.	Cambridge, Mass.
48620	Precision Thermometer & Inst. Co.	Southampton, Pa.
49956	Microwave & Power Tube Div.	Waltham, Mass.
52090	Rowan Controller Co.	Westminster, Md.
52983	Sanborn Company	Waltham, Mass.
54294	Shallcross Mfg. Co.	Selma, N.C.
55026	Simpson Electric Co.	Chicago, Ill.
55933	Sonotone Corp.	Elmsford, N.Y.
55938	Raytheon Co. Commercial Apparatus & System Div.	So. Norwalk, Conn.
56137	Spaulding Fibre Co., Inc.	Tonawanda, N.Y.
56289	Sprague Electric Co.	North Adams, Mass.
59446	Telex Corp.	Tulsa, Okla.
59730	Thomas & Betts Co.	Elizabeth, N.J.
60741	Triplett Electrical Inst. Co.	Bluffton, Ohio
61775	Union Switch and Signal, Div. of Westinghouse Air Brake Co.	Pittsburgh, Pa.
62119	Universal Electric Co.	Owosso, Mich.
63743	Ward-Leonard Electric Co.	Mt. Vernon, N.Y.
64959	Western Electric Co., Inc.	New York, N.Y.
65092	Weston Inst. Inc. Weston-Newark	Newark, N.J.
66295	Wittek Mfg. Co.	Chicago, Ill.
66346	Minnesota Mining & Mfg. Co. Revere Mincom Div.	St. Paul, Minn.
70276	Allen Mfg. Co.	Hartford, Conn.
70309	Allied Control	New York, N.Y.
70318	Allmetal Screw Product Co., Inc.	Garden City, N.Y.
70417	Amplex, Div. of Chrysler Corp.	Detroit, Mich.
70485	Atlantic India Rubber Works, Inc.	Chicago, Ill.
70563	Amperite Co., Inc.	Union City, N.J.
70674	ADC Products Inc.	Minneapolis, Minn.
70903	Belden Mfg. Co.	Chicago, Ill.
70998	Bird Electric Corp.	Cleveland, Ohio
71002	Birnbach Radio Co.	New York, N.Y.
71034	Bliley Electric Co., Inc.	Erie, Pa.
71041	Boston Gear Works Div. of Murray Co. of Texas	Quincey, Mass.
71218	Bud Radio, Inc.	Willoughby, Ohio
71279	Cambridge Thermionics Corp.	Cambridge, Mass.
71286	Camloc Fastener Corp.	Paramus, N.J.
71313	Cardwell Condenser Corp.	Lindenhurst, L.I., N.Y.
71400	Bussmann Mfg. Div. of McGraw-Edison Co.	St. Louis, Mo.

From: Handbook Supplements
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Table 6-5. Manufacturer's Code List

Code No.	Manufacturer	Address
83501	Gavitt Wire and Cable Co., Div. of Amerace Corp.	Brookfield, Mass.
83594	Burroughs Corp Electronic Tube Div.	Plainfield, N.J.
83740	Union Carbide Corp. Consumer Prod. Div.	New York, N.Y.
83777	Model Eng. and Mfg., Inc.	Huntington, Ind.
83821	Loyd Scruggs Co.	Festus, Mo.
83942	Aeronautical Inst. & Radio Co.	Lodi, N.J.
84171	Arco Electronics Inc.	Great Neck, N.Y.
84396	A.J. Glesener Co., Inc.	San Francisco, Cal.
84411	TRW Capacitor Div.	Ogallala, Neb.
84970	Sarkes Tarzian, Inc.	Bloomington, Ind.
85454	Boonton Molding Company	Boonton, N.J.
85471	A.B. Boyd Co.	San Francisco, Cal.
85474	R.M. Bracamonte & Co.	San Francisco, Cal.
85660	Koiled Kords, Inc.	Hamden, Conn.
85911	Seamless Rubb Co.	Chicago, Ill.
86174	Fafnir Bearing C	Los Angeles, Calif.
86197	Clifton Precision Products Co., Inc.	Clifton Heights, Pa.
86579	Precision Rubber Products Corp.	Dayton, Ohio
86684	Radio Corp. of America, Electronic Comp. & Devices Div.	Harrison, N.J.
86928	Seastrom Mfg. Co.	Glendale, Cal.
87034	Marco Industries	Anaheim, Cal.
87216	Philco Corporation (Lansdale Division)	Lansdale, Pa.
87473	Western Fibrous Glass Products Co.	San Francisco, Cal.
87664	Van Waters & Rogers Inc.	San Francisco, Cal.
87930	Tower Mfg. Corp.	Providence, R.I.
88140	Cutler-Hammer, Inc.	Lincoln, Ill.
88220	Gould-National Batteries, Inc.	St. Paul, Minn.
88698	General Mills, Inc.	Buffalo, N.Y.
89231	Graybar Electric Co.	Oakland, Cal.
89473	G.E. Distributing Corp.	Schenectady, N.Y.
89665	United Transformer Co.	Chicago, Ill.
90030	United Shoe Machinery Corp.	Beverly, Mass.
90179	U S Rubber Co., Consumer Ind. & Plastics Prod. Div.	Passaic, N.J.
90763	United Carr Fastener Corp	Chicago, Ill.
90970	Bearing Engineering Co.	San Francisco, Cal.
91146	ITT Cannon Elect. Inc., Salem Div.	Salem, Mass.
91260	Connor Spring Mfg. Co.	San Francisco, Cal.
91345	Miller Dial & Nameplate Co.	El Monte, Cal.
91418	Radio Materials Co.	Chicago, Ill.
91506	Augat Inc.	Attleboro, Mass.
91637	Dale Electronics, Inc.	Columbus, Nebr.
91662	Elco Corp.	Willow Grove, Pa.
91737	Gremar Mfg. Co., Inc.	Wakefield, Mass.
91827	K F Development Co.	Redwood City, Cal.
91886	Malco Mfg. Co., Inc.	Chicago, Ill.
91929	Honeywell Inc., Micro Switch Div.	Freeport, Ill.
91961	Nahm-Bros, Spring Co.	Oakland, Cal.
92180	Tru-Connector Corp.	Peabody, Mass.
92367	Elgeet Optical Co., Inc.	Rochester, N.Y.
92607	Tensolite Insulated Wire Co., Inc.	Tarrytown, N.Y.
92702	IMC Magnetics Corp.	Westbury, Long Island, N.Y.
92966	Hudson Lamp Co.	Kearney, N.J.
93332	Slyvania Electric Prod. Inc., Semiconductor Div.	Woburn, Mass.
93369	Robbins & Myers Inc.	Pallisades Park, N.J.
93410	Stemco Controls, Div. of Essex Wire Corp.	Mansfield, Ohio
93632	Waters Mfg. Co.	Culver City, Cal.
93929	G.V. Controls	Livingston, N.J.
94137	General Cable Corp.	Bayonne, N.J.
94144	Raytheon Co., Comp. Div., Ind. Comp. Operations	Quincy, Mass.
94148	Scientific Electronics Products, Inc.	Loveland, Colo.
94154	Wagner Elect. Corp., Tung-Sol Div.	Newark, N.J.
94197	Curtiss-Wright Corp. Electronics Div.	East Patterson, N.J.
94222	South Chester Corp.	Chester, Pa.
94330	Wire Cloth Products, Inc.	Bellwood, Ill.
94375	Automatic Metal Products Co.	Brooklyn, N.Y.
94682	Worcester Pressed Aluminum Corp.	Worcester, Mass.
94696	Magnecraft Electric Co.	Chicago, Ill.
95023	George A. Philbrick Researchers, Inc.	Boston, Mass.
95236	Allies Products Corp.	Diania, Fla.
95238	Continental Connector Corp.	Woodside, N.Y.
95263	Leecraft Mfg. Co., Inc.	Long Island, N.Y.
95265	National Coil Co.	Sheridan, Wyo.
95275	Vitramon, Inc.	Bridgeport, Conn.
95348	Gordos Corp.	Bloomfield, N.J.
95354	Methode Mfg. Co.	Rolling Meadows, Ill.
95566	Arnold Engineering Co.	Marengo, Ill.
95712	Dage Electric Co., Inc.	Franklin, Ind.
95984	Siemon Mfg. Co.	Wayne, Ill.
95987	Weckesser Co.	Chicago, Ill.
96067	Microwave Assoc., West Inc.	Sunnyvale, Cal.
96095	Hi-Q Div. of Aerovox Corp.	Olean, N.Y.
96256	Thordarson-Meissner Inc.	Mt. Carmel, Ill.
96296	Solar Manufacturing Co.	Los Angeles, Cal.
96396	Microswitch, Div. of Minn.-Honeywell	Freeport, Ill.
96330	Carlton Screw Co.	Chicago, Ill
96341	Microwave Associates, Inc.	Burlington, Mass.
96501	Excel Transformer Co.	Oakland, Cal.
96508	Xcelite Inc.	Orchard Park, N.Y.
96733	San Fernando Elect. Mfg. Co.	San Fernando, Cal.
96881	Thomson Ind. Inc.	Long Island, N.Y.
97464	Industrial Retaining Ring Co.	Irvington, N.J.
97539	Automatic & Precision Mfg.	Englewood, N.J.
97979	Reon Resistor Corp.	Yonkers, N.Y.
97983	Litton System Inc., Adler-Westrex Commun. Div.	New Rochelle, N.Y.
98141	R-Tronics, Inc.	Jamaica, N.Y.
98159	Rubber Teck, Inc.	Gardena, Cal.
98220	Hewlett-Packard Co., Moseley Div.	Pasadena, Cal.
98278	Microdot, Inc.	So. Pasadena, Cal.
98291	Sealectro Corp.	Mamaronech, N.Y.
98376	Zero Mfg. Co.	Burbank, Cal.
98410	Etc Inc.	Cleveland, Ohio
98731	General Mills Inc., Electronics Div.	Minneapolis, Minn.
98734	Paeco Div. of Hewlett-Packard Co.	Palo Alto, Cal.
98821	North Hills Electronics, Inc.	Glen Cove, N.Y.
98978	International Electronic Research Corp.	Burbank, Cal.
99109	Columbia Technical Corp.	New York, N.Y.
99313	Varian Associates	Palo Alto, Cal
99378	Atlee Corp.	Winchester, Mass.
99515	Marshall Ind., Capacitor Div.	Monrovia, Cal.
99707	Control Switch Division, Controls Co. of America	El Segundo, Cal.
99800	Delevan Electronics Corp.	East Aurora, N.Y.
99848	Wilco Corporation	Indianapolis, Ind.
99928	Branson Corp.	Whippany, N.J.
99934	Rembrandt, Inc.	Boston, Mass.
99942	Hoffman Electronics Corp., Semiconductor Div.	El Monte, Cal.
99957	Technology Instrument Corp. of Calif.	Newbury Park, Cal.

The following HP Vendors have no number assigned in the latest supplement to the Federal Supply Code for Manufacturers Handbook.

0000F	Malco Tool and Die	Los Angeles, Calif.
0000Z	Willow Leather Products Corp.	Newark, N.J.
000AB	ETA	England
000BB	Precision Instrument Components Co.	Van Nuys, Cal.
000CS	Hewlett-Packard Co., Colorado Springs	Colorado Springs, Colorado
000MM	Rubber Eng. & Development	Hayward, Cal.
000NN	A "N" D Mfg. Co.	San Jose, Cal.
000QQ	Cooltron	Oakland, Cal.
000WW	California Eastern Lab	Burlington, Cal.
000YY	S.K. Smith Co.	Los Angeles, Cal.

00015-45
Revised: October 1969

From: Handbook Supplements
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BACK DATING MANUAL CHANGES

SECTION VII
MANUAL CHANGES

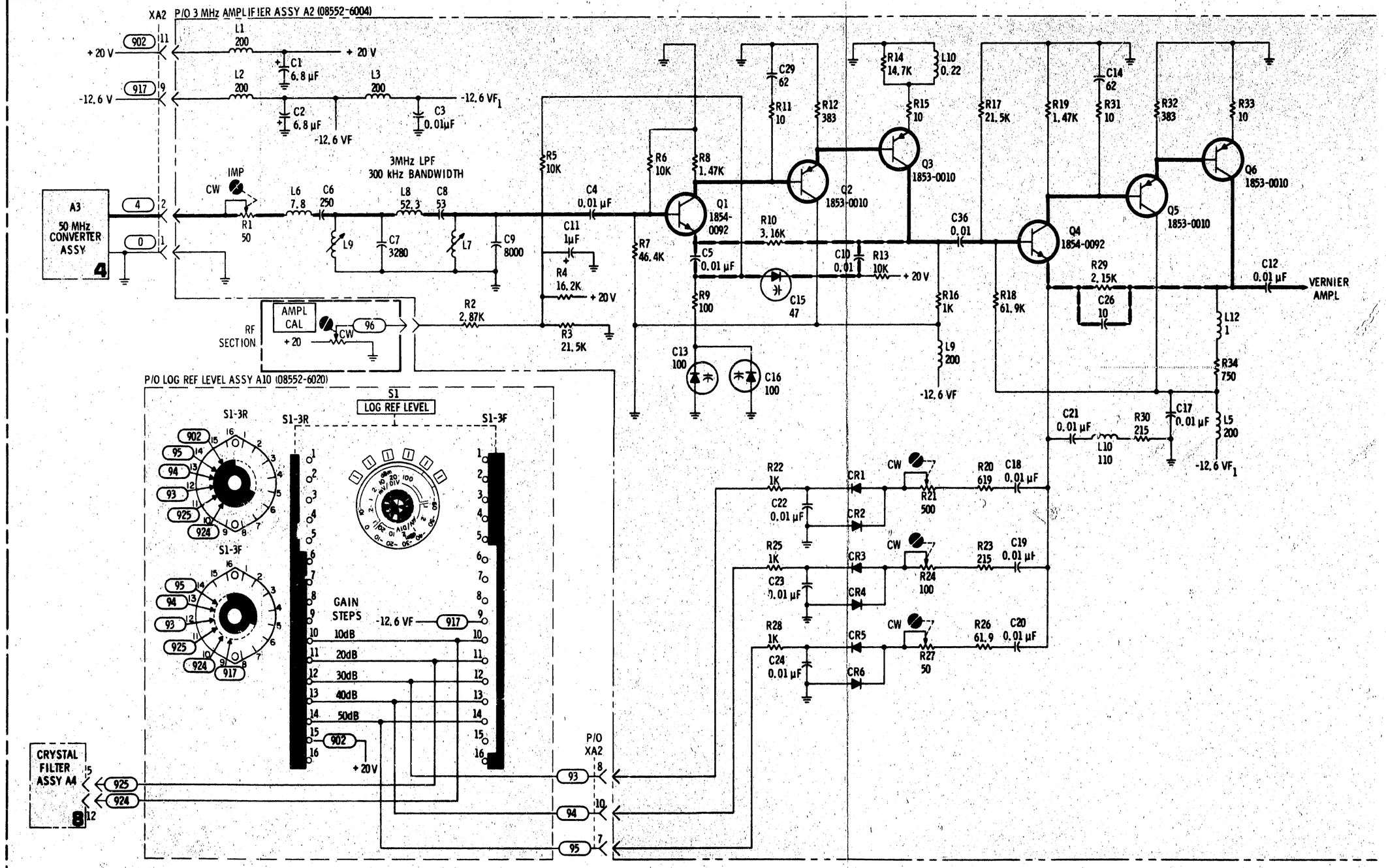
7-1. CURRENT INSTRUMENTS.

7-2. This manual applies directly to standard Model 8552A Spectrum Analyzer IF Sections having a serial prefix of 952.

7-3. This manual also covers instruments with a serial prefix below 952. Changes made to the 8552A prior to serial prefix 952 are covered in this section. Each change that was made is covered by a schematic and a parts list. Changes are identified by the serial prefix numbers on the schematics.

7-4. NEWER INSTRUMENTS.

7-5. As changes are made to the Model 8552A, newer instruments may have serial prefix numbers not listed in this manual. The manuals for these instruments will be supplied with an additional "Manual Changes" sheet containing the required information; contact your nearest Hewlett-Packard Sales and Service Office for information if this sheet is missing.



SERIAL PREFIX NUMBER 903-00564 AND BELOW

REFERENCE DESIGNATIONS WITHIN OUTLINED (— - - —) ASSEMBLIES ARE ABBREVIATED. FULL DESIGNATION INCLUDES ASSEMBLY NUMBER; e.g., R1 OF ASSEMBLY A1 IS A1R1. DESIGNATIONS OF OTHER COMPONENTS ARE COMPLETE AS SHOWN.

5

Figure 7-1. Serial Prefix 903-00564 and Below, 3 MHz Amplifier (Sheet 1 of 2)

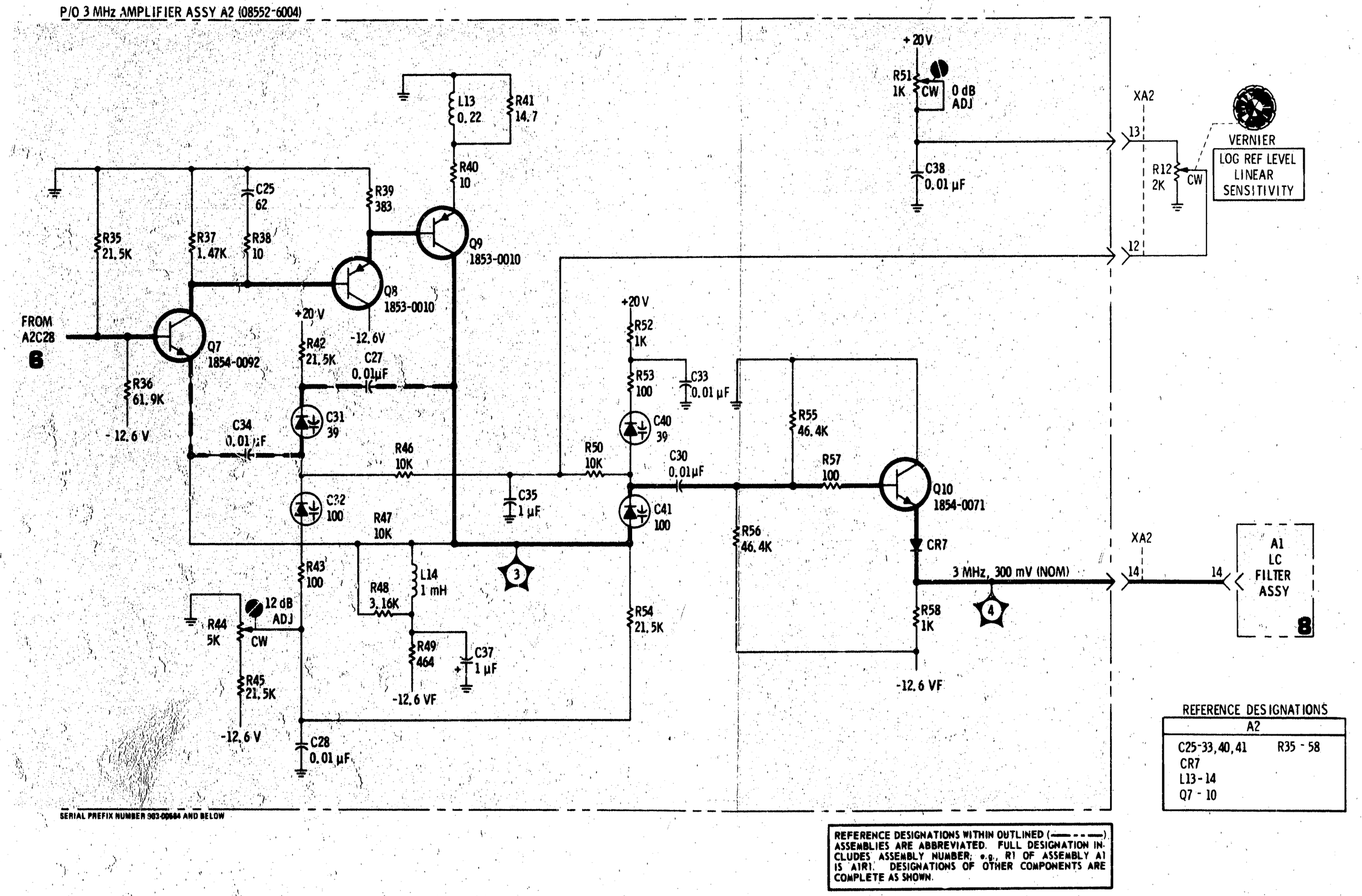


Figure 7-2. Serial Prefix 903-00564 and Below, 3 MHz Amplifier (Sheet 2 of 2)

8552A IF SECTION

P/O CRYSTAL FILTER ASSY A4 (08552-6006)

XA4

FROM SERVICE SHEET 8 — 2 — XA4 2 — C8 0.01 μF — R4 51.1K — R6 511 — C9 2-8 — Q11 1854-0071 — R5 14.7K — R7 511 — -12.6 VF

FROM SERVICE SHEET 8 — 916 — XA4 13 — R1 100 — Q12 1853-0001 — C1 0.01 μF — -12.6 V — R2 51.1 — C2 1 μF — R3 10 — C3 0.01 μF — K1

-12.6 VF — L2 200 — C5 0.01 μF — -12.6 VF1

-12.6 V — 927 — XA4 9 — L1 200 — C4 6.8 μF + — L3 200 — C6 0.01 μF — -12.6 VF2

L4 200 — C7 0.01 μF — -12.6 VF3

L5 24 — L6 24 — C15 9-35 — C16 1000 — R17 14.7K — R19 100 — R18 51.1K — R8* 215K — Y1

Q3 1854-0071 — Q2 1854-0071 — R20 6.81K — R21 1K — R22 4.7 — C18 30 — R23 100 — Q4 1853-0020 — C19 30 — R24 100 — Q1 1854-0071 — R27 511

R28* 2.15K — C17 0.01 μF — C20 20 — R25 1K — R26 681 — R32 511 — R44 10 — -12.6 VF1 — C58 0.01 μF

R33 511 — Q5 1853-0020 — C23 2-8 — Y2 — C24 0.47 μF — K2 — R34 10K — R35* 215K — SIGNAL — RELAY COIL

C21 0.01 μF — R29 100 — R30 200 20 dB ADJ (CW) — C22 0.05 μF — CR6 — CR7 — R31 2.15K

R15 4.02K — CR5 — R16 2.15K — C14 0.01 μF

R13 909 — CR4 — R14 2.15K — C13 0.01 μF

R11 261 — CR3 — R12 1K — C12 0.01 μF

R9 121 — C10 0.01μF — CR2 — CR1 — C11 0.05 μF — R10 1K

R36 121 — C25 0.01 μF — CR8 — CR9 — C26 0.05 μF — R37 1K

R38 261 — CR10 — R39 1K — C27 0.01 μF

R40 909 — CR11 — R41 2.15K — C28 0.01 μF

R42 4.02K — CR12 — R43 2.15K — C29 0.01 μF

XA4

FROM SERVICE SHEET 8 — 10 dB 924 — 12 — TO SHEET 7

20 dB 925 — 5

0.05 kHz 912 — 7

0.1 kHz 913 — 8

0.3 kHz 914 — 10

1 kHz 915 — 11

R45 100 — R46 100 — R47 100 — R48 100 — C54 0.01 μF — C55 0.01 μF — C56 0.01 μF — C57 0.01 μF

TO 10

SERIAL PREFIX NUMBER 851-00464 AND BELOW

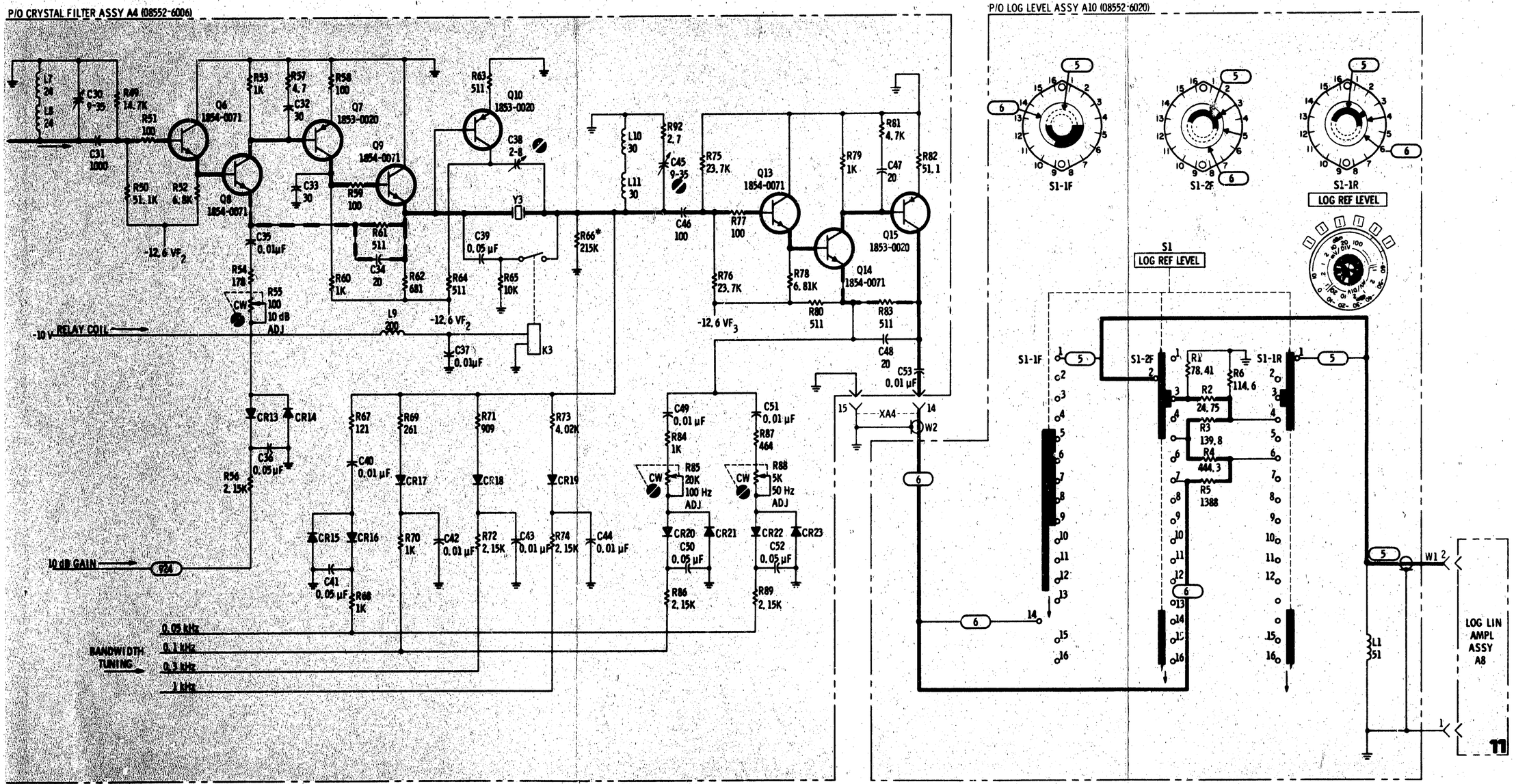
REFERENCE DESIGNATIONS

A4		CHASSIS
C1-29, 54-58	Q1-5, 11, 12	XA4
CR1-12	R1-48	
K1,2	Y1,2	
L1-6		

REFERENCE DESIGNATIONS WITHIN OUTLINED (— - - —) ASSEMBLIES ARE ABBREVIATED. FULL DESIGNATION INCLUDES ASSEMBLY NUMBER; e.g., R1 OF ASSEMBLY A1 IS A1R1. DESIGNATIONS OF OTHER COMPONENTS ARE COMPLETE AS SHOWN.

9

Figure 7-3. Serial Prefix 851-00464 and Below, 3 MHz Crystal Filter (Sheet 1 of 2)



A4	A10	CHASSIS
C30-53 Y3	L1	XA4
CR13-23	R1-6	W1, 2
K3	S1-1F, 1R, 2F	
L7-11		
Q6-10, 13-15		
R49-89		

Figure 7-4. Serial Prefix 851-00464 and Below, 3 MHz Crystal Filte (Sheet 2 of 2)

SERIAL PREFIX 851-00464 AND BEL
3 MHz CRYSTAL FILTER (SHEET 1 O

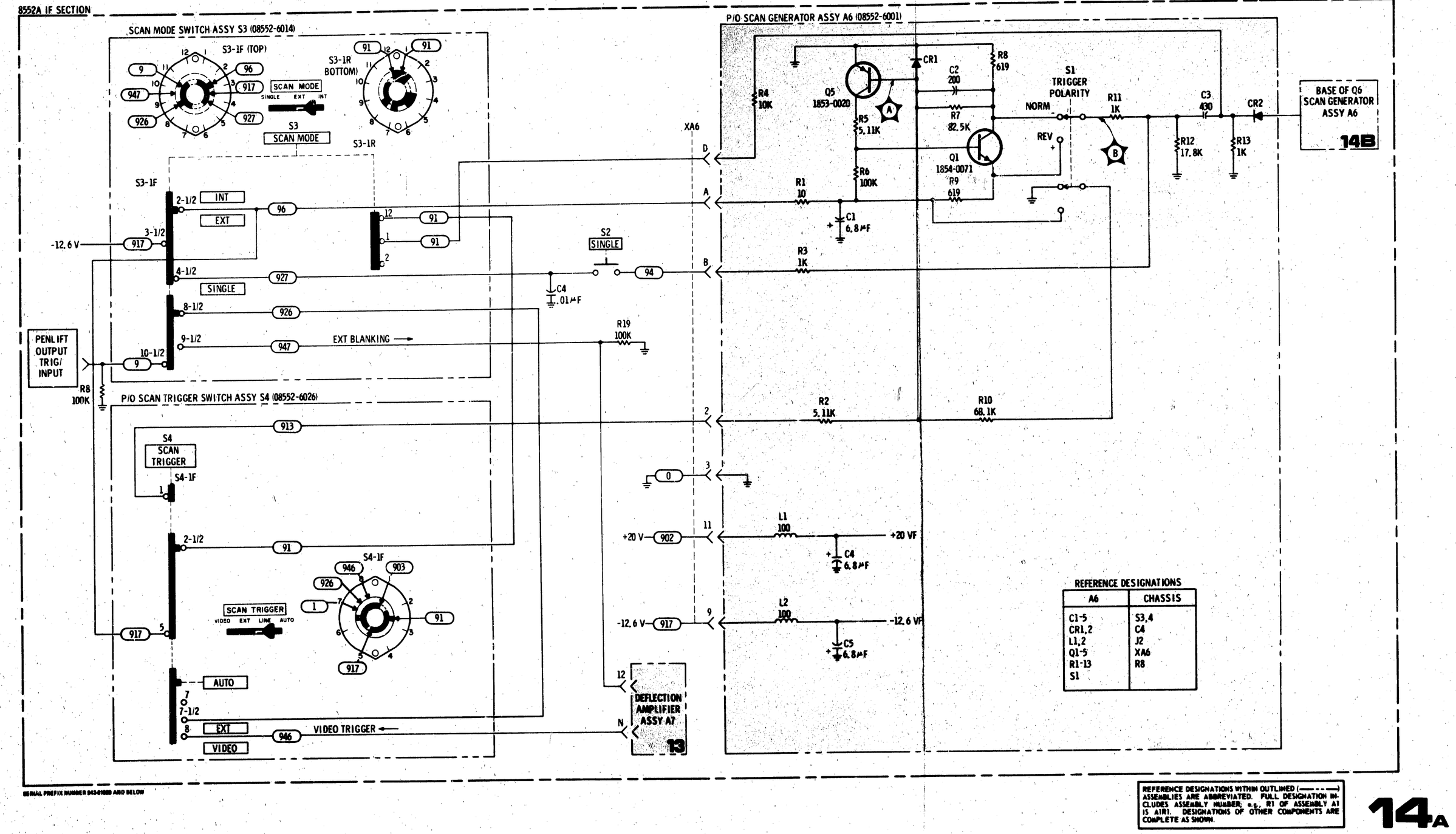
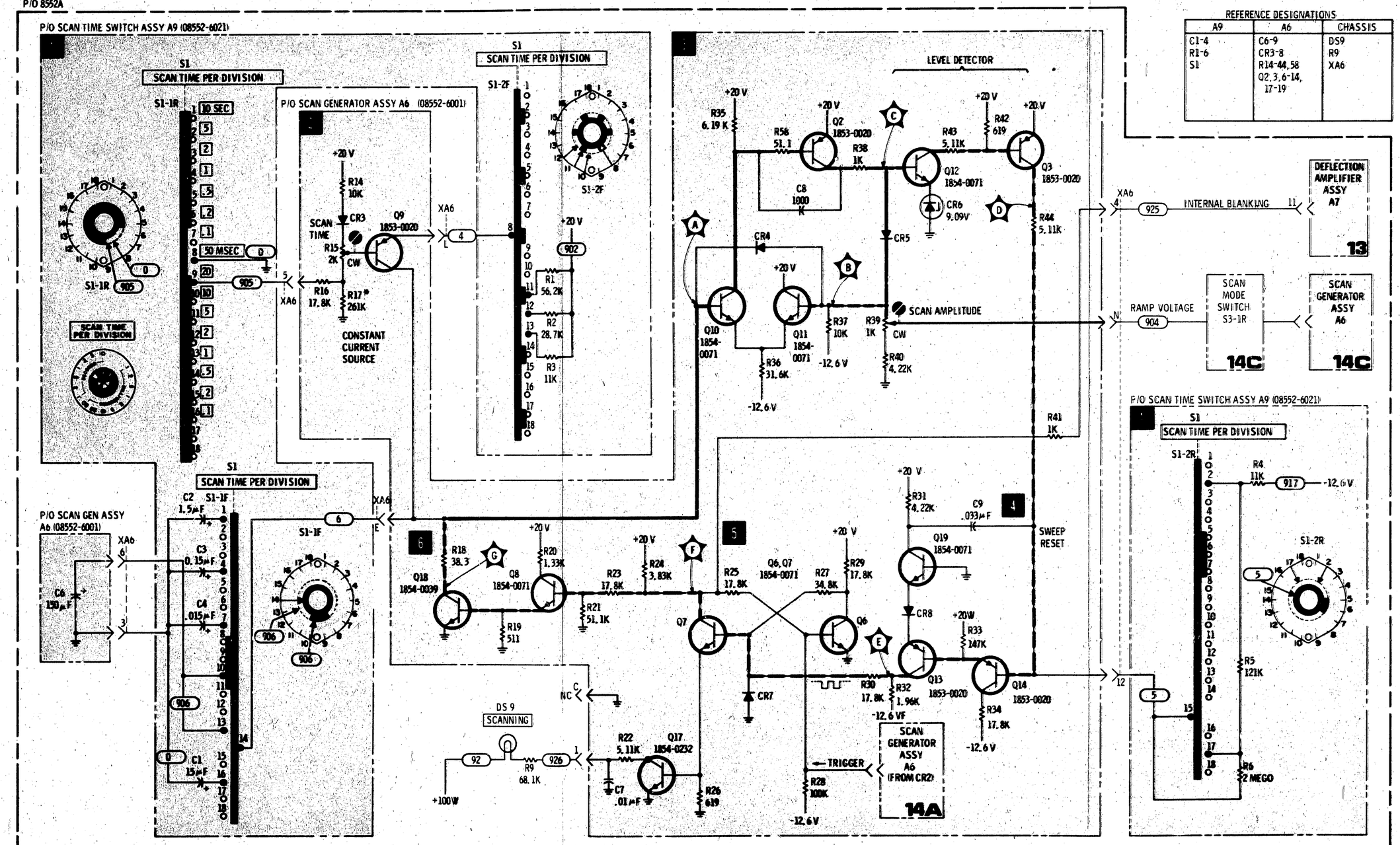


Figure 7-5. Serial Prefix 943-01889 and Below, Scan Control and Trigger Circuits



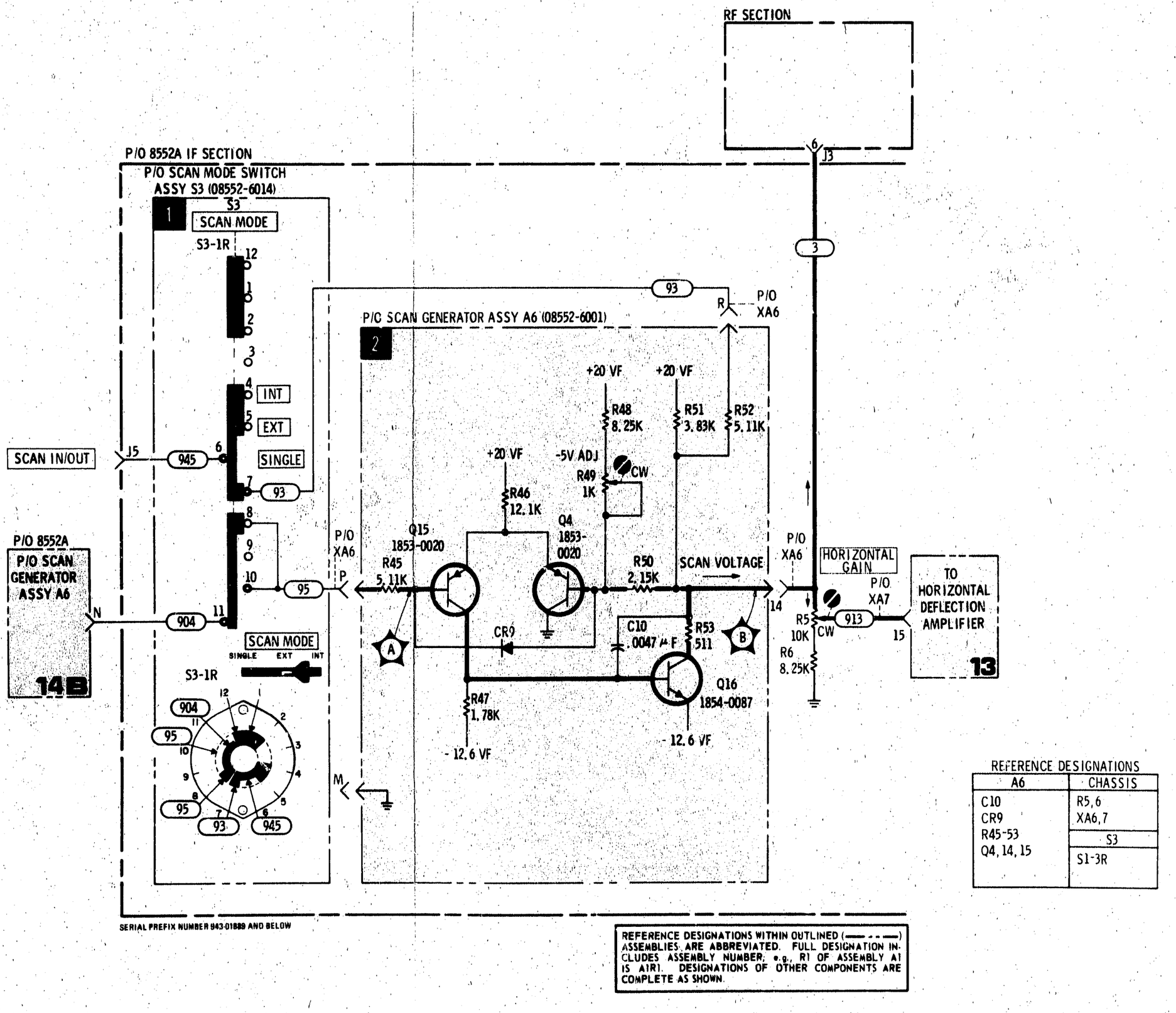
REFERENCE DESIGNATIONS		
A9	A6	CHASSIS
C1-4 R1-6 S1	C6-9 CR3-8 R14-44, 58 Q2, 3, 6-14, 17-19	DS9 R9 XA6

SERIAL PREFIX NUMBER 943-01889 AND BELOW

Figure 7-6. Serial Prefix 943-01889 and Below Scan Generator and Control Circuits

REFERENCE DESIGNATIONS WITHIN OUTLINED (— - - —) ASSEMBLIES ARE ABBREVIATED. FULL DESIGNATION INCLUDES ASSEMBLY NUMBER, e.g., R1 OF ASSEMBLY A1 IS A1R1. DESIGNATIONS OF OTHER COMPONENTS ARE COMPLETE AS SHOWN.

◆ SERIAL PREFIX 943-01889 AND BELOW
SCAN CONTROL AND TRIGGER CIRCUITS



REFERENCE DESIGNATIONS

A6	CHASSIS
C10 CR9 R45-53 Q4, 14, 15	R5, 6 XA6, 7
	S3
	S1-3R

REFERENCE DESIGNATIONS WITHIN OUTLINED (— - - —) ASSEMBLIES ARE ABBREVIATED. FULL DESIGNATION INCLUDES ASSEMBLY NUMBER; e.g., R1 OF ASSEMBLY A1 IS A1R1. DESIGNATIONS OF OTHER COMPONENTS ARE COMPLETE AS SHOWN.

Figure 7-7. Serial Prefix 943-01889 and Below, Scan Generator Circuits

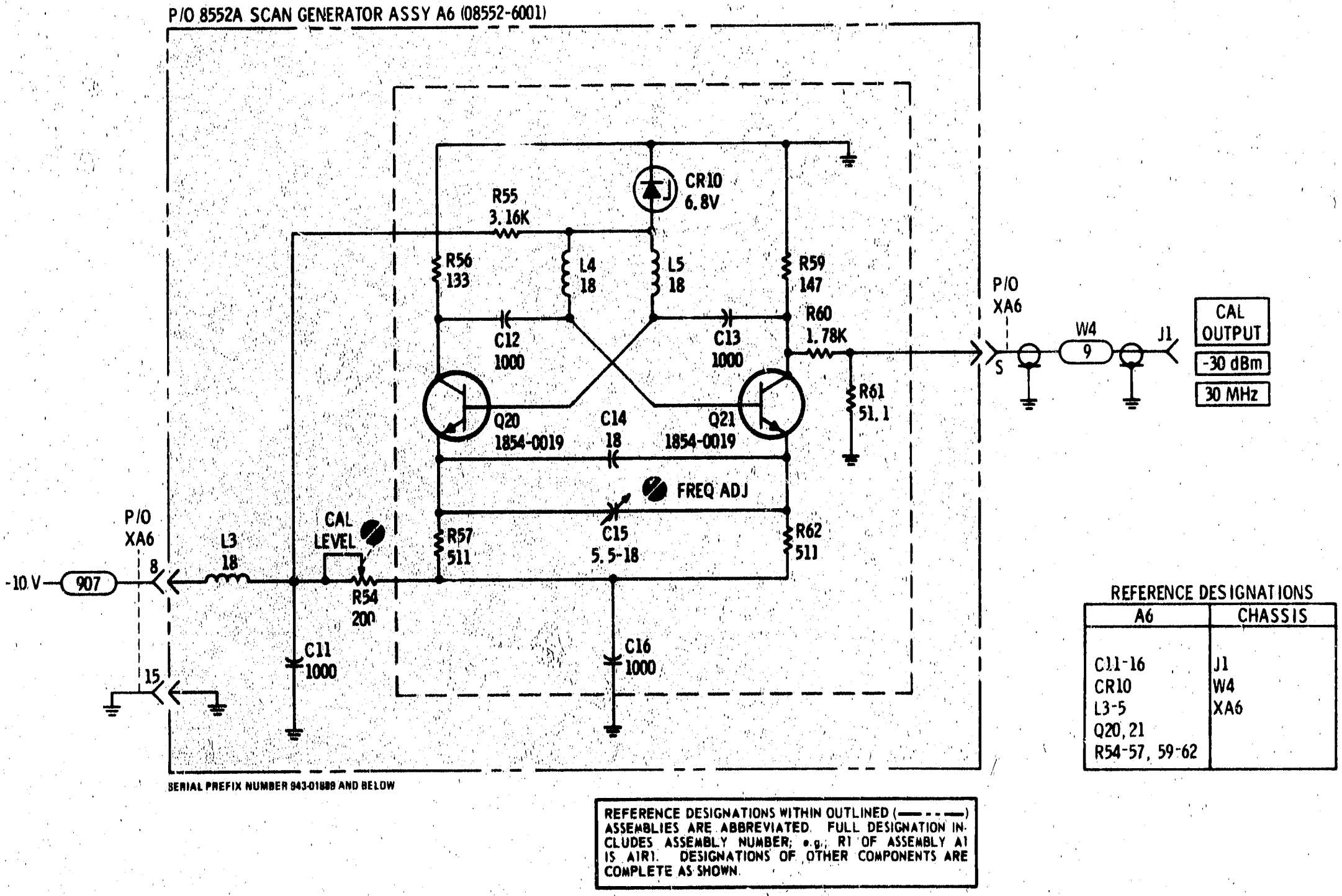


Figure 7-8. 30 MHz Calibration Oscillator

Table 7-1. 3 MHz Amplifier A2 Reference Designation Index

Reference Designation	Part No.	Description #	Note
A2	08552-6004	BOARD ASSY:3 MHZ AMPLIFIER	
A2C1	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A2C2	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A2C3	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C4	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C5	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C6	0160-3046	C:FXD MICA 250 PF 1% 100VDCW	
A2C7	0160-3047	C:FXD MICA 3280 PF 1% 100VDCW	
A2C8	0160-3045	C:FXD MICA 53.8 PF 1% 100VDCW	
A2C9	0160-3048	C:FXD MICA 8000 PF 1% 100VDCW	
A2C10	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C11	0180-0291	C:FXD ELECT 1.0 UF 10% 35VDCW	
A2C12	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C13	0122-0221	C:VOLTAGE VAR 100 PF 10% 30VDCW	
A2C14	0140-0205	C:FXD MICA 62 PF 5%	
A2C15	0122-0213	C:VOLTAGE VAR 47 PF 10% 30VDCW	
A2C16	0122-0221	C:VOLTAGE VAR 100 PF 10% 30VDCW	
A2C17	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C18	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C19	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C20	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C21	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C22	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C23	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C24	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C25	0140-0205	C:FXD MICA 62 PF 5%	
A2C26	0160-2257	C:FXD CER 10 PF 5% 500VDCW	
A2C27	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C28	0160-2930	C:FXD CEP 0.01 UF +80-20% 100VDCW	
A2C29	0140-0205	C:FXD MICA 62 PF 5%	
A2C30	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C31	0122-0043	C:VOLTAGE VAR 39-17.95PF 2% 4-25VDCW	
A2C32	0122-0044	C:VOLTAGE VAR 100-45.9PF 2% 4-25VDCW	
A2C33	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C34	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C35	0180-0291	C:FXD ELECT 1.0 UF 10% 35VDCW	
A2C36	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C37	0180-0291	C:FXD ELECT 1.0 UF 10% 35VDCW	
A2C38	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A2C39		NOT ASSIGNED	
A2C40	0122-0043	C:VOLTAGE VAR 39-17.95PF 2% 4-25VDCW	
A2C41	0122-0044	C:VOLTAGE VAR 100-45.9PF 2% 4-25VDCW	
A2CR1	1901-0040	DIODE:SILICON 30MA 30WV	
A2CR2	1901-0040	DIODE:SILICON 30MA 30WV	
A2CR3	1901-0040	DIODE:SILICON 30MA 30WV	
A2CR4	1901-0040	DIODE:SILICON 30MA 30WV	
A2CR5	1901-0040	DIODE:SILICON 30MA 30WV	

 # See introduction to this section for ordering information

Table 7-1. 3 MHz Amplifier A2 Reference Designation Index

Reference Designation	Part No.	Description #	Note
A2CR6	1901-0040	DIODE:SILICON 30MA 30WV	
A2CR7	1901-0040	DIODE:SILICON 30MA 30WV	
A2L1	9140-0237	COIL:FXD 200 UH 5%	
A2L2	9140-0237	COIL:FXD 200 UH 5%	
A2L3	9140-0237	COIL:FXD 200 UH 5%	
A2L4	9140-0237	COIL:FXD 200 UH 5%	
A2L5	9140-0237	COIL:FXD 200 UH 5%	
A2L6	9100-2744	COIL/CHOKE 7.8 UH 2%	
A2L7	08552-6011	INDUCTOR:300 KHZ FILTER #1	
A2L8	9100-2476	COIL/CHOKE 52.3 UH 1%	
A2L9	08552-6012	INDUCTOR:300 KHZ FILTER #2	
A2L10	9100-1611	COIL:FXD 0.22 UH 20%	
A2L11	9100-1636	COIL/CHOKE 110 UH 5%	
A2L12	9140-0137	COIL:FXD RF 1000 UH 5%	
A2L13	9100-1611	COIL:FXD 0.22 UH 20%	
A2L14	9140-0137	COIL:FXD RF 1000 UH 5%	
A2Q1	1854-0092	Q:SI NPN	
A2Q2	1853-0010	Q:SI PNP(SELECTED FROM 2N3251)	
A2Q3	1853-0010	Q:SI PNP(SELECTED FROM 2N3251)	
A2Q4	1854-0092	Q:SI NPN	
A2Q5	1853-0010	Q:SI PNP(SELECTED FROM 2N3251)	
A2Q6	1853-0010	Q:SI PNP(SELECTED FROM 2N3251)	
A2Q7	1854-0092	Q:SI NPN	
A2Q8	1853-0010	Q:SI PNP(SELECTED FROM 2N3251)	
A2Q9	1853-0010	Q:SI PNP(SELECTED FROM 2N3251)	
A2Q10	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A2R1	2100-1754	R:VAR WW 50 OHM 5% TYPE V 1W	
A2R2	0698-3151	R:FXD MET FLM 2.87K OHM 1% 1/8W	
A2R3	0757-0199	R:FXD MET FLM 21.5K OHM 1% 1/8W	
A2R4	0757-0447	R:FXD MET FLM 16.2K OHM 1% 1/8W	
A2R5	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A2R6	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A2R7	0698-3162	R:FXD MET FLM 46.4K OHM 1% 1/8W	
A2R8	0757-1094	R:FXD MET FLM 1.47K OHM 1% 1/8W	
A2R9	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A2R10	0757-0279	R:FXD MET FLM 3.16K OHM 1% 1/8W	
A2R11	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A2R12	0698-3446	R:FXD MET FLM 383 OHM 1% 1/8W	
A2R13	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A2R14	0698-3428	R:FXD MET FLM 14.7 OHM 1% 1/8W	
A2R15	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A2R16	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A2R17	0757-0199	R:FXD MET FLM 21.5K OHM 1% 1/8W	
A2R18	0757-0460	R:FXD MET FLM 61.9K OHM 1% 1/8W	
A2R19	0757-1094	R:FXD MET FLM 1.47K OHM 1% 1/8W	
A2R20	0757-0418	R:FXD MET FLM 619 OHM 1% 1/8W	

 # See introduction to this section for ordering information

Table 7-1. 3 MHz Amplifier A2 Reference Designation Index

Reference Designation	Part No.	Description #	Note
A2R21	2100-1757	R:VAR WW 500 OHM 5% TYPE V 1W	
A2R22	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A2R23	0698-3441	R:FXD MET FLM 215 OHM 1% 1/8W	
A2R24	2100-1755	R:VAR WW 100 OHM 5% TYPE V 1W	
A2R25	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A2R26	0757-0276	R:FXD MET FLM 61.9 OHM 1% 1/8W	
A2R27	2100-1754	R:VAR WW 50 OHM 5% TYPE V 1W	
A2R28	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A2R29	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A2R30	0698-3441	R:FXD MET FLM 215 OHM 1% 1/8W	
A2R31	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A2R32	0698-3446	R:FXD MET FLM 383 OHM 1% 1/8W	
A2R33	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A2R34	0757-0420	R:FXD MET FLM 750 OHM 1% 1/8W	
A2R35	0757-0199	R:FXD MET FLM 21.5K OHM 1% 1/8W	
A2R36	0757-0460	R:FXD MET FLM 61.9K OHM 1% 1/8W	
A2R37	0757-1094	R:FXD MET FLM 1.47K OHM 1% 1/8W	
A2R38	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A2R39	0698-3446	R:FXD MET FLM 383 OHM 1% 1/8W	
A2R40	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A2R41	0698-3428	R:FXD MET FLM 14.7 OHM 1% 1/8W	
A2R42	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A2R43	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A2R44	2100-1760	R:VAR WW 5K OHM 5% TYPE V 1W	
A2R45	0757-0199	R:FXD MET FLM 21.5K OHM 1% 1/8W	
A2R46	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A2R47	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A2R48	0757-0279	R:FXD MET FLM 3.16K OHM 1% 1/8W	
A2R49	0698-0082	R:FXD MET FLM 464 OHM 1% 1/8W	
A2R50	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A2R51	2100-1758	R:VAR WW 1K OHM 5% TYPE V 1W	
A2R52	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A2R53	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A2R54	0757-0199	R:FXD MET FLM 21.5K OHM 1% 1/8W	
A2R55	0698-3162	R:FXD MET FLM 46.4K OHM 1% 1/8W	
A2R56	0698-3162	R:FXD MET FLM 46.4K OHM 1% 1/8W	
A2R57	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A2R58	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A2T81	08552-2004	BOARD:BLANK PC	
	0360-0124	TERMINAL:SOLDER LUG	

See introduction to this section for ordering information

Table 7-2. Crystal Filter A4 Reference Designation Index

Reference Designation	Part No.	Description #	Note
A4	08552-6006	BOARD ASSY:CRYSTAL FILTER	
A4C1	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C2	0180-0291	C:FXD ELECT 1.0 UF 10% 35VDCW	
A4C3	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C4	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A4C5	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C6	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C7	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C8	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C9	0121-0059	C:VAR CER 2-8 PF 300VDCW	
A4C10	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C11	0160-2917	C:FXD CER 0.05 UF +80-20% 100VDCW	
A4C12	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C13	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C14	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C15	0121-0105	C:VAR CER 9-35 PF NPO	
A4C16	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A4C17	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C18	0160-2199	C:FXD MICA 30 PF 5%	
A4C19	0160-2199	C:FXD MICA 30 PF 5%	
A4C20	0160-2198	C:FXD MICA 20 PF 5%	
A4C21	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C22	0160-2917	C:FXD CER 0.05 UF +80-20% 100VDCW	
A4C23	0121-0059	C:VAR CER 2-8 PF 300VDCW	
A4C24	0160-0174	C:FXD CER 0.47 UF +80-20% 25VDCW	
A4C25	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C26	0160-2917	C:FXD CER 0.05 UF +80-20% 100VDCW	
A4C27	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C28	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C29	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C30	0121-0105	C:VAR CER 9-35 PF NPO	
A4C31	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A4C32	0160-2199	C:FXD MICA 30 PF 5%	
A4C33	0160-2199	C:FXD MICA 30 PF 5%	
A4C34	0160-2198	C:FXD MICA 20 PF 5%	
A4C35	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C36	0160-2917	C:FXD CER 0.05 UF +80-20% 100VDCW	
A4C37	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C38	0121-0059	C:VAR CER 2-8 PF 300VDCW	
A4C39	0160-2917	C:FXD CER 0.05 UF +80-20% 100VDCW	
A4C40	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C41	0160-2917	C:FXD CER 0.05 UF +80-20% 100VDCW	
A4C42	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C43	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C44	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C45	0121-0105	C:VAR CER 9-35 PF NPO	
A4C46	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A4C47	0160-2198	C:FXD MICA 20 PF 5%	
A4C48	0160-2198	C:FXD MICA 20 PF 5%	
A4C49	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C50	0160-2917	C:FXD CER 0.05 UF +80-20% 100VDCW	
A4C51	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C52	0160-2917	C:FXD CER 0.05 UF +80-20% 100VDCW	
A4C53	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C54	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	

 # See introduction to this section for ordering information

Table 7-2. Crystal Filter A4 Reference Designation Index

Reference Designation	Part No.	Description #	Note
A4C55	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C56	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C57	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4C58	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A4CR1	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR2	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR3	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR4	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR5	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR6	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR7	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR8	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR9	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR10	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR11	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR12	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR13	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR14	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR15	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR16	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR17	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR18	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR19	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR20	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR21	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR22	1901-0040	DIODE:SILICON 30MA 30WV	
A4CR23	1901-0040	DIODE:SILICON 30MA 30WV	
A4K1	0490-0743	RELAY:REED	
A4K2	0490-0743	RELAY:REED	
A4K3	0490-0743	RELAY:REED	
A4L1	9140-0237	COIL:FXD 200 UH 5%	
A4L2	9140-0237	COIL:FXD 200 UH 5%	
A4L3	9140-0237	COIL:FXD 200 UH 5%	
A4L4	9140-0237	COIL:FXD 200 UH 5%	
A4L5	9100-1622	COIL/CHOKE 24.0 UH 5%	
A4L6	9100-1622	COIL/CHOKE 24.0 UH 5%	
A4L7	9100-1622	COIL/CHOKE 24.0 UH 5%	
A4L8	9100-1622	COIL/CHOKE 24.0 UH 5%	
A4L9	9140-0237	COIL:FXD 200 UH 5%	
A4L10	9100-1622	COIL/CHOKE 24.0 UH 5%	
A4L11	9100-1622	COIL/CHOKE 24.0 UH 5%	
A4Q1	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A4Q2	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A4Q3	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A4Q4	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A4Q5	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	

See introduction to this section for ordering information

Table 7-2. Crystal Filter A4 Reference Designation Index

Reference Designation	Part No.	Description #	Note
A4Q6	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A4Q7	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A4Q8	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A4Q9	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A4Q10	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A4Q11	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A4Q12	1853-0001	Q:SI PNP(SELECTED FROM 2N1132)	
A4Q13	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A4Q14	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A4Q15	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A4R1	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A4R2	0757-0394	R:FXD MET FLM 51.1 OHM 1% 1/8W	
A4R3	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A4R4	0757-0458	R:FXD MET FLM 51.1K OHM 1% 1/8W	
A4R5	0698-3156	R:FXD MET FLM 14.7K OHM 1% 1/8W	
A4R6	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A4R7	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A4R8	0698-3454	R:FXD MET FLM 215K OHM 1% 1/8W	
A4R9	0757-0403	R:FXD MET FLM 121 OHM 1% 1/8W	
A4R10	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A4R11	0698-3132	R:FXD FLM 261 OHM 1% 1/8W	
A4R12	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A4R13	0757-0422	R:FXD MET FLM 909 OHM 1% 1/8W	
A4R14	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R15	0698-3558	R:FXD MET FLM 4.02K OHM 1% 1/8W	
A4R16	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R17	0698-3156	R:FXD MET FLM 14.7K OHM 1% 1/8W	
A4R18	0757-0458	R:FXD MET FLM 51.1K OHM 1% 1/8W	
A4R19	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A4R20	0757-0439	R:FXD MET FLM 6.81K OHM 1% 1/8W	
A4R21	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A4R22	0698-0001	R:FXD COMP 4.7 OHM 5% 1/2W	
A4R23	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A4R24	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A4R25	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A4R26	0757-0419	R:FXD MET FLM 681 OHM 1% 1/8W	
A4R27	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A4R28	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R29	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A4R30	2100-1756	R:VAR WW 200 OHM 5% TYPE V 1W	
A4R31	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R32	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A4R33	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A4R34	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A4R35	0698-3454	R:FXD MET FLM 215K OHM 1% 1/8W	
A4R36	0757-0403	R:FXD MET FLM 121 OHM 1% 1/8W	
A4R37	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A4R38	0698-3132	R:FXD FLM 261 OHM 1% 1/8W	
A4R39	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A4R40	0757-0422	R:FXD MET FLM 909 OHM 1% 1/8W	

 # See introduction to this section for ordering information

Table 7-2. Crystal Filter A4 Reference Designation Index

Reference Designation	Part No.	Description #	Note
A4R41	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R42	0698-3558	R:FXD MET FLM 4.02K OHM 1% 1/8W	
A4R43	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R44	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A4R45	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A4R46	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A4R47	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A4R48	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A4R49	0698-3156	R:FXD MET FLM 14.7K OHM 1% 1/8W	
A4R50	0757-0458	R:FXD MET FLM 51.1K OHM 1% 1/8W	
A4R51	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A4R52	0757-0439	R:FXD MET FLM 6.81K OHM 1% 1/8W	
A4R53	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A4R54	0698-3439	R:FXD MET FLM 178 OHM 1% 1/8W	
A4R55	2100-1755	R:VAR WW 100 OHM 5% TYPE V 1W	
A4R56	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R57	0698-0001	R:FXD COMP 4.7 OHM 5% 1/2W	
A4R58	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A4R59	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A4R60	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A4R61	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A4R62	0757-0419	R:FXD MET FLM 681 OHM 1% 1/8W	
A4R63	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A4R64	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A4R65	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A4R66	0698-3454	R:FXD MET FLM 215K OHM 1% 1/8W	
A4R67	0757-0403	R:FXD MET FLM 121 OHM 1% 1/8W	
A4R68	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A4R69	0698-3132	R:FXD FLM 261 OHM 1% 1/8W	
A4R70	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A4R71	0757-0422	R:FXD MET FLM 909 OHM 1% 1/8W	
A4R72	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R73	0698-3558	R:FXD MET FLM 4.02K OHM 1% 1/8W	
A4R74	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R75	0698-3158	R:FXD MET FLM 23.7K OHM 1% 1/8W	
A4R76	0698-3158	R:FXD MET FLM 23.7K OHM 1% 1/8W	
A4R77	0757-0401	R:FXD MET FLM 100 OHM 1% 1/8W	
A4R78	0757-0439	R:FXD MET FLM 6.81K OHM 1% 1/8W	
A4R79	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A4R80	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A4R81	0698-0001	R:FXD COMP 4.7 OHM 5% 1/2W	
A4R82	0757-0394	R:FXD MET FLM 51.1 OHM 1% 1/8W	
A4R83	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A4R84	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A4R85	2100-1762	R:VAR WW 20K 5% 1W	
A4R86	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A4R87	0698-0082	R:FXD MET FLM 464 OHM 1% 1/8W	
A4R88	2100-1760	R:VAR WW 5K OHM 5% TYPE V 1W	
A4R89	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	

 # See introduction to this section for ordering information

Table 7-2. Crystal Filter A4 Reference Designation Index

Reference Designation	Part No.	Description #	Note
A4TB1	08552-2006	BOARD:BLANK PC	
	0360-0124	TERMINAL:SOLDER LUG	
A4Y1	0410-0139	CRYSTAL:QUARTZ(MATCHED SET OF 3)	
A4Y2	0410-0139	CRYSTAL:QUARTZ(MATCHED SET OF 3)	
A4Y3	0410-0139	CRYSTAL:QUARTZ(MATCHED SET OF 3)	

See introduction to this section for ordering information

Table 7-3. Scan Generator A6 Reference Designation Index

Reference Designation	HP Part No.	Description #	Note
A6	08552-6001	BOARD ASSY:SCAN GENERATOR	
A6C1	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A6C2	0140-0198	C:FXD MICA 200 PF 5%	
A6C3	0160-0939	C: FXD MICA 430 PF 5% 300 VDCW	
A6C4	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A6C5	0180-0116	C:FXD ELECT 6.8 UF 10% 35VDCW	
A6C6	0180-2136	C:FXD ELECT 150 UF 10% 30VDCW	
A6C7	0160-2930	C:FXD CER 0.01 UF +80-20% 100VDCW	
A6C8	0160-0153	C:FXD MY 0.001 UF 10% 200VDCW	
A6C9	0160-0163	C:FXD MY 0.033 UF 10% 200VDCW	
A6C10	0160-0157	C:FXD MY 0.0047 UF 10% 200VDCW	
A6C11	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A6C12	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A6C13	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A6C14	0160-2263	C:FXD CER 18 PF 5% 500VDCW	
A6C15	0121-0036	C:VAR CER 5.5-18 PF CAL FREQUENCY	
A6C16	0150-0050	C:FXD CER DISC 1000 PF +80-20% 1000VDCW	
A6CR1	1901-0025	DIODE:SILICON 100MA/1V	
A6CR2	1901-0025	DIODE:SILICON 100MA/1V	
A6CR3	1901-0025	DIODE:SILICON 100MA/1V	
A6CR4	1901-0040	DIODE:SILICON 30MA 30WV	
A6CR5	1901-0025	DIODE:SILICON 100MA/1V	
A6CR6	1902-0785	DIODE:BREAKDOWN 9.09V 5%	
A6CR7	1901-0025	DIODE:SILICON 100MA/1V	
A6CR8	1901-0025	DIODE:SILICON 100MA/1V	
A6CR9	1901-0040	DIODE:SILICON 30MA 30WV	
A6CR10	1902-0052	DIODE BREAKDOWN:6.81V	
A6L1	9140-0210	COIL:FXD RF 100 UH 5%	
A6L2	9140-0210	COIL:FXD RF 100 UH 5%	
A6L3	9100-2267	COIL/CHOKE 18 UH	
A6L4	9100-2267	COIL/CHOKE 18 UH	
A6L5	9100-2267	COIL/CHOKE 18 UH	
A6MP1	08552-0024	SHIELD:CAN,SCAN GENERATOR	
A6Q1	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A6Q2	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A6Q3	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A6Q4	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A6Q5	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A6Q6	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A6Q7	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A6Q8	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A6Q9	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A6Q10	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	

 # See introduction to this section for ordering information

Table 7-3. Scan Generator A6 Reference Designation Index

Reference Designation	Part No.	Description #	Note
A6Q11	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A6Q12	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A6Q13	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A6Q14	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A6Q15	1853-0020	Q:SI PNP(SELECTED FROM 2N3702)	
A6Q16	1854-0087	Q:SI NPN(SIMILAR TO 2N3417)	
A6Q17	1854-0232	Q:SI NPN(SELECTED FROM 2N3440)	
A6Q18	1854-0039	Q:SI NPN	
A6Q19	1854-0071	Q:SI NPN(SELECTED FROM 2N3704)	
A6Q20	1854-0019	Q:SI NPN(SELECTED FROM 2N2369)	
A6Q21	1854-0019	Q:SI NPN(SELECTED FROM 2N2369)	
A6R1	0757-0346	R:FXD MET FLM 10 OHM 1% 1/8W	
A6R2	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A6R3	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A6R4	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A6R5	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A6R6	0757-0465	R:FXD MET FLM 100K 1% 1/8W	
A6R7	0757-0463	R:FXD MET FLM 82.5K 1% 1/8W	
A6R8	0757-0418	R:FXD MET FLM 619 OHM 1% 1/8W	
A6R9	0757-0418	R:FXD MET FLM 619 OHM 1% 1/8W	
A6R10	0757-0461	R:FXD MET FLM 68.1K OHM 1% 1/8W	
A6R11	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A6R12	0698-3136	R:FXD MET FLM 17.8K OHM 1% 1/8W	
A6R13	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A6R14	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A6R15	2100-1759	R:VAR ww 2K OHM 5% TYPE V 1W SCAN TIME ADJ	
A6R16	0698-3136	R:FXD MET FLM 17.8K OHM 1% 1/8W	
A6R17	0698-3455	R:FXD MET FLM 261K OHM 1% 1/8W FACTORY SELECTED PART	
A6R18	0698-3396	R:FXD MET FLM 38.3 OHM 1% 1/2W	
A6R19	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A6R20	0757-0317	R:FXD MET FLM 1.33K OHM 1% 1/8W	
A6R21	0757-0458	R:FXD MET FLM 51.1K OHM 1% 1/8W	
A6R22	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A6R23	0698-3136	R:FXD MET FLM 17.8K OHM 1% 1/8W	
A6R24	0698-3153	R:FXD MET FLM 3.83K 1% 1/8W	
A6R25	0698-3136	R:FXD MET FLM 17.8K OHM 1% 1/8W	
A6R26	0757-0418	R:FXD MET FLM 619 OHM 1% 1/8W	
A6R27	0757-0123	R:FXD MET FLM 34.8K OHM 1% 1/8W	
A6R28	0757-0465	R:FXD MET FLM 100K 1% 1/8W	
A6R29	0698-3136	R:FXD MET FLM 17.8K OHM 1% 1/8W	
A6R30	0698-3136	R:FXD MET FLM 17.8K OHM 1% 1/8W	
A6R31	0698-3154	R:FXD MET FLM 4.22K OHM 1% 1/8W	
A6R32	0698-0083	R:FXD MET FLM 1.96K OHM 1% 1/8W	
A6R33	0698-3452	R:FXD MET FLM 147K OHM 1% 1/8W	

 # See introduction to this section for ordering information

Table 7-3. Scan Generator A6 Reference Designation Index

Reference Designation	Part No.	Description #	Note
A6R34	0698-3136	R:FXD MET FLM 17.8K OHM 1% 1/8W	
A6R35	0757-0290	R:FXD MET FLM 6.19K OHM 1% 1/8W	
A6R36	0698-3160	R:FXD MET FLM 31.6K 1% 1/8W	
A6R37	0757-0442	R:FXD MET FLM 10.0K 1% 1/8W	
A6R38	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A6R39	2100-1758	R:VAR WW 1K OHM 5% TYPE V 1W SCAN AMPLITUDE	
A6R40	0698-3154	R:FXD MET FLM 4.22K OHM 1% 1/8W	
A6R41	0757-0280	R:FXD MET FLM 1K OHM 1% 1/8W	
A6R42	0757-0418	R:FXD MET FLM 619 OHM 1% 1/8W	
A6R43	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A6R44	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A6R45	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A6R46	0757-0444	R:FXD MET FLM 12.1K OHM 1% 1/8W	
A6R47	0757-0278	R:FXD MET FLM 1.78K OHM 1% 1/8W	
A6R48	0757-0441	R:FXD MET FLM 8.25K 1% 1/8W	
A6R49	2100-1758	R:VAR WW 1K OHM 5% TYPE V 1W -5V ADJ	
A6R50	0698-0084	R:FXD MET FLM 2.15K 1% 1/8W	
A6R51	0698-3153	R:FXD MET FLM 3.83K 1% 1/8W	
A6R52	0757-0438	R:FXD MET FLM 5.11K 1% 1/8W	
A6R53	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A6R54	2100-1756	R:VAR WW 200 OHM 5% TYPE V 1W CAL LEVEL	
A6R55	0757-0279	R:FXD MET FLM 3.16K OHM 1% 1/8W	
A6R56	0698-7073	R:FXD MET FLM 133 OHM 1% 1/20W	
A6R57	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A6R58	0757-0394	R:FXD MET FLM 51.1 OHM 1% 1/8W	
A6R59	0698-7074	R:FXD MET FLM 147 OHM 1% 1/20W	
A6R60	0757-0278	R:FXD MET FLM 1.78K OHM 1% 1/8W	
A6R61	0757-0394	R:FXD MET FLM 51.1 OHM 1% 1/8W	
A6R62	0757-0416	R:FXD MET FLM 511 OHM 1% 1/8W	
A6S1	3101-0973	SWITCH:SLIDE DPDT 0.5A 125V AC/DC NORM/REV POLARITY	
A6TB1	08552-2001	BOARD:BLANK PC	
S3	08552-6014	SWITCH ASSY:SCAN MODE	
S4	08552-6026	SWITCH ASSY:SCAN TRIGGER	

 # See introduction to this section for ordering information

SERVICE INFORMATION

SECTION VIII
SERVICE

8-1. INTRODUCTION.

8-2. This section provides instructions for troubleshooting and repair of the HP 8552A Spectrum Analyzer IF Section.

8-3. LINE VOLTAGE REQUIREMENTS.

8-4. During adjustment and testing, the Spectrum Analyzer must be installed with an RF Section into a 140 Series Display Section which is connected to a source of power which is 50 to 60 Hz and 115 or 230 Vac ±10%. If adjustment of the dc voltage regulators is necessary, the Spectrum Analyzer should be connected to the ac power source through a variable auto transformer and then be adjusted to check regulator action when the line voltage varies as much as 10%.

8-5. MAINTENANCE AIDS.

8-6. Servicing Aids on Printed Circuit Boards. Servicing aids provided on circuit boards include holes to fit the board removal tool, numbered test points (on some boards), transistor designators, adjustment callouts, and assembly stock numbers.

8-7. TEST EQUIPMENT AND ACCESSORIES REQUIRED.

8-8. Test equipment and accessory requirements are listed in the System Test and Troubleshooting Procedure, the individual Service Sheets, and in the Test Equipments and Accessories list, Table 1-5. Test instruments other than those listed may be used if their performance equals or exceeds that of the equipment listed.

8-9. Circuit Board Extender. A circuit board extender is supplied with the HP 11592A Service Kit. The extender board may be used to extend the assemblies in the 8552A IF Section, clear of the housing (see Figure 8-1) to provide easy access to test points and components.

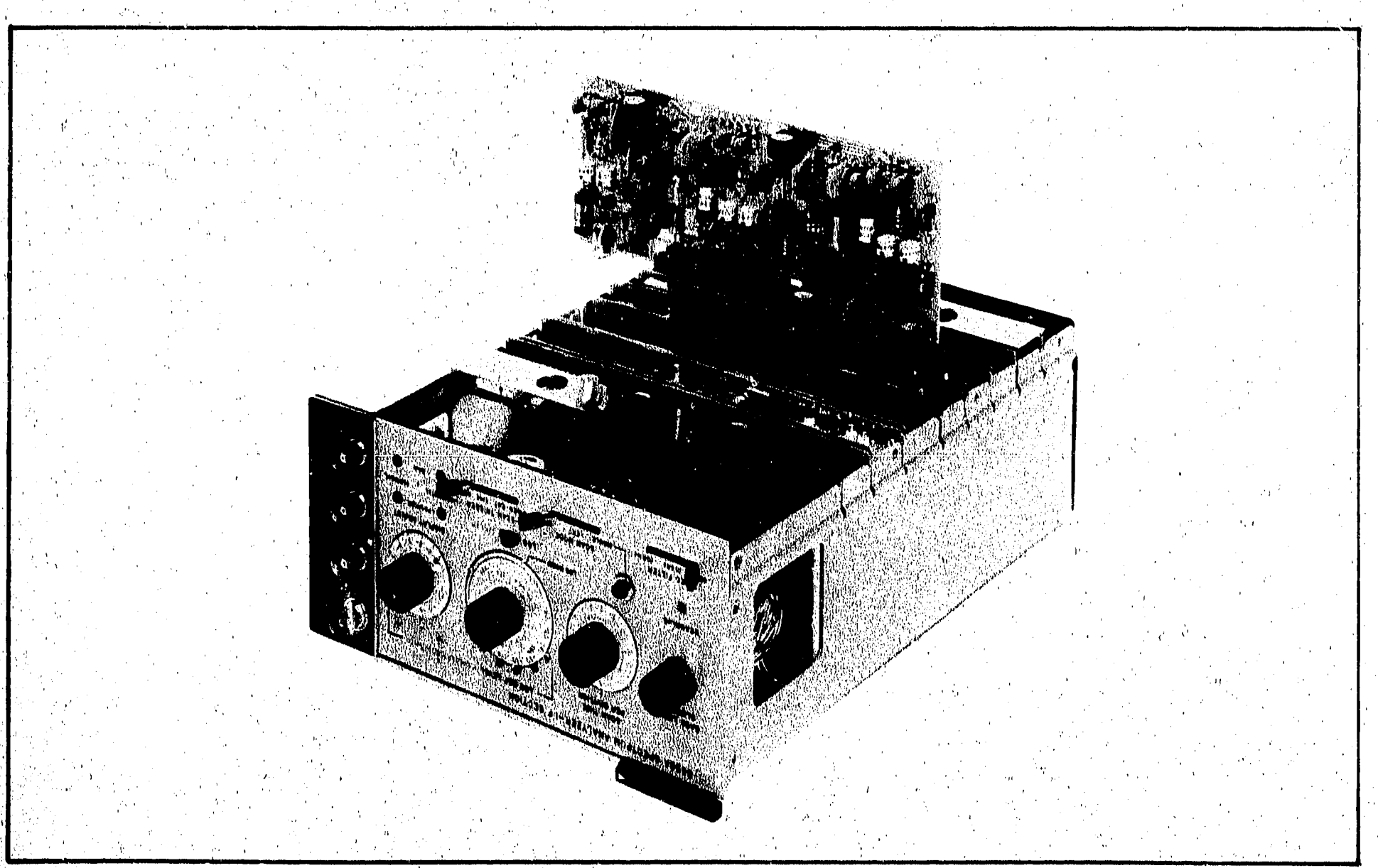


Figure 8-1. 8552A IF Section with Circuit Board Extended for Maintenance

8-10. ADJUSTMENTS.

8-11. The procedures contained in these sections do not include calibration or adjustment. Service Sheets which contain adjustable components refer to procedures in the Performance and Adjustment Sections which should be performed after repairs are accomplished.

8-12. GENERAL PROCEDURES.

8-13. The troubleshooting procedure is divided into two maintenance levels. The first, System Test and Troubleshooting Procedure, is designed to quickly isolate the cause of a malfunction to a circuit or assembly. The second provides circuit analysis and test procedures to aid in isolating faults to a defective component. Circuit descriptions and test procedures for the second maintenance level are located on the page facing the schematic diagram of the circuit to be repaired.

8-14. After the cause of a malfunction has been located and remedied in any circuit containing adjustable components, the applicable procedure specified in the Performance and Adjustment Section should be performed.

8-15. GENERAL SERVICE INFORMATION.

8-16. Part Location Aids. The locations of chassis-mounted parts and major assemblies are shown in Figure 8-7. The locations of individual components mounted on printed circuit boards or other assemblies are shown on the appropriate schematic diagram page or on the page opposite it. The part reference designator is the assembly designator plus the part designator. (Example: A10R9 is R9 on the Log Reference Assembly A10). For specific component description and ordering information refer to the parts list in Section VI.

8-17. Factory Selected Components. Some component values are selected at the time of final checkout at the factory (see Table 5-4). Usually these values are not extremely critical; they are selected to provide optimum compatibility with associated components. These components are identified on individual schematics by an asterisk. The recommended procedure for replacing a factory-selected part is as follows:

a. Try the original value, then perform the calibration test specified for the circuit in the performance and adjustment sections of this manual.

b. If calibration cannot be accomplished, try the typical value shown in the parts list and repeat the test.

c. If calibration still cannot be accomplished, perform the calibration test using various values until calibration is accomplished.

8-18. Wiring Diagram. Due to the complexity of the system it is not practical to provide an overall schematic diagram. However, Figure 8-12 provides overall wiring information (except for dc voltages) for all switches and assemblies.

8-19. Printed Circuit Board Exchange. Circuit boards for the 8552A Spectrum Analyzer IF Section are available on an exchange basis at a considerable savings in cost. Simply contact the Hewlett-Packard office nearest you and make your requirements known. The local Hewlett-Packard office will arrange for immediate airmail shipment to minimize equipment downtime. At least 90% of the orders for replacement parts received by an HP Field Sales Office will be shipped the same day — either from the sales office itself or from service center. These factory-repaired exchange circuit boards should be ordered by the special part numbers appearing in Table 6-1 of this manual.

8-20. System Test and Troubleshooting Procedure. Table 8-2 provides information that will, in most cases, isolate the causes of a malfunction to a circuit or assembly, RF Section, or Display Section.

8-21. No attempt is made in this procedure to isolate causes of trouble to the component level. Reference is made to the specific Service Sheet which describes the circuits and test procedures for the portion of the analyzer to which the malfunction has been isolated. Where RF or Display Section maintenace is indicated, refer to the RF or Display Section Operating and Service Manual.

8-22. Diagram Notes. Figure 8-6, Schematic Diagram Notes, provides information relative to symbols and measurement units shown in schematic diagrams.

8-23. ETCHED CIRCUITS.

8-24. The etched circuit boards in the 8552A are of the plated-through type consisting of metallic conductors bonded to both sides of insulating material. The metallic conductors are extended through the component mounting holes by a plating process. Soldering can be done from either side of the board with equally good results. Table 8-1 lists recommended tools and materials. Following are recommendations and precautions pertinent to etched circuit repair work.

a. Avoid unnecessary component substitution; it can result in damage to the circuit board and/or adjacent components.

b. Do not use a high-power soldering iron on etched circuit boards. Excessive heat may lift a conductor or damage the board.

c. Use a suction device (Table 8-1) or wooden toothpick to remove solder from com-

ponent mounting holes. DO NOT USE A SHARP METAL OBJECT SUCH AS AN AWL OR TWIST DRILL FOR THIS PURPOSE. SHARP OBJECTS MAY DAMAGE THE PLATED-THROUGH CONDUCTOR.

d. After soldering, remove excess flux from the soldered areas and apply a protective coating to prevent contamination and corrosion. See Table 8-1 for recommendations.

8-25. Etched Conductor Repair. A broken or burned section of conductor can be repaired by bridging the damaged section with a length of tinned copper wire. Allow adequate overlap and remove any varnish from etched conductor before soldering wire into place.

8-26. COMPONENT REPLACEMENT.

a. Remove defective component from board.

NOTE

Axial lead components, such as resistors and tubular capacitors, can be replaced without unsoldering. Clip leads near body of defective component, remove component and straighten leads left in board. Wrap leads of replacement component one turn around original leads. Solder wrapped connection, and clip off excess lead.

b. If component was unsoldered, remove solder from mounting holes, and position component as original was positioned. DO NOT FORCE LEADS INTO MOUNTING HOLES; sharp lead ends may damage plated-through conductor.

8-27. Transistor Replacement.

8-28. Solid state transistors are in many physical forms. This sometimes results in confusion as to which lead is the collector, which is the emitter,

Table 8-1. Etched Circuit Soldering Equipment

Item	Use	Specification	Item Recommended
Soldering tool	Soldering Unsoldering	Wattage rating: 47½ - 56½ Tip Temp: 850 - 900 degrees	Ungar #776 Handle with *Ungar #4037 Heating Unit
Soldering *Tip	Soldering Unsoldering	*Shape: pointed	*Ungar #PL111
De-soldering aid	To remove molten solder from connection	Suction device	Soldapullt by Edsyn Co., Arleta, California
Resin (flux) solvent	Remove excess flux from soldered area before application of protective coating	Must not dissolve etched circuit base board material or conductor bonding agent	Freon Acetone Lacquer Thinner Isopropyl Alcohol (100% dry)
Solder	Component replacement Circuit board repair Wiring	Resin (flux) core, high tin content (60/40 tin/lead), 18 gauge (SWG) preferred	
Protective	Contamination, corrosion protection	Good electrical insulation, corrosion-prevention properties	Silicone Resin such as GE DRI-FILM **88

*For working on 8552A Boards: for general purpose work, use Ungar No. 1237 Heating Unit (37, 5W, tip temp of 750—800 degrees) and Ungar No. PL113 1/8" chisel tip.

**General Electric Co., Silicone Products Dept., Waterford, New York, U.S.A.

and which is the base. Figure 8-2 shows epoxy and metal case transistors and the means of identifying the leads.

8-29. To replace the transistor proceed as follows:

a. Do not apply excessive heat; see Table 8-1 for recommended soldering tools.

b. Use long-nose pliers between transistor and hot soldering iron as a heat sink. The instant solder is melted, use pliers to pull lead free of board.

c. When installing replacement transistor, ensure sufficient lead length to dissipate soldering heat by using about the same length of exposed lead as used for original transistor.

8-30. Some transistors are mounted for good heat dissipation. This requires good thermal contact with mounting surfaces. To assure good thermal contact for a replacement transistor, coat both sides of the black insulator with Dow Corning #5 silicone compound or equivalent before fastening the transistor to the chassis. Dow Corning #5 compound is available in 8-oz tubes from Hewlett-Packard; order HP Stock No. 8500-0059.

8-31. Diode Replacement.

8-32. Solid state diodes are in many physical forms. This sometimes results in confusion as to which lead or connection is for the cathode (negative) or anode (positive), since not all diodes are marked with the standard symbols. Figure 8-2 shows examples of some diode marking methods.

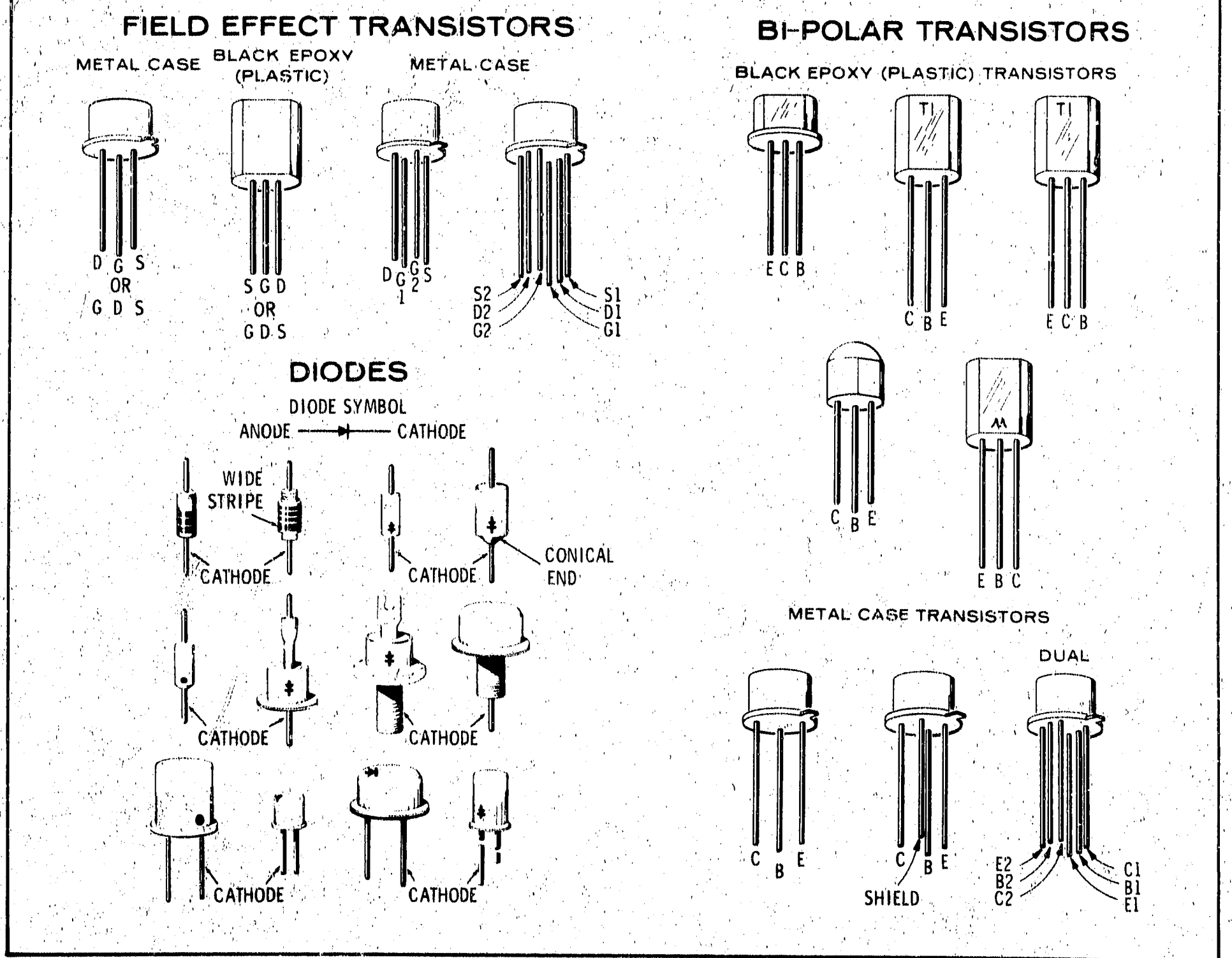


Figure 8-2. Examples of Diode and Transistor Marking Methods

If doubt exists as to polarity, an ohmmeter may be used to determine the proper connection. It is necessary to know the polarity of the ohms lead with respect to the common lead for the ohmmeter used. (For the HP Model 410B Vacuum Tube Voltmeter, the ohms lead is negative with respect to the common; for the HP Model 412A DC Vacuum Tube Voltmeter, the ohms lead is positive with respect to the common.) When the ohmmeter indicates the least diode resistance, the cathode of the diode is connected to the ohmmeter lead which is negative with respect to the other lead.

NOTE

Replacement instructions are the same as those listed for transistor replacement.

8-33. SWITCHING INFORMATION.

8-34. The manner in which switch wafers are schematically presented in this manual is distinctly different from that used in previous Hewlett-Packard manuals. An exception to this is the overall wiring diagram, Figure 8-12, which uses the conventional wafer type of switch presentation. If the following information concerning the evolution of this system of switch presentation is carefully studied, it will be seen that circuits are more easily understood and much more easily traced.

8-35. One of the major objections to drawing switch wafer symbols as the wafer appears is that many lines must cross other lines on the schematics. This problem has not been completely eliminated by use of straight-line presentation, but it has been minimized and circuits are much easier to follow once the basic principles are understood.

8-36. Figure 8-3 illustrates the evolution of straight-line switch presentation from the pictorial view of a switch wafer. Part A shows the wafer as it actually appears. In parts B and C, when the wafer is viewed as being a flexible, stretchable material, the transition from wafer to straight-line presentation begins to be obvious. In part D the transition is complete and the wafer now appears to be a slide type switch. In part E the final result is shown. Note that those contacts which maintain contact with the metallic portion of the rotor regardless of switch position (in the illustration contact 7) are moved to the other side for clarification. Note too that lead lines and arrows to switch contacts are no longer required.

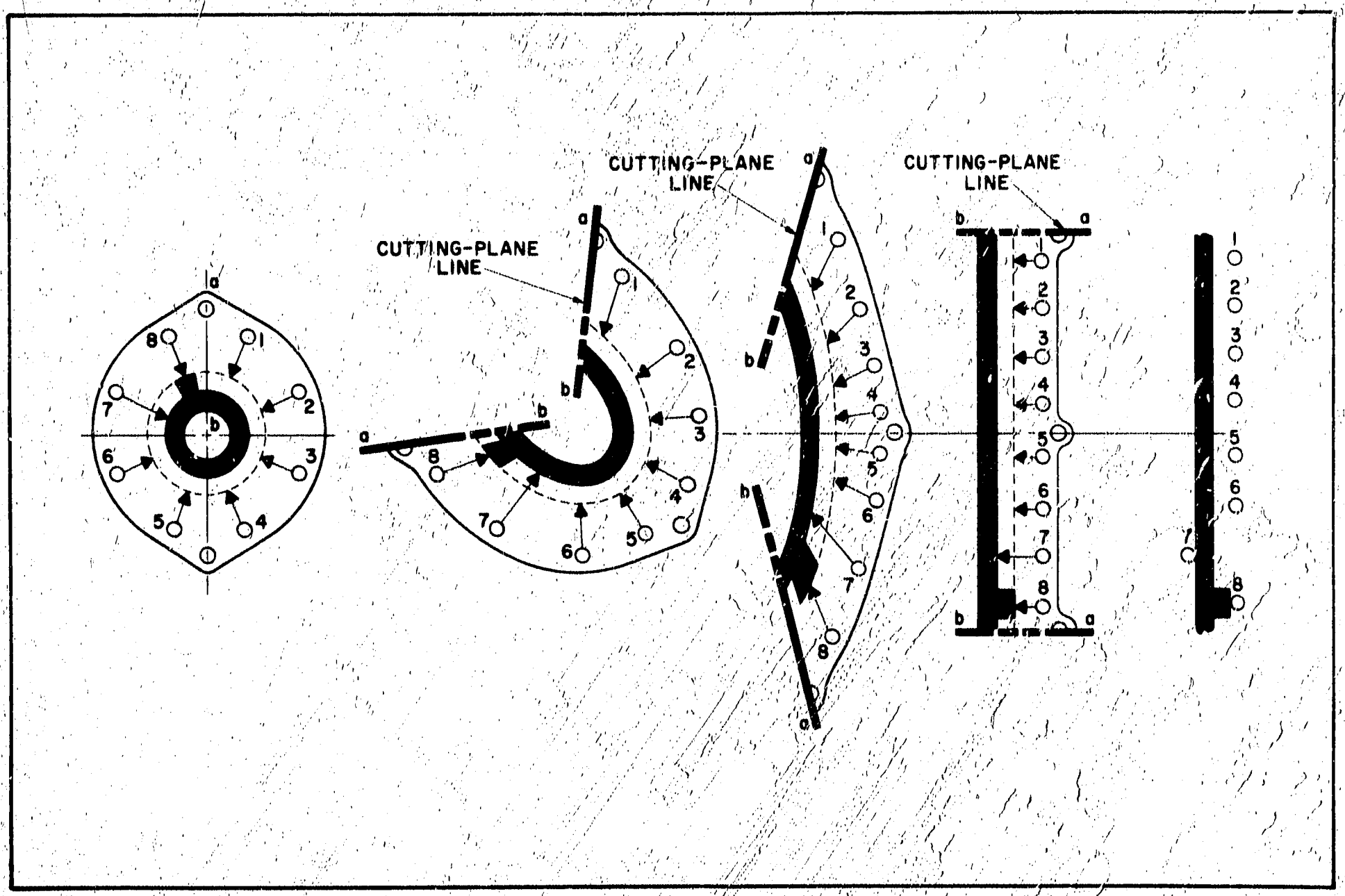


Figure 8-3. Evolution of Straight-Line Switch Presentation

8-37. In all schematics in this manual the switches, unless otherwise noted, are shown in the maximum CCW position. The physical layouts of the switches are shown as well as a straight-line presentation of switch action. It is important to note that in the straight-line presentation, the portion of a rotor mating with the bottom contact of a switch mates with the top contact of the switch when the switch is turned one step in the clockwise direction. Switch wafer S1-1F (P/O INPUT ATTENUATION assembly A3 from the RF Section) is illustrated in three positions to demonstrate switch action (see Figure 8-4).

8-38. Figure 8-4 illustrates the difference between the old method of switch presentation and the straight line presentation. The example chosen represents the RF Section INPUT ATTENUATION switch.

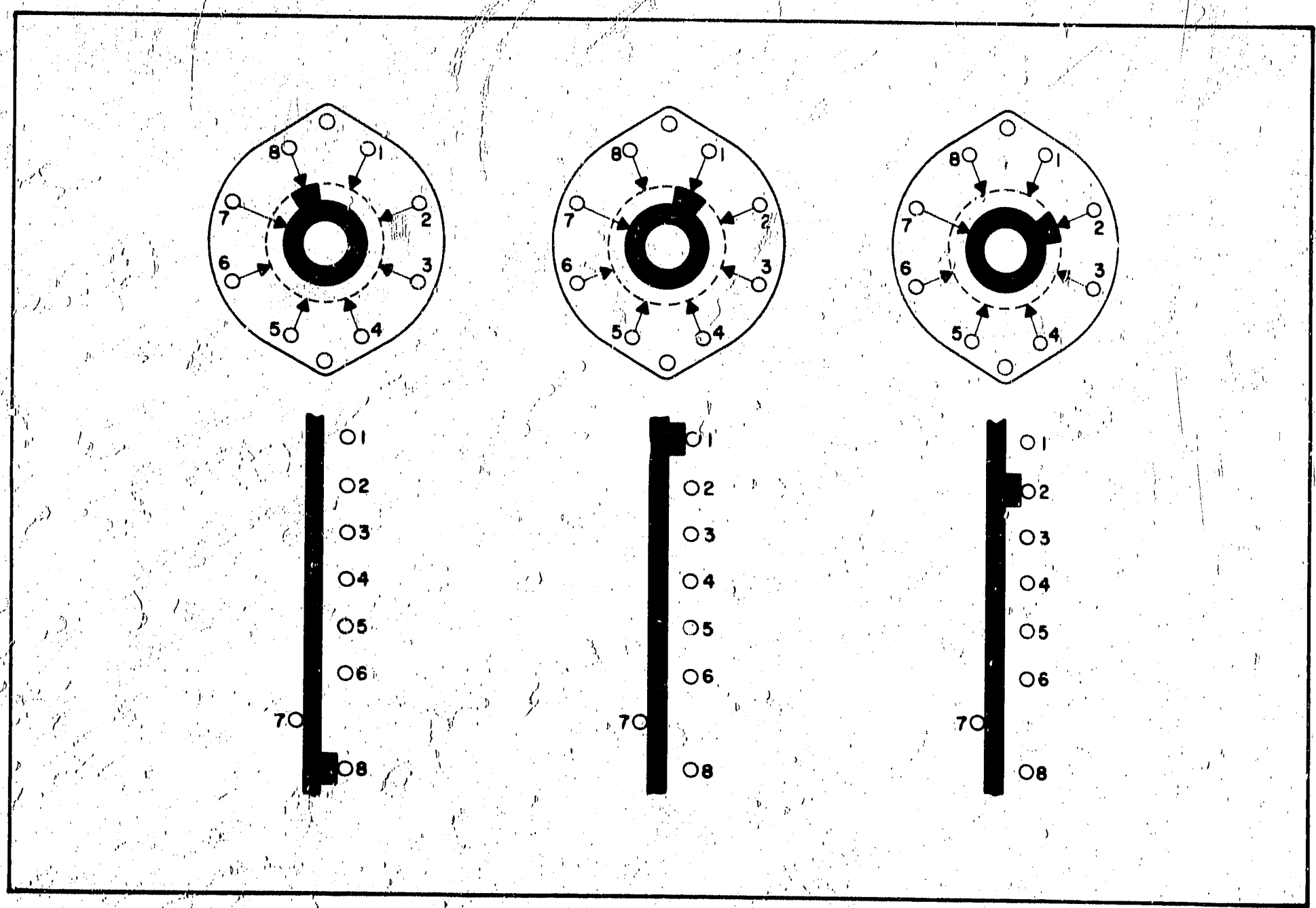


Figure 8-4. Three Positions of Index Light Selector Wafer

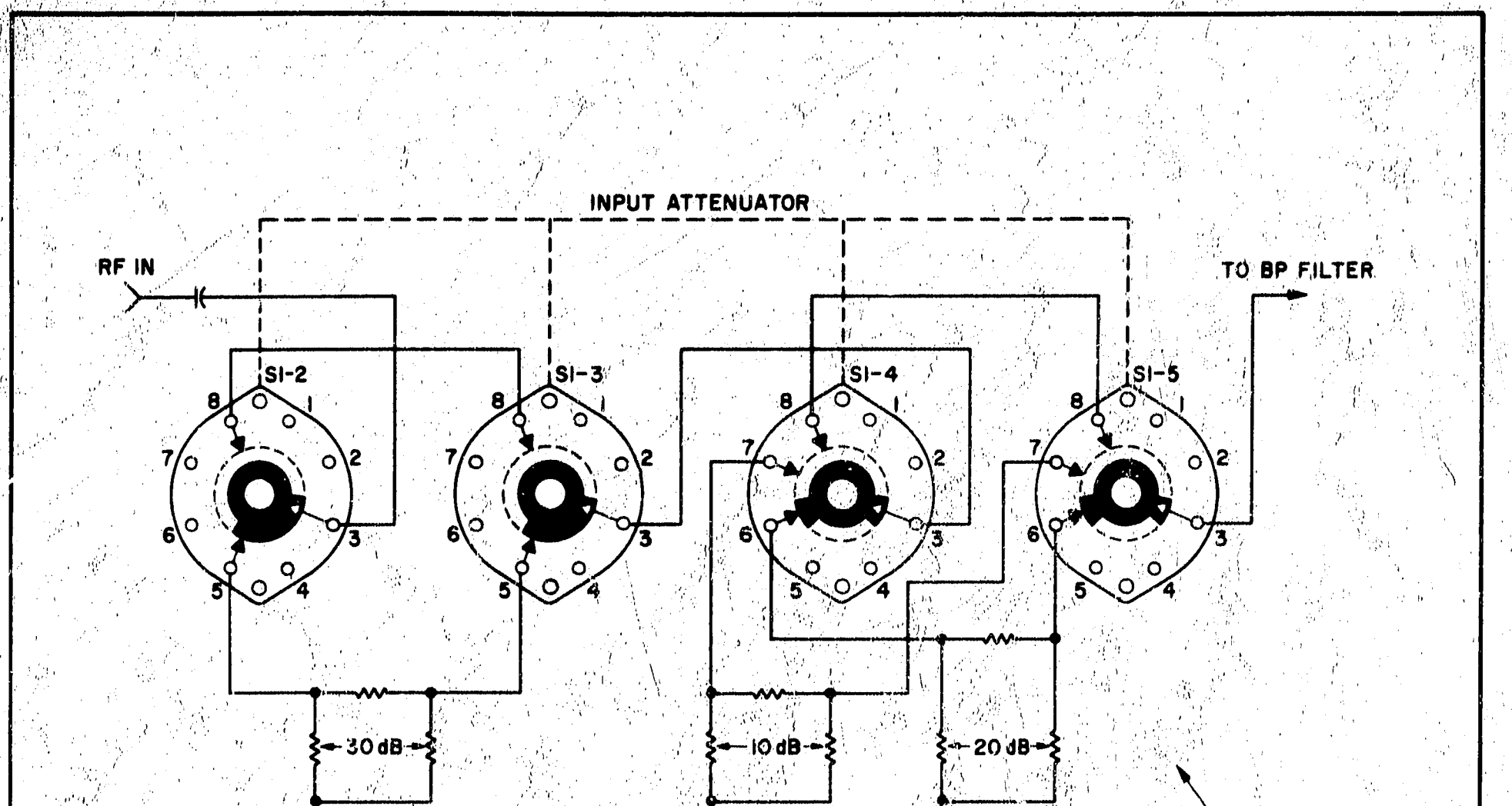


Figure 8-5. Wafer Switch Presentation Versus Straight-Line Presentation

Table 8-2. System Test and Troubleshooting Procedure

TEST	FAULT	PROCEDURE
1. Set POWER switch to ON. Power lamp on, fan operates. Proceed to test 2.	Light not on and/or fan inoperative	Check Display Section
2. Rotate INPUT ATTENUATION control and observe LOG REF LEVEL index lights Lights operate properly. Proceed to test 3.	None of the lights illuminate Some, but not all lights illuminate	Check the −12.6 volt supply from Display Section. If voltage is present see Service Sheet 3. If voltage is not present, check the Display Section power supply. Check light bulbs on Service Sheet 5.
3. Set Analyzer controls as follows: SCAN TIME PER DIVISION . . 5 ms SCAN MODE . . . . . INT SCAN TRIGGER . . . . . AUTO and observe SCANNING light. Light operates normally. Proceed to test 4.	SCANNING light does not illuminate	Check power supply circuits on Service Sheet 17.
4. Adjust Display Section for a baseline trace. Baseline trace is normal, Proceed to test 5.	Trace does not appear	Connect the oscilloscope to the SCAN IN/OUT jack on the front panel of the analyzer and observe the waveform.  Oscilloscope control settings: 0.2V/Div .0 msec/Div 10:1 Prove If the waveform is not present, check the scan amplifier and the scan generator (Service Sheet 14). If the waveform is present, check the horizontal deflection amplifier, Service Sheet 13. If trouble persists, check Display Section.

Table 8-2. System Test and Troubleshooting Procedure (cont'd)

TEST	FAULT	PROCEDURE
5. Set analyzer controls as follows: FREQUENCY . . . . . 30 MHz BANDWIDTH . . . . . 10 kHz FINE TUNE . . . . . Centered SCAN WIDTH . . . PER DIVISION SCAN WIDTH PER DIVISION 1 MHz INPUT ATTENUATION . . . 10 dB TUNING STABILIZER . . . . ON BASE LINE CLIPPER . . . . . ccw LOG REF LEVEL . . . . . 0 dBm LOG REF LEVEL Vernier . . . ccw LOG/LINEAR . . . . . LOG VIDEO FILTER . . . . . OFF SCAN TIME PER DIVISION . . . . . 2 MILLISECONDS Connect CAL OUTPUT to RF INPUT and observe display. The 30 MHz signal should appear close to the center of the display CRT at a level of −30 dBm. If signal is correct, proceed to test 8.	Signal does not appear on Display Section CRT	Connect HP 8405A to CAL OUTPUT jack. The Vector Voltmeter should indicate approximately −30 dBm at 30 MHz. If the signal is not present refer to Service Sheet 15. Repair the calibration oscillator and repeat the test. If CAL OUTPUT is present proceed to test 6.
6. Set analyzer controls as follows: BANDWIDTH . . . . . 10 kHz FINE TUNE . . . . . Centered SCAN WIDTH . . . PER DIVISION SCAN WIDTH PER DIVISION 20 kHz INPUT ATTENUATION . . . . 0 dB TUNING STABILIZER . . . . OFF BASELINE CLIPPER . . . . . ccw LOG REF LEVEL . . . . . -30 dBm LOG REF LEVEL Vernier . . . ccw LOG/LINEAR . . . . . LOG VIDEO FILTER . . . . . OFF SCAN TIME PER DIVISION . . . . . 2 MILLISECONDS Connect a 50 MHz −33 dBm signal from the 606B to the W6 jack behind the tuning dial assembly on the top of the RF Section using the 11592-60001 cable. Tune the 606B slightly around 50 MHz until the signal is centered. With the AMPL CAL centered the signal should read −30 dBm ±2 dBm.	If signal is correct Signal is missing	Trouble in RF Section. See Systems Test and Troubleshooting Procedure in RF Section Manual Proceed to Step 7

NOTE

In steps 7a and 7b it is necessary to simulate the input impedance of the circuit following the point tested to ensure accuracy of the meter readings. Use the HP 1250-0837 jack-to-jack adapter, the HP 1250-0832 BNC to Sub-miniature adapter, the HP 11593A termination, the HP 11592-60002 cable and the HP 10218A Probe to BNC adapter to connect the specific jack to the HP 8405A.

Table 8-2. System Test and Troubleshooting Procedure (cont'd)

TEST	FAULT	PROCEDURE
7. Perform the following sub-tests until a malfunction has been found and corrected, then repeat test.		
7a. Connect HP 8405A to 8552A-A3J7 using the adapters tested above. Meter indications should indicate about −7 dBm at 47 MHz. If signal is correct, proceed to test 7b.	Signal is missing or incorrect	Refer to Service Sheet 3 and repair the 47 MHz local oscillator circuit.
7b. Connect the HP 8405A to terminal labeled 3 MHz under top cover of 8552 and set analyzer controls as follows: SCAN WIDTH ..... ZERO INPUT ATTENUATION ..... 0 dB LOG REF LEVEL ..... -10 dBm CAL OUTPUT ..... RF INPUT Tune analyzer for maximum signal. Signal should be about 8 mV rms at 3 MHz. If signal is correct, proceed to test 7c.	Signal is missing or incorrect	Proceed to step 7c.
7c. Connect the HP 8405A to 8552A-XA1-14/R with analyzer set as in 7b, and tune analyzer for maximum. Signal level should be about 28 mV rms. If signal is correct, proceed to test 7d.	Signal is missing or incorrect	Refer to Service Sheets 5 and 6 and repair the 3 MHz IF assembly.
7d. Connect the HP 8405A to 8552A-XA4-2 with analyzer set as in 7b, and tune analyzer for maximum. Signal level should be about 26 mV rms. If signal is correct, proceed to test 7e.	Signal is missing or incorrect	Refer to Service Sheet 7 and repair the LC Bandwidth circuit.
7e. Connect the HP 8405A to 8552A-XA8-2 with analyzer set as in 7b, and tune analyzer for maximum. Signal level should be about 68 mV rms. If signal is correct, proceed to test 7f.	Signal is missing or incorrect	Refer to Service Sheets 8, 9, and 10 and repair the Crystal Filter circuit.

Table 8-2. System Test and Troubleshooting Procedure (cont'd)

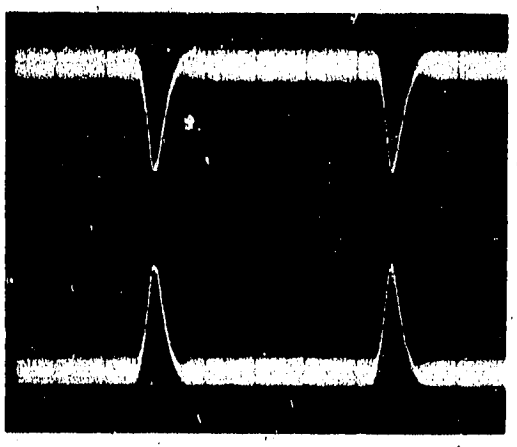
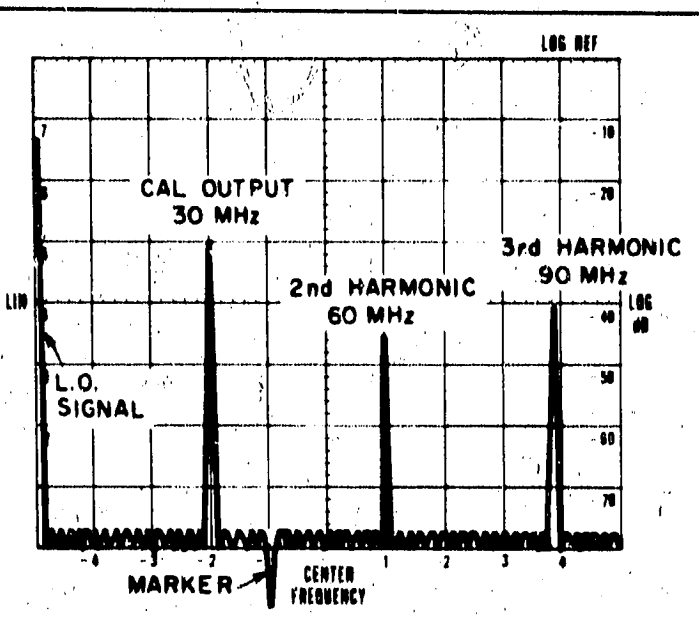
TEST	FAULT	PROCEDURE
7f. Connect the HP 180A/1801A/ 1821A Channel A input to SCAN IN/OUT jack and the channel B input to 8552A XA7-B. Oscilloscope control settings: VOLTS/DIV . . . . . 2V/Div TIME/DIV . . . . . 2 msec/div 10:1 probes If waveform is correct, trouble is in the Display Section or in interconnecting wiring. After making repairs repeat test 5.	Waveform B is missing or incorrect	Refer to Service Sheets 11 and 12 and repair the Lin/Log amplifier circuit. 
7g. Connect the HP 180A/1801A/ 1821A Channel A input to 8552 XA7-5 and the Channel B input to 8552 XA6-E with analyzer set as in 7f. Oscilloscope control settings: VOLTS/DIV . . . . . 2V/Div TIME/DIV . . . . . 2 msec/DIV 10:1 probes If waveform is correct, trouble is in the Display Section or in interconnecting wiring. After making repairs, repeat test 5.	Either waveform is missing or incorrect	Refer to Service Sheet 13 and repair the vertical deflection circuit. 
8. Set analyzer controls as follows: FREQUENCY . . . . . 40 MHz FINE TUNE . . . . . Centered BANDWIDTH . . . . . 300 kHz SCAN WIDTH . . . . . 0—100 MHz SCAN WIDTH PER DIVISION . . . . . 10 MHz INPUT ATTENUATION . . . 10 dB RANGE — MHz . . . . . 0—110 TUNING STABILIZER . . . . ON BASE LINE CLIPPER . . . . . ccw SCAN TIME PER DIVISION . . . . . .2 MILLISECONDS LOG REF LEVEL . . . . . -10 dBm LOG REF LEVEL Vernier . . . . . C LOG/LINEAR . . . . . LOG VIDEO FILTER . . . . . OFF SCAN MODE . . . . . INT SCAN TRIGGER . . . . . AUTO Connect CAL OUTPUT to RF INPUT using a BNC to BNC cable. The display should be similar to that shown in the procedure column.	Sweep does not extend to full width of graticule. Not all signals present or properly spaced	 30 MHz Calibrator Signal and Harmonics See Service Sheet 14. Check Scan Generator assembly. Same as above. Also refer to System Test and Troubleshooting Procedure in RF Section Manual, Service Sheet 13. First LO summing and shaping amplifier may be defective.

Table 8-2. System Test and Troubleshooting Procedure (cont'd)

TEST	FAULT	PROCEDURE
Test 8 (cont'd) Vary VERTICAL position to center baseline trace on bottom CRT graticule. Signal amplitude is unimportant in this test. Proceed to test 9.	Baseline trace does not vary.	See Service Sheet 13. Check vertical deflection circuit.
9. Set LOG REF LEVEL maximum ccw. Set SCAN TIME PER DIVISION to 10 SECONDS and adjust focus and astigmatism. Adjust trace align to center trace on bottom CRT graticule. Proceed to test 10.	Focus and astigmatism inoperative or trace will not align	Refer to Display Section Manual and repair as required.
10. Turn FREQUENCY control and observe marker. Marker should move as FREQUENCY is tuned. Proceed to test 11.	Marker is missing	See System Test and Troubleshooting Procedure in RF Section Manual. Check the marker generator.
11. Tune FREQUENCY control to move the marker exactly under the signal three divisions from the left. The signal will null when the marker is tuned to the exact frequency of the signal. Set SCAN WIDTH PER DIVISION control to 0.05 MHz, BANDWIDTH to 10 kHz, and SCAN WIDTH to PER DIVISION. 30 MHz signal should appear close to the center graticule on the CRT. If correct signal is observed, proceed to test 12.	30 MHz signal does not appear on CRT	Check calibration and alignment of the analyzer.
12. Adjust FREQUENCY to center the 30 MHz signal on CRT, then reduce SCAN WIDTH PER DIVISION to 10 KHz and re-center the display with FINE TUNE control. Signal centers properly. Proceed to test 13.	Signal is unstable. FINE TUNE does not vary signal position.	Refer to System Test and Troubleshooting Procedure in RF Section Manual and repair APC or reference signal circuits. See Service Sheet 4. Check 47 MHz Summing and Shaping Amplifier.
13. Turn LOG REF LEVEL fully ccw. Top of signal should be —70 dB graticule. Rotate LOG REF LEVEL seven steps cw. CRT display should be as shown in the figure. The fault column lists these steps in numerical order beginning with the first step from the ccw position.	Each of the first 4 steps: no increase in gain, not 10 dB gain, or loss of signal.	See Service Sheet 5, 6, 17, 18

Table 8-2. System Test and Troubleshooting Procedure (cont'd)

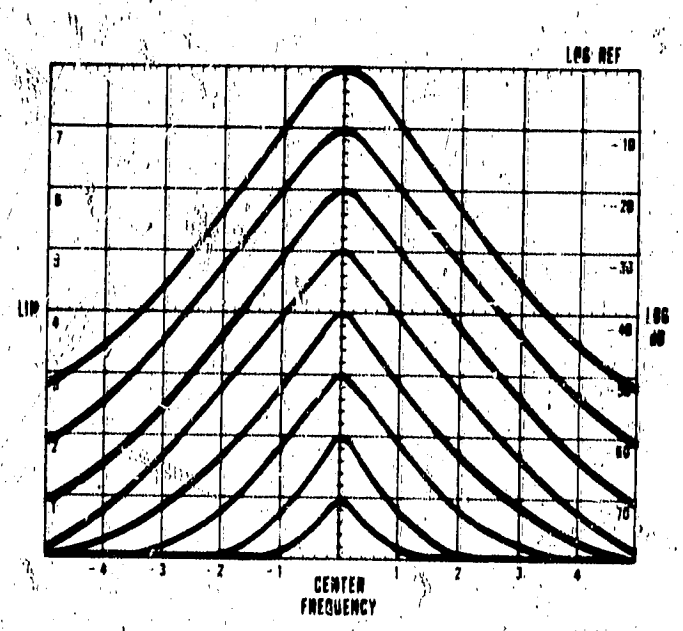
TEST	FAULT	PROCEDURE
13. (cont'd) Set INPUT ATTENUATION to 30 dB and rotate LOG REF LEVEL cw for remaining two steps. Signal amplitude should again reach the top CRT graticule.	Steps 5 & 6 same as above. Step 7 same as above. Steps 8 & 9 same as above. All or most levels incorrect and cannot be corrected by adjustment. No change in signal level or change is incorrect.	 Check 3 MHz step gain amplifier Check 3 MHz step gain amplifier Check 3 MHz step gain amplifier Check Lin/Log amplifier Check variable gain amplifier
14. Set LOG REF LEVEL to −30 dBm (−30 +0). Adjust AMPL CAL so that the top of the signal is exactly on the LOG REF (TOP) graticule of the CRT. Proceed to test 15.	AMPL CAL does not vary signal level.	See Service Sheet 5 . Check calibration amplifier.
15. Set LOG/LINEAR to LINEAR and LINEAR SENSITIVITY to 1 mV/DIV. The CRT deflection should be adjusted by the AMPL CAL control to 7.1 divisions. If display is correct, proceed to test 16.	AMPL CAL cannot be adjusted for 7.1 division display.	See Service Sheets 12 and 15. Probable trouble is in linear amplifier compensation circuit or linear scale factor circuit.

Table 8-2. System Test and Troubleshooting Procedure (cont'd)

TEST	FAULT	PROCEDURE
16. Set analyzer controls as follows: SCAN WIDTH ..... 0—100 MHz SCAN WIDTH PER DIVISION ..... 10 MHz BANDWIDTH ..... 10 kHz LOG/LINEAR ..... LOG LOG REF LEVEL ..... —10 dBm		See Service Sheets 13 and 14.
Turn BASE LINE CLIPPER full ccw.	Bottom 2 divisions of CRT not blanked.	Check base line clipper circuit.
Switch SCAN TIME PER DIVISION through its range	Scan does not occur in all positions.	Check scan generator circuit.
Return SCAN TIME PER DIVISION to 2 MILLISECONDS.		
Set SCAN WIDTH to PER DIVISION	DISPLAY UNCAL does not illuminate.	Refer to System Test and Troubleshooting Procedure in RF Section Manual and Service Sheet 16. Probable cause of trouble is in the analogic circuit or switching circuits.

SCHEMATIC DIAGRAM NOTES

Refer to MIL Std 15B for Symbols Not Shown

Resistance is in ohms and capacitance is in picofarads unless otherwise noted.

P/O = part of.

*Asterisk denotes a factory-selected value. Value shown is typical. Capacit ... may be omitted or resistors jumpered.

Screwdriver adjustment.

Panel control.

Encloses front panel designations.

Encloses rear panel designation.

Circuit assembly borderline.

Other assembly borderline.

Heavy line with arrows indicates path and direction of main signal.

Heavy dashed line with arrows indicates path and direction of main feedback.

Wiper moves toward CW with clockwise rotation of control as viewed from shaft or knob.

Numbers in circles on circuit assemblies show locations of test points.

Encloses wire color code. Code used (MIL-STD-681) is the same as the resistor color code. First number identifies the base color, second number the wider stripe, and the third number identifies the narrower stripe. E.g., (947) denotes white base, yellow wide stripe, violet narrow stripe.

Voltage regulator (breakdown diode).

Denotes Field Effect transistor (FET) with N-type base.

Denotes FET with P-type base.

Denotes Capacitive diode (Varicap, varactor).

Denotes Silicon Controlled Rectifier.

P-Type Metal Oxide Substrate FET (MOSFET)

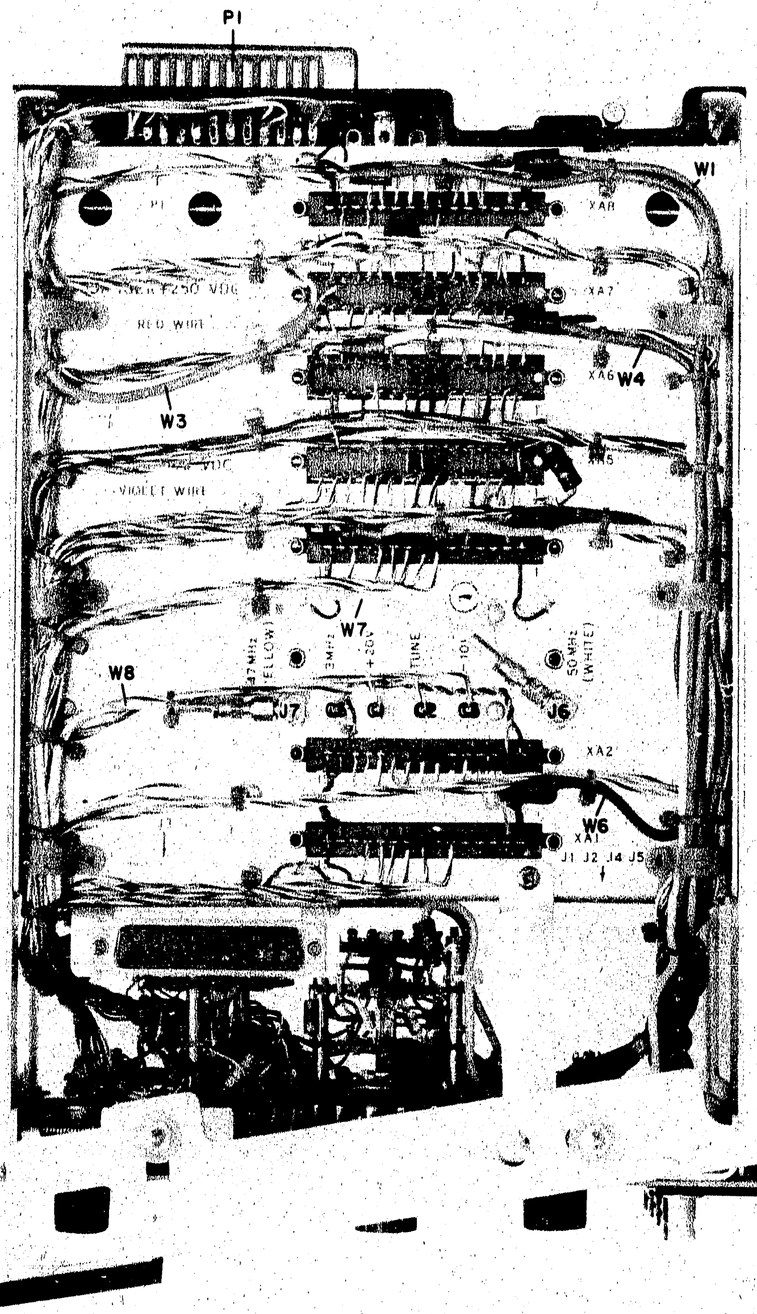
N-Type Metal Oxide Substrate FET (MOSFET)

Figure 8-6. Schematic Diagram Notes

Table 8-3. 8552A IF Section Assembly and Component Location

Assembly		Schematic	Photo
A1	LC Filter	Service Sheet 7	Service Sheet 7
A2	3 MHz Amplifier	Service Sheet 5/6	Service Sheet 5/6
A3	50 MHz Converter	Service Sheet 3	Service Sheet 3
A4	Crystal Filter	Service Sheet 9/10	Service Sheet 9/10
A5	Power Supply	Service Sheet 4/15/17	Service Sheet 4/15/17
A6	Scan Generator	Service Sheet 14/16	Service Sheet 14/16
A7	Deflection Amplifier	Service Sheet 13	Service Sheet 13
A8	Log Amplifier	Service Sheet 11/12	Service Sheet 11/12
A9	Scan Time Switch	Service Sheet 2/14/15	Figure 8-7
A10	Log Ref Level	Service Sheet 2/5/8/10/16	Figure 8-7
A11	Video Filter Switch	Service Sheet 2/12/15	Figure 8-7
Component		**Schematic**	**Photo/Location**
C1-3,5		Service Sheet 3	Figure 8-7
C4		Service Sheet 14	Figure 8-7
DS1-6		Service Sheet 16	Figure 8-7
DS7-8		Service Sheet 12	Front Panel
DS9		Service Sheet 14	Front Panel
F1-2		Service Sheet 17	Rear Panel
L1-4		Service Sheet 3	Rear Panel
R1-3		Service Sheet 3	Rear Panel
R4	HORIZONTAL GAIN	Service Sheet 13	Figure 8-7
R6	HORIZONTAL POSITION	Service Sheet 13	Figure 8-7
R7-8		Service Sheet 13	Figure 8-7
R9		Service Sheet 13	Figure 8-7
R10	BASE LINE CLIPPER	Service Sheet 13	Front Panel
R11	VERTICAL GAIN	Service Sheet 13	Figure 8-7
R12	Log/Lin Vernier	Service Sheet 6	Front Panel
R13-14		Service Sheet 12	Front Panel
R15	VERTICAL POSITION	Service Sheet 13	Front Panel
R16		Service Sheet 12	Figure 8-7
R17		Service Sheet 11	Figure 8-7
R18		Service Sheet 17	Figure 8-7
R19		Service Sheet 13	Figure 8-7
S1	LOG/LINEAR Switch	Service Sheet 12	Figure 8-7
S2	SINGLE (Scan) Switch	Service Sheet 14	Figure 8-7
S3	SCAN MODE Switch	Service Sheet 14	Figure 8-7
S4	SCAN TRIGGER Switch	Service Sheet 14	Figure 8-7
W1		Service Sheet 10/11	Figure 8-7
W2		Service Sheet 10	Figure 8-7
W3		Service Sheet 13	Figure 8-7
W4		Service Sheet 16	Figure 8-7
W5		Service Sheet 12	Figure 8-7
W6		Service Sheet 12	Figure 8-7
W7		Service Sheet 3	Figure 8-7
W8		Service Sheet 3	Figure 8-7

TOP



BOTTOM

Figure 8-7. 8552A Assembly and Adjustment Locations

SERVICE SHEET 1

50 MHz CONVERTER ASSEMBLY

The 50 MHz Converter assembly consists of an IF amplifier, a bandpass filter, a 47 MHz oscillator, and a double balanced mixer. The broadband IF amplifier provides 10 dB of gain. The 47 MHz oscillator is varactor controlled; the frequency is fixed or swept dependent on the control voltage received from the RF Section.

POWER SUPPLY ASSEMBLY

The summing and shaping amplifier combine and process dc levels and ramp signals from the RF Section. The RF Section may supply part or all input signals to the summing amplifier. The shaping amplifier converts any linear input to an exponential ramp to control the varactor in the 47 MHz oscillator. This action ensures that the frequency output is linear with respect to the input control voltage. The light driver is controlled by the VIDEO FILTER, SCAN TIME PER DIVISION switch, and the RF Section SCAN WIDTH PER DIVISION switch and BANDWIDTH switch. When the switch settings prevent accurate amplitude calibration of the analyzer the light driver turns on and lights the UNCAL DISPLAY lamp in the RF Section.

3 MHz IF AMPLIFIER

The 3 MHz IF Amplifier consists of a bandpass filter, a calibrated amplifier, a 10/20/30 dB step amplifier, a 0 to 12 dB variable amplifier and an emitter follower output stage. The input bandpass filter is tuneable and is adjusted to provide a 300 kHz bandpass centered at 3 MHz.

LC BANDWIDTH FILTER ASSEMBLY

The LC Bandwidth Filter Assembly contains four tuned filter circuits and an output circuit to provide a low impedance source to the crystal filter input circuit. The bandwidth of individual filter stages is controlled by the RF Section BANDWIDTH switch which forward biases diodes to place resistors in parallel in the signal path. When the analyzer is operated in the 300 kHz bandwidth mode the four tuned stages are bypassed and only the output stage processes the signal. The four tuned stages provide selectable bandwidth of 100 kHz, 30 kHz, and 10 kHz.

CRYSTAL FILTER ASSEMBLY

The Crystal Filter Assembly consists of three filter stages, a step gain amplifier, and an output amplifier. When the analyzer is operated at bandwidths of 10 kHz or greater, the crystal filter stages are bypassed by relays. The three crystal filter stages provide selectable bandwidths of 3 kHz, 1 kHz, 300 Hz, 100 Hz, or 50 Hz.

LOG/LIN AMPLIFIER ASSEMBLY

The Log/Lin Amplifier Assembly consists of an input emitter follower, eight log amplifiers (six of these amplifiers are used in the LINEAR mode), a linear scale factor amplifier, two summing and isolation amplifiers, and a linear detector. When the analyzer is operated in the LOG mode, the amplifier output is logarithmically proportional to the input signal. When the analyzer is operated in the LINEAR mode, the amplifier output is directly proportional to the input signal.

SCAN CONTROL AND TRIGGER CIRCUITS

These circuits control the operation of the scan generator assembly. With S3 in the INT position and S4 in the AUTO position a dc level (−12.6 volts) provides an enable signal to the scan generator flip flop (see 8). With either switch in any other position, the −12.0 volts is removed from the enabling circuit in the scan generator and a trigger must be provided to enable the flip-flop. In single sweep modes, closing the SINGLE switch enables the flip-flop for one sweep only.

SCAN GENERATOR ASSEMBLY

The trigger circuit is enabled by the −12.6 volts from the control circuits. The trigger circuits drive the flip-flop. The scan time switch is used to select RC components to control the scan time of the scan generator circuits. A constant current source provides the current to charge the selected ramp capacitor to ensure that scan ramps are linear for all selected scan times. The scan ramp amplifier amplifies the input scan signal and applies it to the horizontal deflection amplifier and the RF Section scan width attenuator assembly. An output is also provided at the SCAN IN/OUT connector, on the IF Section front panel, in the INT and SINGLE modes of operation. The connector may also be used in the EXT mode of operation to apply a signal from an external scan generator.

The calibration oscillator is a multivibrator which provides a 30 MHz, −30 dBm signal for use in calibrating the analyzer. The harmonics of the fundamental frequency are also useful in evaluating analyzer performance.

The penlift circuit provides penlift operation to recording devices in all positions of the SCAN TRIGGER switch except EXT and in the INT and SINGLE position of the SCAN MODE switch. In the EXT position of the SCAN MODE switch an external blanking input of −1.5 volts is required to blank the CRT.

DEFLECTION AMPLIFIER ASSEMBLY

The vertical preamplifier and amplifier provide push-pull operation to the vertical deflection plates of the CRT. Vertical gain and position are also controlled by these circuits. The blanking circuits provide blanking operation using the retrace cycle.

The base line clipper and clipper override circuits blank the CRT when the BASE LINE CLIPPER control is adjusted to activate the circuit. When a marker from the RF Section is present, the clipper override circuit is activated and the CRT is not blanked when the marker is present.

The horizontal amplifiers provide push-pull operation to the CRT horizontal circuits to provide the base line display. Horizontal gain and position are also controlled by these circuits.

8552A ASSEMBLY AND ADJUSTMENT LOCATIONS

RF SECTION
50 MHz
P3 A1 J3 W7 9
P/O XA3 2
50 MHz CONVERTER ASSY A3
1
50 MHz AMPL
50 MHz BPF
MIXER
BUFFER AMPL
47 MHz VTO
3
P3 A2 J3 94
P/O XA3 14
P/O XA3 11 4 P/O XA2 2
AMPL CAL
LOG REF LEVEL
LOG REF LEVEL VERNIER
3 MHz AMPLIFIER ASSY A2
3 MHz BPF
CAL AMPL
STEP AMPL
VARIABLE AMPL
ISOL AMPL
5,6
P/O XA2 14 5 P/O XA1 14
LC FILTER ASSY A1
4
OUTPUT AMPL
LC FILTER (4 STAGES)
300 kHz BW PATH
7
P/O XA1 2 2 P/O XA4 2
RF SECTION BANDWIDTH SWITCH
CRYSTAL FILTER ASSY A4
5
STEP AMPL
CRYSTAL FILTER (2 STAGES)
CRYSTAL FILTER (1 STAGE)
OUTPUT AMPL
300 kHz BW PATH
300 kHz BW PATH
8,9,10
P/O XA4 14
P/O XA3 7 945
W1 5
P/O LOG REFERENCE LEVEL SWITCH A10
W2 6
RF SECTION
SEE RF SECTION MANUAL
ANALOG IC CIRCUITS
UNCAL DISPLAY
P/O SCAN TIME SWITCH
P/O VIDEO FILTER
905
POWER SUPPLY ASSY A5
2
P/O XA5
9 5
934 2
4 3
956 30
957 38
SUMMING AMPL
SHAPING AMPL
LIGHT DRIVER
+20 V POWER SUPPLY
-10 V POWER SUPPLY
4,15,17
902 +20 V
907 -10 V
15 P/O XA5
P/O LOG REF LEVEL SWITCH
12
RF SECTION INPUT ATTEN
LOG AMPLIFIER ASSY A8
6
P/O XA8 2
ISOL AMPL
LOG/LIN AMPL (1 STAGE)
LOG/LIN AMPL (3 STAGES)
LOG/LIN AMPL (4 STAGES)
SUMMING AMPL
LINEAR DETECTOR
11,12
P/O XA8 14 15 95
P/O VIDEO FILTER
VERTICAL OUTPUT J4
DEFLECTION AMPLIFIER ASSY A7
9
VERTICAL
GAIN
POSITION
P/O XA7 3 B N 13
VERT PREAMPL
VERT AMPL
BASELINE CLIPPER
CLIPPER OVERRIDE
BLANKING PREAMPL
BLANKING AMPL
HORIZ DEF AMPL
HORIZ DEF AMPL
13
P/O XA7 5 E 11 12 15 J 14 R
VERTICAL AMPL
BLANKING
HORIZONTAL AMPL
GAIN
POSITION
HORIZONTAL
DISPLAY SECTION
RF SECTION MARKER GENERATOR
906
SCAN GENERATOR ASSY A6
8
P/O XA6 A D B C
96
91
94
938
TRIGGER
START-STOP
RESET-DELAY
SCAN CONV AMPL
PENLIFT CIRCUIT
CURRENT SOURCE
ELECTRONIC SWITCH
RAMP AMPL
LEVEL DETECTOR
CALIBRATION OSCILLATOR
14,16
P/O XA6 14 925
8 J1
CAL OUTPUT 30 MHz -30 dBm
L 4 P/O SCAN TIME SWITCH
4 925
N 904 P/O SCAN MODE SWITCH ASSY S3
8 95
J5 SCAN IN/OUT
946
947
7
SCAN TRIGGER
-12.6 V
AUTO
LINE
EXT
VIDEO
6.3 VAC
SCAN MODE
INT
EXT
SINGLE
PENLIFT OUTPUT TRIG/ BLANK INPUT J2

Figure 8-8. Block Diagram

SERVICE SHEET 2

VIDEO FILTER ASSEMBLY A11 (08552-6022)

The video filter switch may be used to place either of two bypass capacitors across the detected output. When either filter is used the video bandwidth is reflected in the DISPLAY UNCAL analogic summing buss.

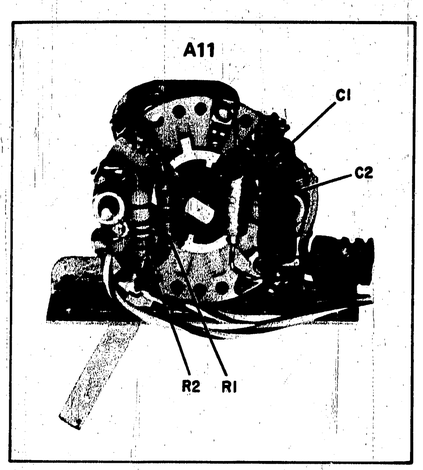


Figure 8-9. Video Filter Assembly A11

LOG REFERENCE LEVEL SWITCH ASSEMBLY A10

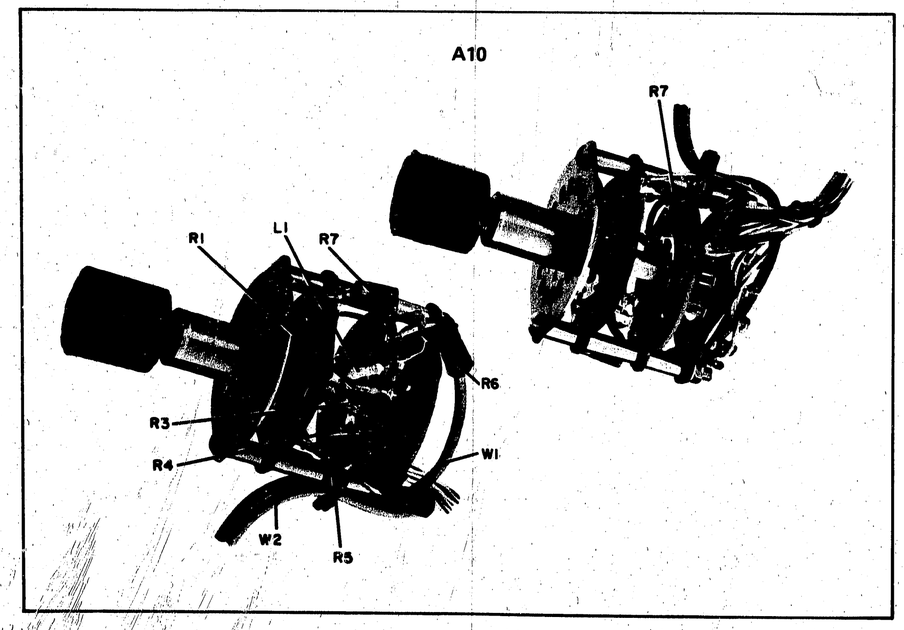


Figure 8-10. Log Reference Level Switch Assembly A10

SERVICE SHEET 1

Figure 8-8. Block Diagram

Switch wafers S1-1F, S1-2F, and S1-1R connect the 3 MHz IF Signal from the crystal filter circuit to the Log/Lin amplifier and provide attenuation to this signal when required.

Switch wafer S1-2R in conjunction with wafer S1-1R of the INPUT ATTENUATION control programs the gain compensation function of the linear scale factor amplifier in the Log/Lin amplifier when the analyzer is operating in the LINEAR mode.

Switch wafers S1-3F and S1-3R provide dc levels to enable or disable diode switches which, in turn, enable or disable step gain amplifiers in the 3 MHz IF and Crystal Filter Assemblies.

The various functions of the scan time switch assembly are as follows:

S1-1F selects the capacitor to be charged to generate the scan ramp.

S1-1R connects (or removes) a ground to R16 to partially control the operational parameters of constant current source Q6.

S1-2F selects the resistor to be used in the emitter circuit of constant current source Q6.

A1-2R selects the resistor (or resistors) to control the sweep reset (dead time) of the scan generator.

S1-3F and S1-3R provide current to the analogic scanning buss to aid in illuminating the DISPLAY UNCAL lamp when switch settings are not compatible with analyzer calibration requirements.

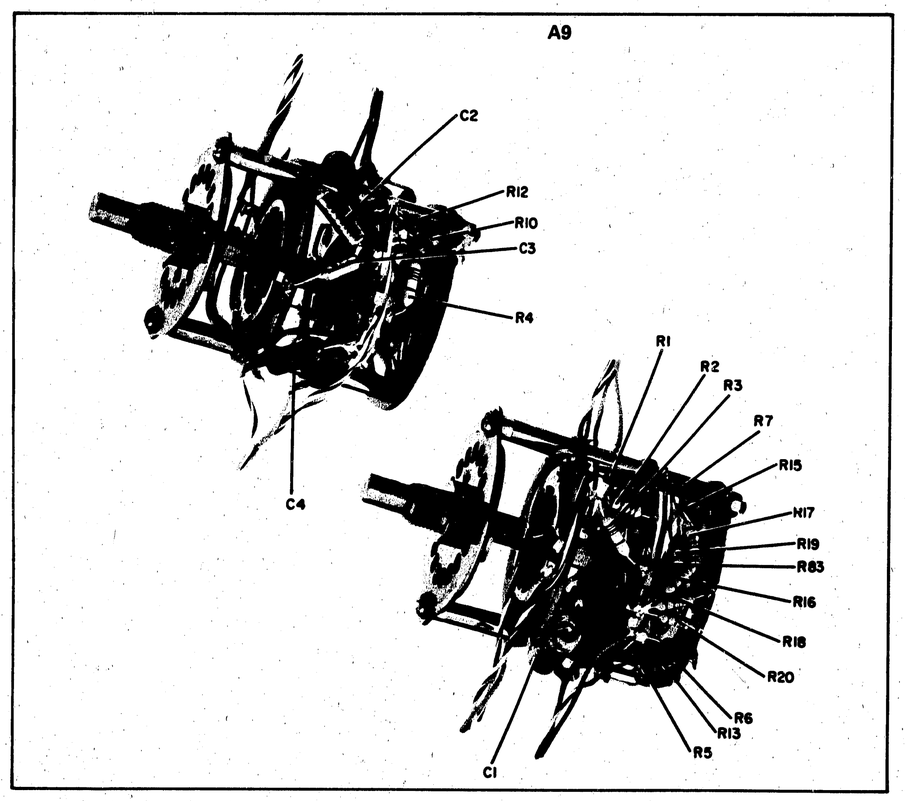


Figure 8-11. Scan Time Switch Assembly A9

Table 8-4. 8552A Jack Identification

Connector	Wire Color Code	Function	Connector	Wire Color Code	Function
J3		RF Sect./IF Sect. Interconnection	P1		IF Sect./Display Sect. Interconnections
Pin 1	912	0.05 kHz Bandwidth	Pin 1	6	+20V
2	913	0.1 kHz Bandwidth	2	3	+100V
3	914	0.3 kHz Bandwidth	3		Open
4	915	1 kHz Bandwidth	4	92	+100V
5	4	Phase Lock Compensation	5		Open
6	3	Preset Scan Voltage	6	7	−100V
7	5	Linear Compensation Control Voltage	7		Open
8	6	Linear Compensation Control Voltage	8	0	Ground
9	938	Log Ref Level Lamp No. 4	9	2	+250V
10	945	Log Ref Level Lamp No. 5	10	0	Horizontal Deflection
11	946	Log Ref Level Lamp No. 6	11	905	Display Uncal Light
12	90	Sensing Ground	12	5	Vertical Deflection
13	8	Blanking for Tracking Generator	13	1	6.3 V AC
14			14		Open
24		Open	15	0	Ground
25	916	10 kHz Bandwidth	16	926	Blanking
26	917	30 kHz Bandwidth	17		Open
27	918	100 kHz Bandwidth	18	0	Ground
28	923	300 kHz Bandwidth	19		Open
29	96	Ampl Cal Adjustment	20		Open
30	957	Normal Analogic Line	21	97	−12.6V
31	934	Scan Voltage to 47 MHz Osc.	22	9	Horizontal Deflection
32	9	Fine Tune Voltage to 47 MHz Osc.	23	906	Marker
			24	9	Vertical Deflection
33	935	Log Ref Level Lamp No. 1			
34	936	Log Ref Level Lamp No. 2			
35	937	Log Ref Level Lamp No. 3			
36	907	−10 volts			
37	902	+20 volts			
38	956	Video Filter Analogic Line			
39	958	Zero Scan Analogic Disable Line			
40		Open			
41	3	0 to 8 V ramp-scan control to tracking generator			
A1	9	W7 50 MHz IF			
A2	6	47 MHz Auxiliary Line			

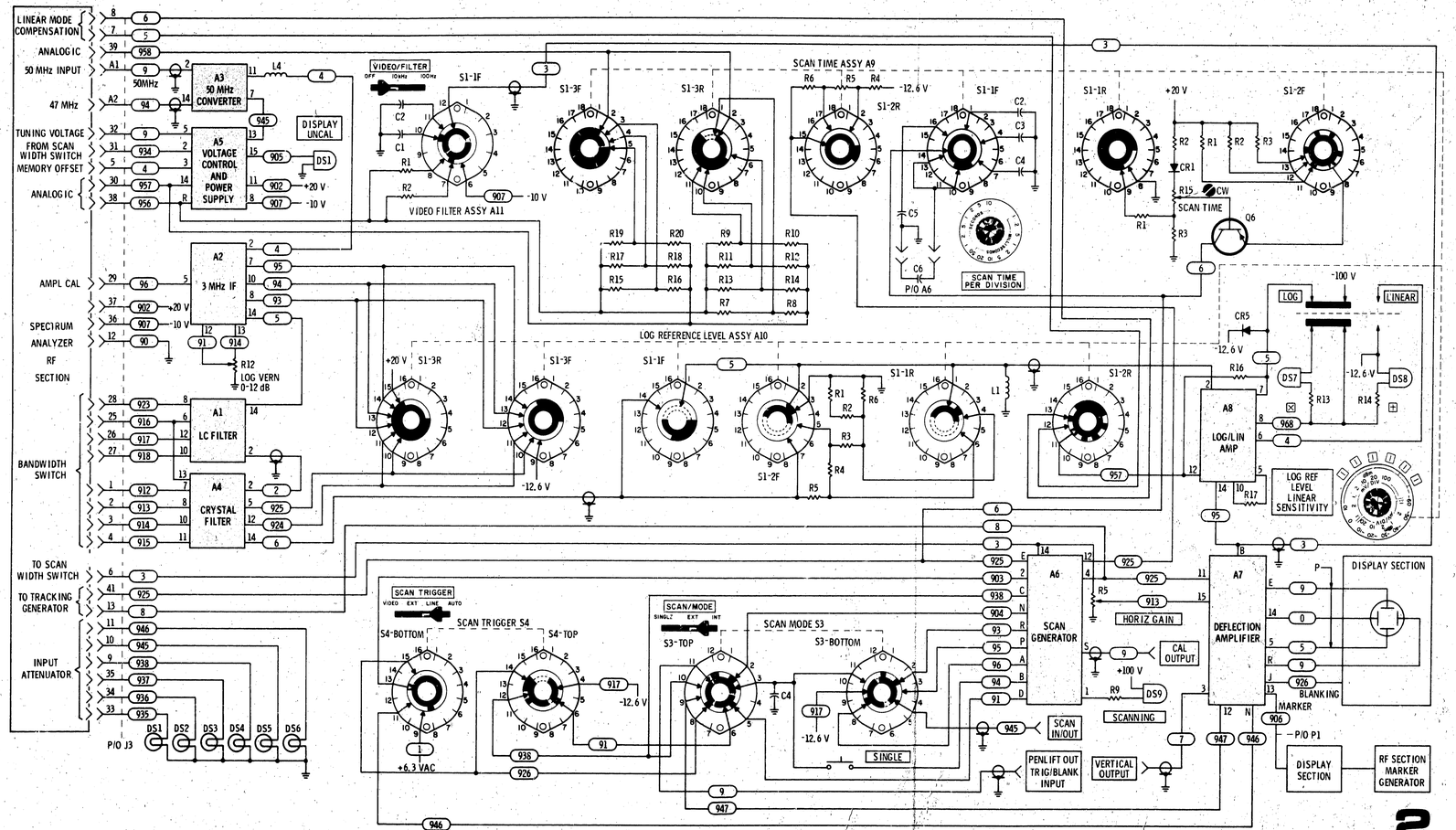


Figure 8-12. Overall Wiring and Switching Diagram

SERVICE SHEET 3

It is assumed that the procedures in Paragraphs 5-37, 5-38, and 5-39 of Section V could not be satisfactorily conducted. It is further assumed that the tuning input from A5, the 50 MHz input, and the correct operating voltages are present.

TROUBLESHOOTING PROCEDURE

When a malfunction has been isolated to the 50 MHz converter assembly, it should be removed from the mainframe and reinstalled using the extender board to provide easy access to all components. Test procedures follow the circuit description in each of the steps below.

EQUIPMENT REQUIRED

VHF Signal Generator	HP 608F
Service Kit	HP 11592A
Vector Voltmeter	HP 8405A
Frequency Counter	HP 5245L/5251A

CONTROL SETTINGS

Unless otherwise specified in individual tests.

SCAN WIDTH	ZERO
BANDWIDTH	300 kHz
FREQUENCY	30 MHz
INPUT ATTENUATION	0 dB
TUNING STABILIZER	OFF

[redacted] 50 MHz AMPLIFIER

Broadband amplifier Q1/Q2 has built in 44 MHz traps to suppress image responses. (44 MHz mixed with the 47 MHz oscillator signal would produce a false 3 MHz IF signal.) Input and output signals are applied through center tapped auto-transformers. Gain of the two-stage amplifier is typically 10 dB.

TEST PROCEDURE [redacted]

With a 30 MHz, −10 dBm signal from the HP 608F applied to the analyzer RF INPUT, and the HP 8405A connected to XA3-2, tune the analyzer FREQUENCY control for maximum signal. Nominal reading is 44 mV rms. Next, connect the HP 8405A to the 50 MHz amplifier output (input feedthru capacitor C1 to the 50 MHz bandpass filter, adjacent to T1). Meter should indicate a typical value of approximately 150 mV rms.

If the 50 MHz amplifier output is correct proceed to step [redacted].

If the 50 MHz amplifier is not providing the correct output, check Q1/Q2 and associated components.

NOTE

After making repairs to the 50 MHz amplifier circuit proceed to step [redacted]. If the test procedure in step [redacted] is satisfactory concluded steps [redacted] and [redacted] may be omitted. If repair to the 50 MHz amplifier is required the 44 MHz Rejection Adjustments defined in Paragraph 5-39 of Section V should be made.

[redacted] 50 MHz BANDPASS FILTER

The 50 MHz Bandpass Filter consists of four tuned circuits wound on a common coil form. C5, C6, C9, and C10 are adjusted to center the bandpass at 50 MHz.

TEST PROCEDURE [redacted]

With a 30 MHz, −10 dBm signal from the HP 608F applied to the analyzer RF INPUT, and the HP 8405A connected to the bandpass filter output (feedthru capacitor C13 at the output of bandpass filter), tune the analyzer FREQUENCY control for maximum signal. Nominal voltage is 90 mV rms.

If bandpass filter output signal voltage is correct, proceed to step [redacted].

If bandpass filter output signal is low or missing, first try realignment in accordance with Paragraph 5-38 of Section V. If this does not correct the malfunction, replace the Bandpass Filter.

After bandpass filter replacement is completed, proceed to step [redacted]. If the test results in step [redacted] are satisfactory, step [redacted] may be omitted.

NOTE

If bandpass filter replacement is necessary, the new filter should be realigned in accordance with Paragraph 5-38 of Section V.

[redacted] 47 MHz LOCAL OSCILLATOR

Q1/Q2 oscillates at 46,700 kHz when 0 volts tuning voltage is applied to varactor C15. Depending on the RF Section used, the 47 MHz oscillator is operated at a fixed frequency of 47 MHz or is swept. See the appropriate RF Section manual for information on the modes of operation for the oscillator.

TEST PROCEDURE [redacted]

Connect the HP 8405A Channel A probe to the 47 MHz local oscillator output at XA3-14 (use 50 ohm load) and the Channel B probe to the input of T4 (second feedthru capacitor from bottom of board on the local oscillator cover). Channel A should read approximately −7 dBm (100 mV into 50 ohms) and Channel B should read approximately 670 mV rms (approximately +10 dBm).

If the meter readings are correct proceed to step [redacted].

The 47 MHz local oscillator is a sealed unit and field repairs are not practical. If the above readings are not obtained, replace the 47 MHz Local Oscillator Assembly A3A2.

Check the oscillator frequency by connecting the 5245L/5251A to XA3-14. Vary R42 on A5 to adjust the oscillator to 47 MHz.

NOTE

If it is necessary to replace the 47 MHz Oscillator Assembly, the checks and adjustments in Paragraph 5-37 of Section V should be performed.

[redacted] MIXER

The 50 MHz IF signal mixes with the 47 MHz local oscillator output to produce a 3 MHz IF signal containing all of the modulation components of the 50 MHz signal. The 3 MHz IF is coupled out through T2 to the 3 MHz IF Amplifier Assembly. Conversion loss through the mixer is approximately 7 dB.

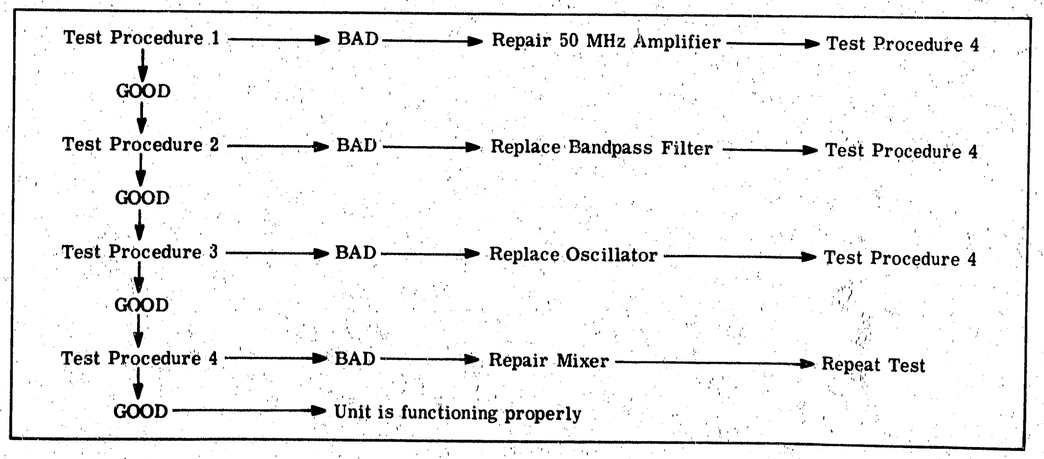
TEST PROCEDURE [redacted]

With a 30 MHz, −10 dBm signal from the HP 608F applied to the analyzer RF INPUT, and the HP 8405A connected to the mixer output at 3 MHz feedthru under chassis, tune the analyzer FREQUENCY control for maximum. Typical signal level is 44 mV rms.

If the proper signal level is not present check the mixer circuit.

If the proper signal level is present, the unit is functioning properly.

Simplified Test Procedure Tree



SERVICE SHEET 2

Figure 8-12. Overall Wiring and Switching Diagram

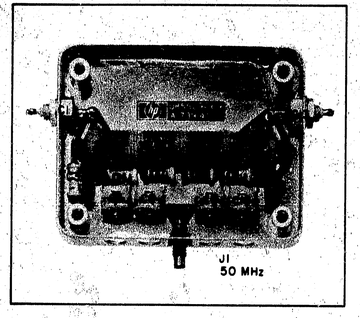


Figure 8-13. 50 MHz Bandpass Filter A3A1 Component Identification

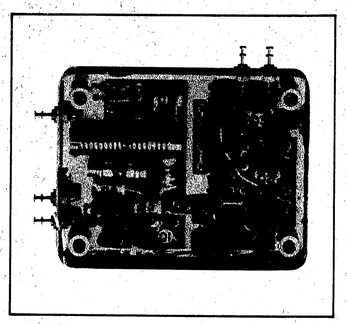


Figure 8-14. 47 MHz Local Oscillator Subassembly A3A2 Component Identification

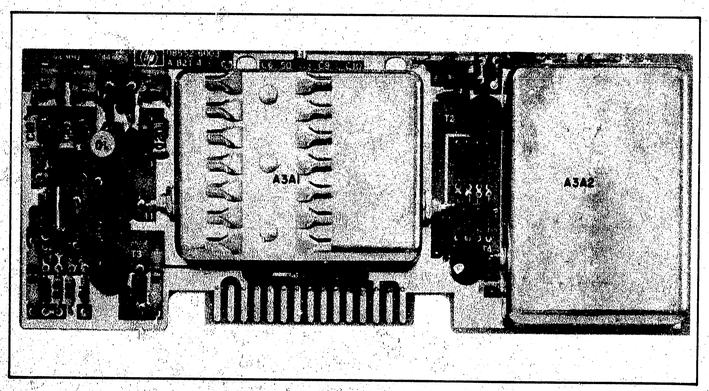
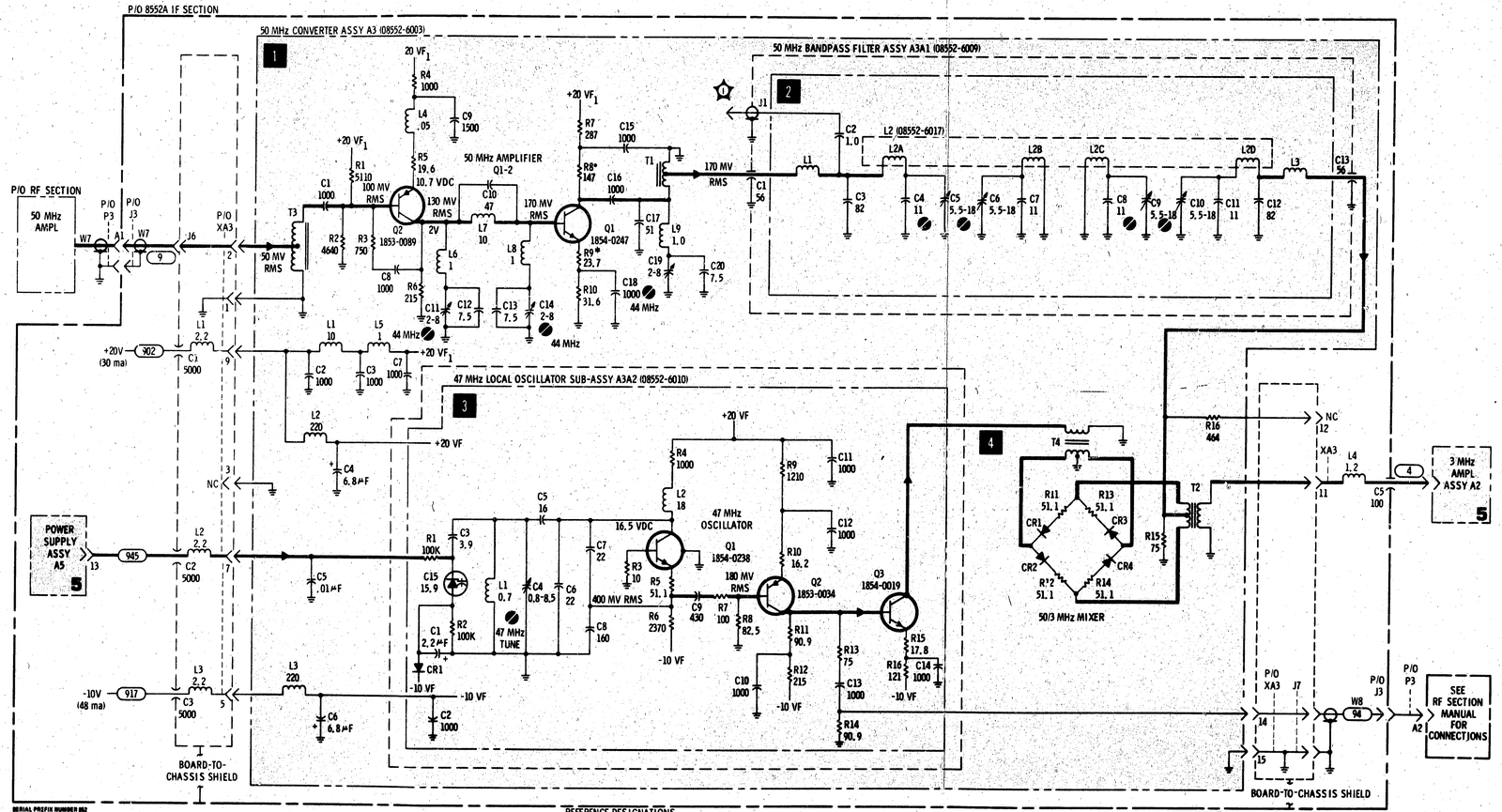


Figure 8-15. 50 MHz Converter Assembly A3, Component Identification



REFERENCE DESIGNATIONS

A3	A3A1	A3A2	CHASSIS	RF SECTION
C1-20	C1-13	C1-15	C1-3,5	CHASSIS
CR1-4	L1-3	CR1	L1-4	P3
L1-9	J1	L1,2	J3,6,7	W7
Q1,2		Q1-3	W7,8	
R1-16		R1-16	XA3	
T1-4				

Figure 8-16. 50 MHz Converter

SERVICE SHEET 4

It is assumed that input dc voltages are present and correct and that the dc control level from the marker generator is present and correct.

TROUBLESHOOTING PROCEDURE

When trouble has been isolated to the 47 MHz summing and shaping amplifier, remove power supply assembly A5 and reinstall it on the extender board to provide access to components and test points.

NOTE

See the appropriate RF Section manual for inputs to the summing and shaping circuits. Depending on the RF Section, the inputs will be a dc voltage or dc voltages and a ramp voltage.

EQUIPMENT REQUIRED

Digital Voltmeter . . . . . HP 3440A/3439A

CONTROL SETTINGS

Any

■ 47 MHz SUMMING AND SHAPING AMPLIFIER

The summing and shaping amplifier combine and process dc levels and ramp signals from the RF Section. The RF Section may supply part or all input signals to the summing amplifier. The shaping amplifier converts any linear input to an exponential ramp to control the varactor in the 47 MHz oscillator. This action ensures that the frequency output is linear with respect to the input control voltage.

TEST PROCEDURE ■

Since only steady dc levels are involved, checking for voltages shown on the schematic should enable the technician to speedily locate defective components.

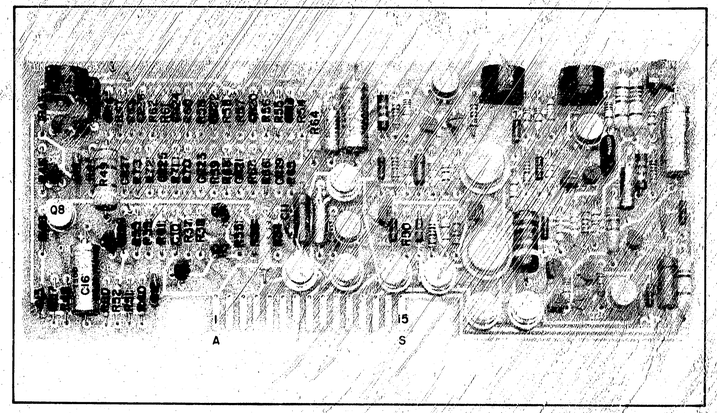


Figure 8-17. P/O Power Supply Assembly A5 Component Identification

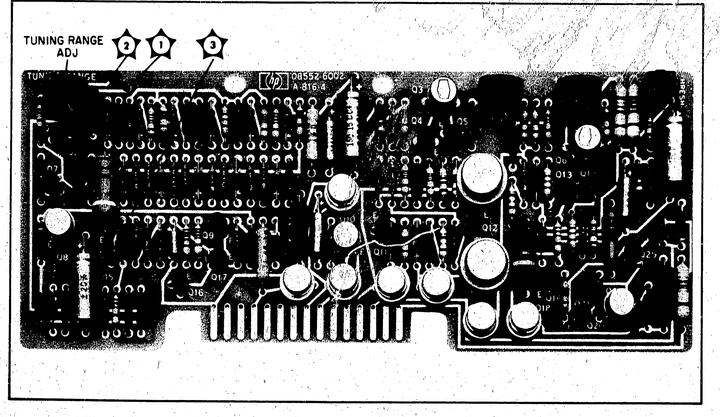


Figure 8-18. P/O Power Supply Assembly A5 Test Point and Adjustment Identification

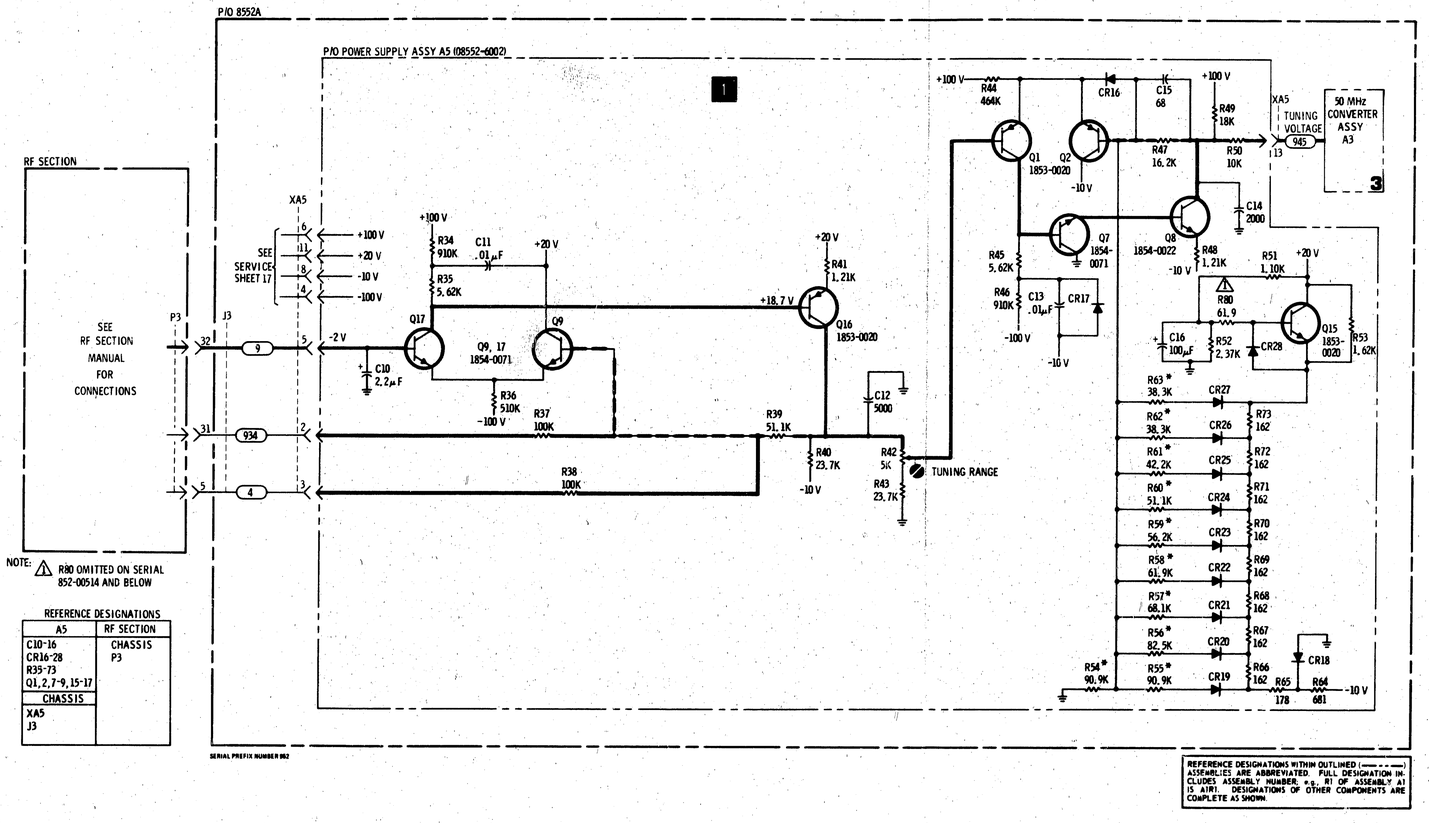


Figure 8-19. 47 MHz Oscillator Control

SERVICE SHEET 5

It is assumed that the 3 MHz input signal and the correct dc input voltages are present and that the output signal is missing or out of tolerance.

TROUBLESHOOTING PROCEDURE

When a malfunction has been isolated to the 3 MHz IF amplifier A2, the board should be removed from the IF Section assembly and reinstalled using the extender board to provide access to components. Connect the CAL OUTPUT to the RF INPUT.

NOTE

Part of the 3 MHz IF amplifier circuit is shown on Service Sheet 6. It will be necessary to utilize both service sheets to verify proper operation of the amplifier after repairs are completed.

EQUIPMENT REQUIRED

Vector Voltmeter	HP 8405A
Service Kit	HP 11592A

CONTROL SETTINGS

Unless otherwise specified in individual tests

INPUT ATTENUATION	0 dB
SCAN WIDTH PER DIVISION	20 kHz
LOG REF LEVEL	−10 dBm
SCAN WIDTH	ZERO
LOG/LINEAR	LOG
FREQUENCY	30 MHz

3 MHz AMPLIFIER ASSEMBLY (General)

The 3 MHz amplifier assembly consists of a bandpass filter, a calibrated amplifier, a 10/20/30 dB step amplifier, a variable 0 to 12 dB amplifier, and an emitter follower output stage. The 0 to 12 dB amplifier and the emitter follower output stage are shown on Service Sheet 6.

■ 3 MHz BANDPASS FILTER

The 3 MHz bandpass filter is a two-section adjustable filter which is adjusted to provide a bandpass of 300 kHz centered at 3 MHz.

TEST PROCEDURE ■

Connect the HP 8405A to TP A (Q1-b) and tune the analyzer for maximum signal. Meter should indicate approximately 6.0 mV rms. If the signal level is correct proceed to step ■. If the signal is low or missing, check the bandpass filter and R1.

NOTE

If the bandpass filter circuit required repairs the adjustment procedure specified in Paragraph 5-35 of Section V should be performed.

■ 3 MHz CALIBRATION AMPLIFIER

The gain of the 3 MHz calibrated amplifier is controlled by a variable capacitive voltage divider. The variable capacitive elements are varactors which are controlled by a dc level from the RF Section front panel screwdriver adjustment. This circuit is adjusted during the analyzer alignment procedure to compensate for overall gain requirements and to provide absolute amplitude calibration of the displayed signal. Circuit gain is nominally 10 dB and is adjustable by approximately ±4 dB.

TEST PROCEDURE ■

Connect the HP 8405A to TP 1 (Q3-c) and tune analyzer for maximum signal. Meter reading is typically 27 mV rms. If this level is present turn the AMPL CAL adjustment to verify proper operation, return control setting to the level observed first, and proceed to step ■. If signal is missing or level is not as specified, check Q1/Q2/Q3 and associated components.

■ 10/20/30 dB STEP AMPLIFIER AND CONTROL CIRCUITS

The gain of the 10/20/30 dB step amplifier is controlled by diode controlled bias networks in the emitter circuit of Q4. This amplifier actually provides the 30, 40, and 50 dB gain steps for the overall system. (The 10 and 20 dB steps are a function of the Crystal Filter Assembly.) Diodes CR1, CR3, and CR5 are reverse biased by the +20 volts applied from the LOG REF LEVEL assembly A10 at settings of −20 dBm or less. As the LOG REF LEVEL switch is rotated, the 30, 40, and 50 dB gain steps are enabled by removing the +20 volts and applying −12.6 volts first to CR1, then to CR1 and CR3, and finally in the 50 dB position to CR1, CR3, and CR5. As CR1, CR3, and CR5 are forward biased they in turn forward bias CR2, CR4, and CR6 to effectively parallel the bias networks in the emitter circuit of Q4. As each diode pair is forward biased the gain of the amplifier is increased by 10 dB. R21, R24, and R27 are adjusted for absolute amplitude calibration of the displayed signal.

◀ SERVICE SHEET 4

Figure 8-19. 47 MHz Oscillator Control

TEST PROCEDURE ■

Connect the HP 8405A to TP2 and tune the analyzer for maximum signal. Rotate the LOG REF LEVEL control as indicated below and observe meter readings.

Signal levels shown are typical.

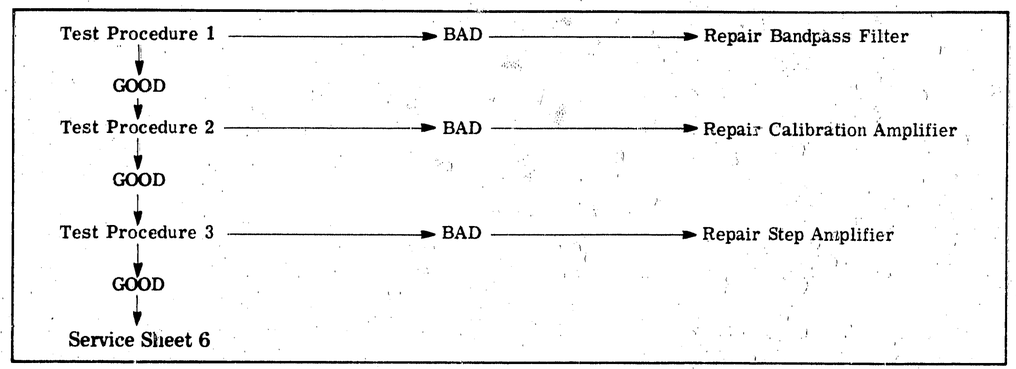
If correct levels are observed proceed to step ■ on Service Sheet 6.

If correct levels are not obtained check the 10/20/30 dB step amplifier, bias networks or LOG REF LEVEL switch assembly as required.

NOTE

When repairs are required to the 3 MHz IF assembly additional tests specified in Paragraphs 5-32, 5-35, and 5-36 of Section V should be performed.

Simplified Test Procedure Tree



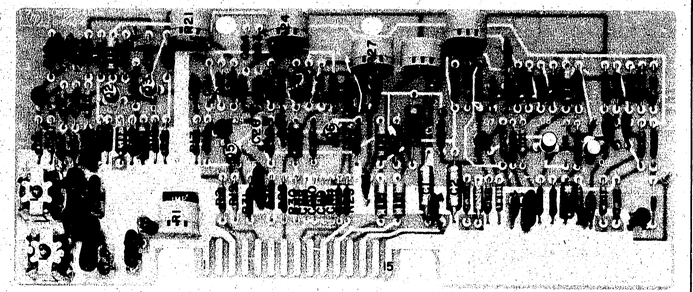


Figure 8-20. P/O 3 MHz Amplifier Assembly A2 Component Identification

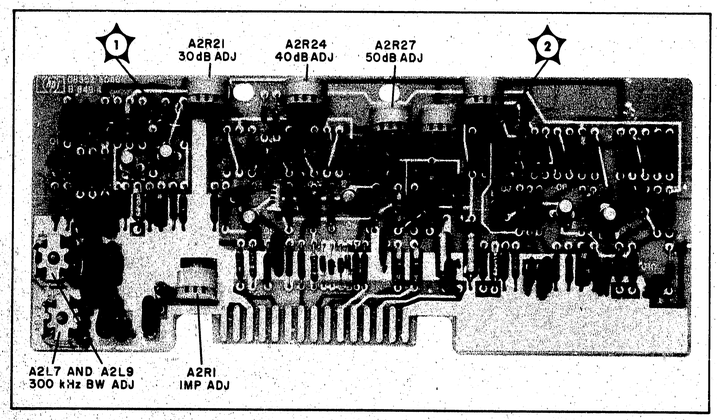


Figure 8-21. P/O 3 MHz Amplifier Assembly A2 Test Point and Adjustment Identification

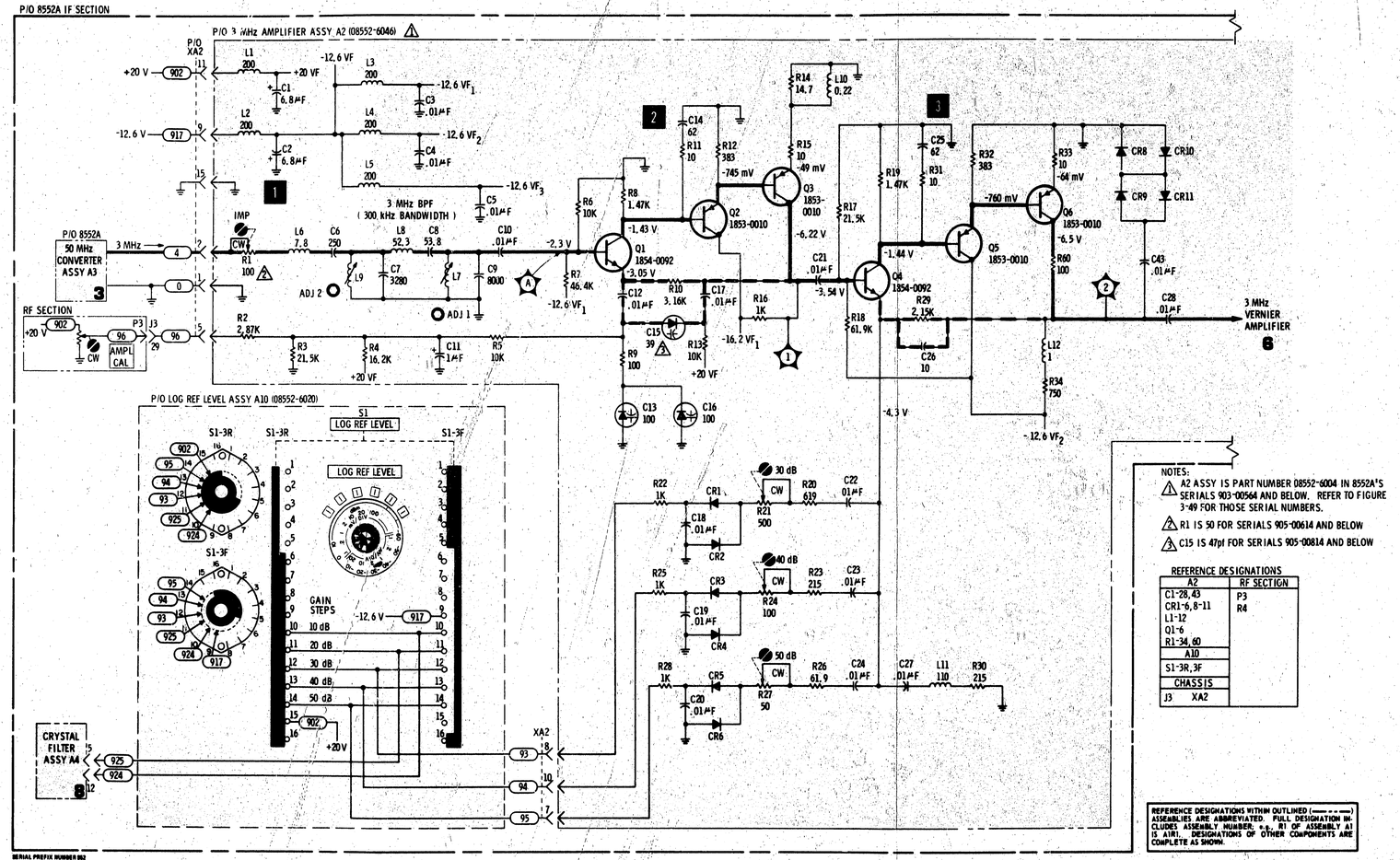


Figure 8-22. 3 MHz IF Amplifier (Sheet 1 of 2)

SERVICE SHEET 6

It is assumed that the 3 MHz input signal and the circuit dc input voltages are present and that the output signal is missing or out of tolerance.

TROUBLESHOOTING.

When a malfunction has been isolated to the 3 MHz IF amplifier A2, the board should be removed from the IF Section and reinstalled using the extender board to provide access to components. Connect the CAL OUTPUT to the RF INPUT.

NOTE

Part of the 3 MHz IF amplifier circuit is shown on Service Sheet 5. It will be necessary to utilize both service sheets to verify proper operation of the amplifier after repairs are completed.

EQUIPMENT REQUIRED

Vector Voltmeter	HP 8405A
Service Kit	HP 11592A

CONTROL SETTINGS

Unless otherwise specified in individual tests.

INPUT ATTENUATION	0 dB
SCAN WIDTH PER DIVISION	20 kHz
LOG REF LEVEL	−10 dBm
SCAN WIDTH	ZERO
BANDWIDTH	300 kHz
LOG/LINEAR	LOG
FREQUENCY	30 MHz

1 12 dB VARIABLE GAIN AMPLIFIER

The gain of the 0 to 12 dB amplifier is controlled by two varactor voltage dividers. One of these voltage dividers controls the level of the degenerative feedback from the output stage to the input stage; the other controls the level of the signal applied to the 3 MHz amplifier output stage. The LOG REF LEVEL · LINEAR SENSITIVITY vernier control, R1, on the front panel of the IF Section controls the gain of the variable gain amplifier. R1 is calibrated by adjustments located on the 3 MHz IF amplifier assembly. R44 calibrates the 12 dB maximum and R51 calibrates the 0 dB minimum.

TEST PROCEDURE 1

Connect the HP 8405A to TP B (junction of C40/C41) and tune the analyzer for maximum signal level on the meter. Rotating the LINEAR SENSITIVITY vernier control to both extremes should produce typical readings of 30 mV rms to 130 mV rms. If the meter readings are correct proceed to step 2.

If the meter readings are not correct repair the variable gain amplifier and repeat the test.

2 3 MHz IF AMPLIFIER OUTPUT CIRCUIT

The 3 MHz IF amplifier output circuit consists of an emitter follower. The purpose of this stage is to provide isolation between the variable gain IF amplifier and the LC Filter assembly.

TEST PROCEDURE 2

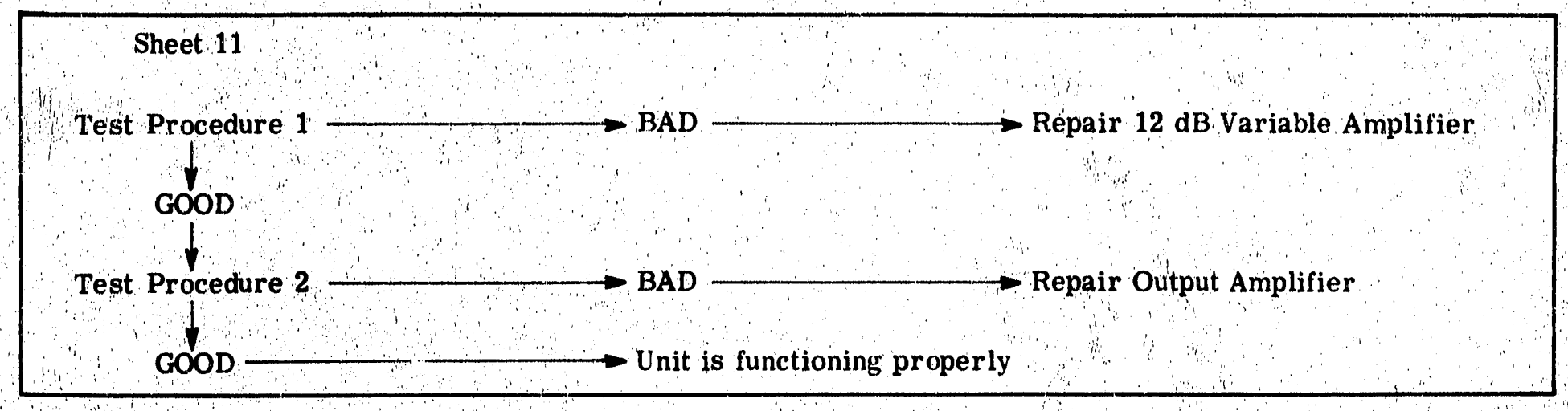
Connect the HP 8405A to TP 4 and tune the analyzer for maximum signal level on the meter. Typical reading is 30 mV rms with LOG/LIN vernier CCW. If the meter reading is correct the assembly is functioning properly.

If the meter reading is incorrect check Q10 and associated components.

NOTE

When repairs are required the tests specified in Paragraphs 5-32, 5-35, and 5-36 of Section V should be performed.

Simplified Test Procedure Tree



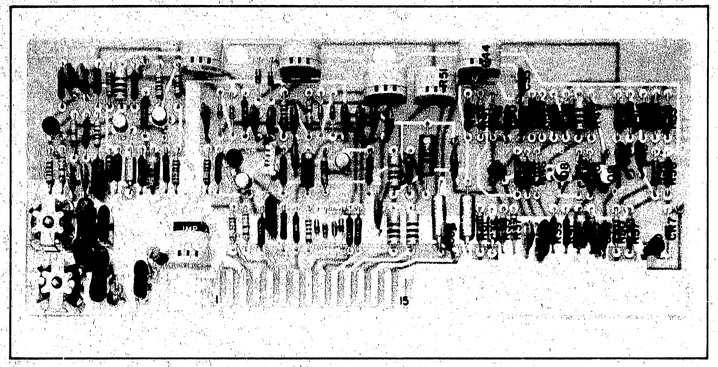


Figure 8-23. P/O 3 MHz IF Amplifier Assembly A2 Component Identification

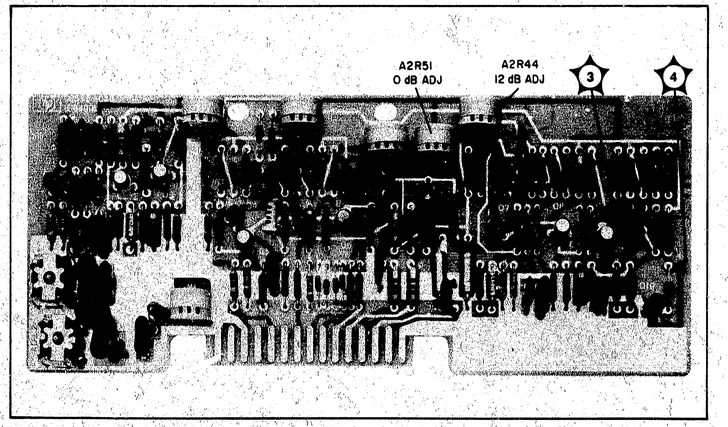


Figure 8-24. P/O 3 MHz IF Amplifier Assembly A2 Test Point and Adjustment Identification

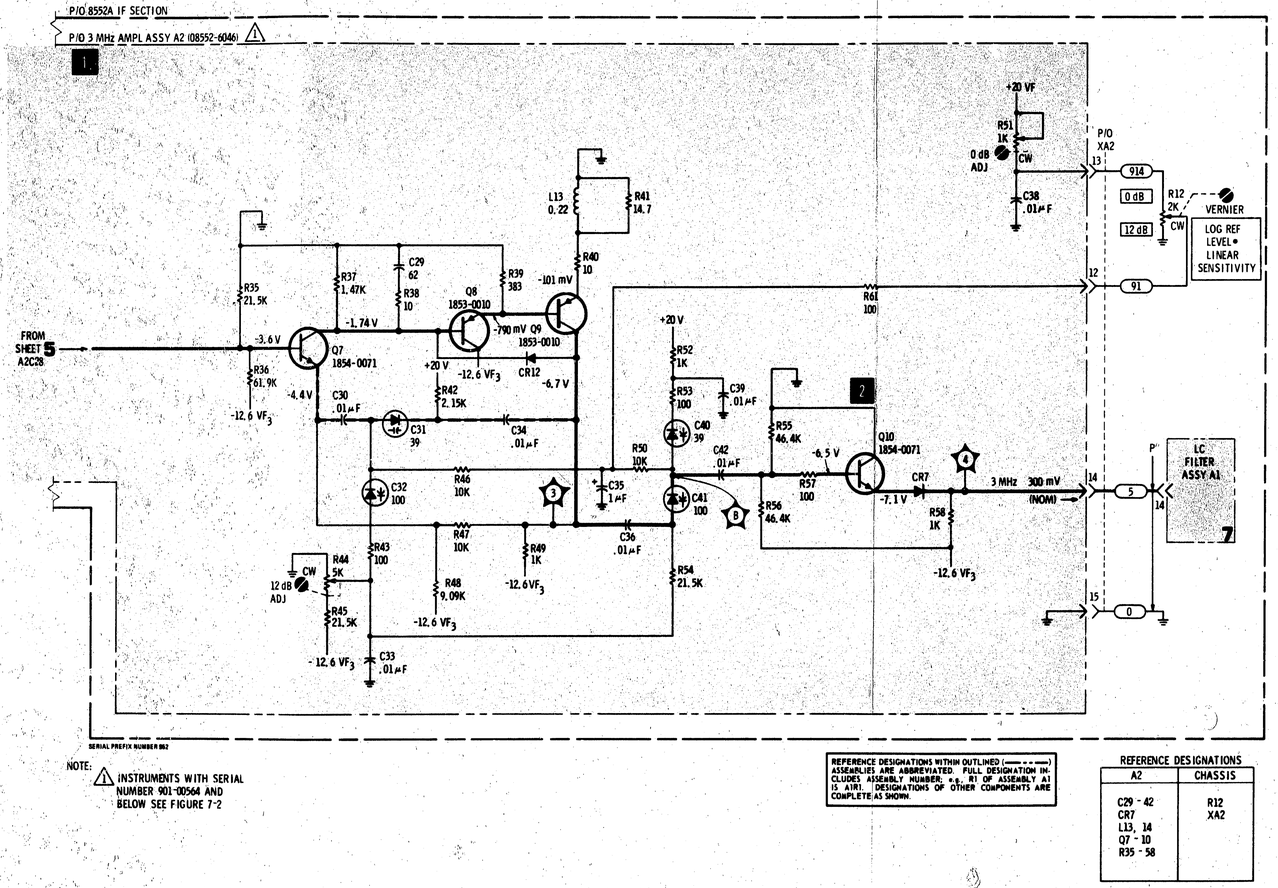


Figure 8-25. 3 MHz IF Amplifier (Sheet 2 of 2)

SERVICE SHEET 7

It is assumed that the 3 MHz signal from the 3 MHz IF amplifier and dc supply voltages are present and within tolerances, and that the output is missing or incorrect.

TROUBLESHOOTING PROCEDURE

When trouble has been isolated to the LC Filter assembly it should be removed from the IF Section frame and reinstalled using the extender board to provide access to components.

EQUIPMENT REQUIRED

VHF Signal Generator	HP 608F
Vector Voltmeter	HP 8405A
Service Kit	HP 11592A
Digital Voltmeter	HP 3440A/3443A

CONTROL SETTINGS

Unless otherwise specified in individual tests.

SCAN WIDTH	ZERO
INPUT ATTENUATION	0 dB
TUNING STABILIZER	On
SCAN WIDTH PER DIVISION	20 kHz
LOG REF LEVEL	−10 dBm
LOG/LINEAR	LOG
FREQUENCY	30 MHz

[redacted] LC BANDWIDTH FILTER STAGES

Q4, Q3, A2 and Q1 with associated components comprise four selectable-bandwidth, unity gain stages. The four stages are identical except that the fourth stage (Q1) has an adjustable resistor in the feedback path. This resistor is adjusted to provide compensation for losses incurred when narrow bandwidths are selected. When the 10 kHz bandwidth is selected the input signal is coupled to Q4 thru C1 and R4. When the 30 kHz bandwidth is selected the input signal is coupled to Q4 thru C1 and the parallel combination of R4 and R3. When the 100 kHz bandwidth is selected the signal is coupled to Q4 thru C1/R4 and C2/R5 in parallel. When the 300 kHz bandwidth is selected all four stages are bypassed and the signal is coupled directly to the output amplifier. Operation of Q3, Q2 and Q1 is identical to that described for Q4 except for reference designators.

TEST PROCEDURE [redacted]

With a 30 MHz, −10 dBm signal from the HP 608F applied to the analyzer RF INPUT, connect the HP 8405A to TP A, Q1 emitter. Tune the analyzer for maximum with the BANDWIDTH switch in the 10 kHz position. Typical meter reading is 280 mV rms.

Rotate the BANDWIDTH switch to the 30, 100 and 300 kHz positions. The meter reading should be approximately the same for bandwidths of 10, 30 and 100 kHz, and drop to approximately 0 volt in the 300 kHz BANDWIDTH position.

If the signal is not present at any of the BANDWIDTH settings the trouble is likely to be in one of the four stages. To isolate to a defective stage check for the presence of the signal at the emitter of Q2, then Q3, then Q4. Signal levels should approximate those specified for Q1 emitter. If the cause of the malfunction is not detected, proceed to step [redacted].

If the signal is correct at some, but not all, bandwidth selections, trouble is likely to be in the switching or diode matrix. Proceed to step [redacted].

If the correct readings are observed proceed to step [redacted].

[redacted] SWITCHING AND DIODE MATRIX

When the BANDWIDTH switch is in the 300 kHz position, −12.6 volts are applied to XA1-8. This dc level accomplishes the following:

a. Overcomes the positive voltage applied through R42 to forward bias CR9 and CR12. This allows the input signal to be coupled directly to the output amplifier.

b. Forward biases CR13 to provide a dc level to the relay driver in the Crystal Filter assembly. This causes the Crystal Filter circuits to be bypassed.

c. Forward biases CR11 to disable the first selectable bandwidth stage Q4.

d. Forward biases CR16 to reverse bias CR17 and disconnect the fourth selectable bandwidth stage Q1 from the output stage.

When the SCAN WIDTH switch is placed in the preset scan position, −12.6 volts is applied to XA1-8 and the LC bandwidth filter operates in the 300 kHz mode regardless of BANDWIDTH switch position.

When the BANDWIDTH switch is placed in the 100 kHz position −10 volts is applied to XA1-10/L. This −10 volts is applied to LC Filter diodes and also forward biases CR15 to operate the bypass relays in the Crystal Filter assembly. The diode bias voltage forward biases CR2, CR4, CR6, and CR8 to place resistors R5, R14, R23, and R33 in parallel with those already in the signal path. This effectively swamps the LC circuits to modify their Q factor and provide a bandpass of 100 kHz centered at 3 MHz.

When the BANDWIDTH switch is placed in the 30 kHz position −10 volts is applied to XA1-12/N. This −10 volts is applied to LC Filter diodes and also forward biases CR14 to operate the bypass relays in the Crystal Filter assembly. The diode bias voltage forward biases CR1, CR3, CR5, and CR7 to place resistances R3, R11, R20, and R31 in parallel with those already in the signal path. This effectively swamps the LC circuits to modify their Q factors and provide a bandpass of 30 kHz centered at 3 MHz.

When the BANDWIDTH switch is placed in the 10 kHz position the switching diodes are not used for signal steering and the LC filter provides a 10 kHz bandpass centered at 3 MHz.

TEST PROCEDURE [redacted]

Use the HP 3440A/3443A to check for voltages shown in the chart for XA1 contacts on Service Sheet 8 step [redacted].

If the correct readings are obtained at XA1 pins 6, 7, 12, 10, and 8, check the diode matrix. If correct readings are not obtained, check the BANDWIDTH switch, SCAN WIDTH switch, CR1, CR2, CR3, wiring, etc.

When correct readings are obtained recheck step [redacted] then proceed to step [redacted].

[redacted] LC FILTER OUTPUT AMPLIFIER

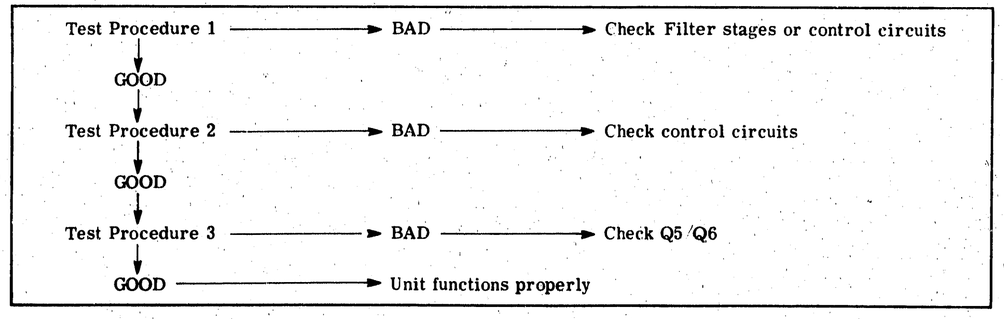
The output stage consists of Q5 and Q6. This stage provides unity gain and a low impedance output to drive the Crystal Filter assembly.

TEST PROCEDURE [redacted]

With a 30 MHz, −10 dBm signal from the HP 608F applied to the RF INPUT, connect the HP 8405A to TP 1. Tune the analyzer for maximum signal and observe the meter reading. Typical reading should be 280 mV rms.

If the correct signal level is observed assembly is functioning properly. If not, check Q5/Q6 and associated components.

Simplified Test Procedure Tree



SERVICE SHEET 6

Figure 8-25. 3 MHz IF Amplifier (Sheet 2 of 2)

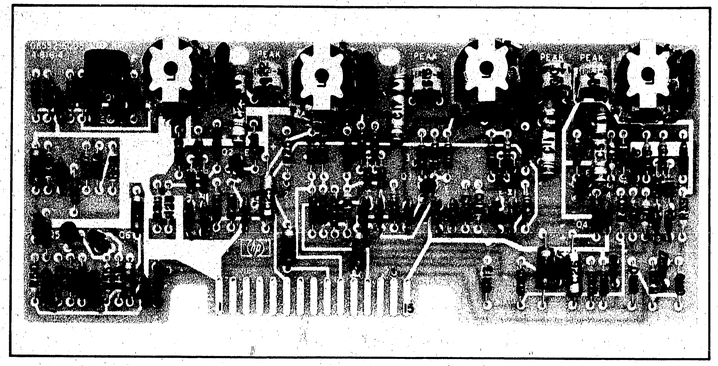


Figure 8-26. LC Filter Assembly A1 Component Identification

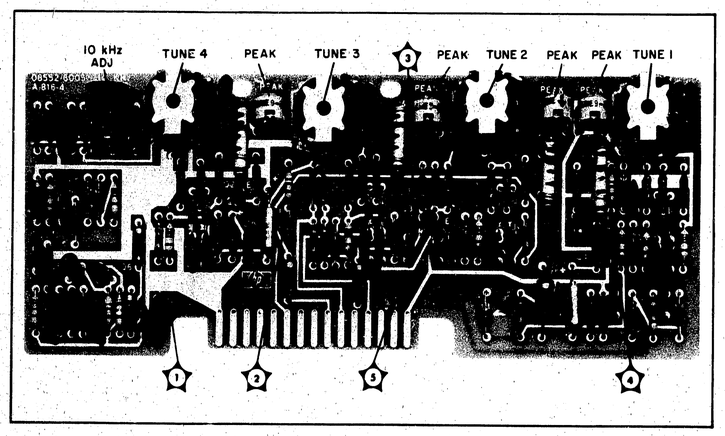


Figure 8-27. LC Filter Assembly A1 Test Point and Adjustment Identification

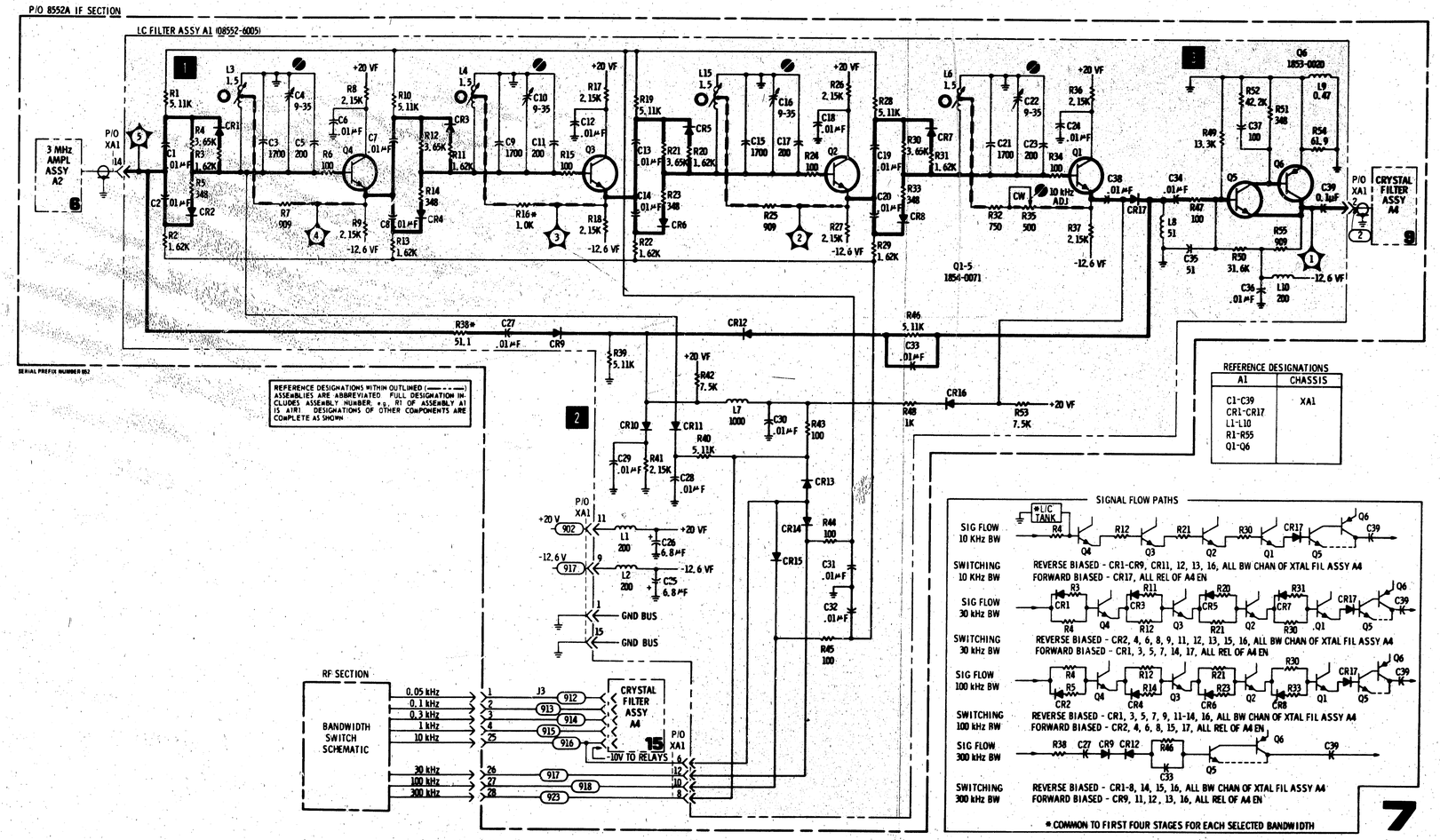


Figure 8-28. 3 MHz LC/BW Filter

SERVICE SHEET 8

Normally, malfunctions which occur in the switching circuits will be detected and corrected while troubleshooting circuits shown on Service Sheets.

TROUBLESHOOTING PROCEDURE

Since these switches function for voltage switching only, all components and wiring can be checked by monitoring voltage levels at the input connector to the 3 MHz IF amplifier, LC Filter assembly, and the Crystal Filter assembly.

EQUIPMENT REQUIRED

Service Kit . . . . . HP 11592A
Digital Voltmeter . . . . . HP 3440A/3443A

CONTROL SETTINGS

As required to check dc levels.

■ P/O LOG REFERENCE LEVEL ASSEMBLY

This portion of the log reference level assembly applies +20 volts or −12.6 volts to enable or disable switches to control the gain of stages in the 3 MHz IF amplifier and Crystal Filter assemblies.

TEST PROCEDURE ■

Use the HP 3440A/3443A Digital Voltmeter to verify switching voltages at pins of XA2 and XA4 for operation of LOG REF LEVEL switch. The voltages shown in the adjacent chart are typical.

If voltages are correct switch section is functioning properly.

If voltages are not correct check voltage inputs to switch, switch contacts and wiring.

Pin of XA2	Log Ref Level Switch Settings (dBm)					
	-10	-20	-30	-40	-50	-60
8	+20	+20	-12.6	-12.6	-12.6	-12.6
10	+20	+20	+20	-12.6	-12.6	-12.6
7	+20	+20	+20	+20	-12.6	-12.6
Pin of XA4						
12	+20	-12.6	-12.6	-12.6	-12.6	-12.6
5	+20	+20	-12.6	-12.6	-12.6	-12.6

♪ BANDWIDTH CONTROL

Pins 1-4, and 25-28 of J3 make contact with the RF Section. The RF Section BANDWIDTH switch provides positive or negative voltages to add, bypass or remove bandwidth shaping elements in the signal path.

TEST PROCEDURE ♪

Use the HP 3440A/3443A Digital Voltmeter to verify switching voltages at pins of XA1 and XA4 for operation of SCAN WIDTH switch and BANDWIDTH switches. The voltages shown in the chart below are typical.

If all voltages are correct the portions of the SCAN WIDTH and BANDWIDTH switches shown on Service Sheet 8 are functioning properly.

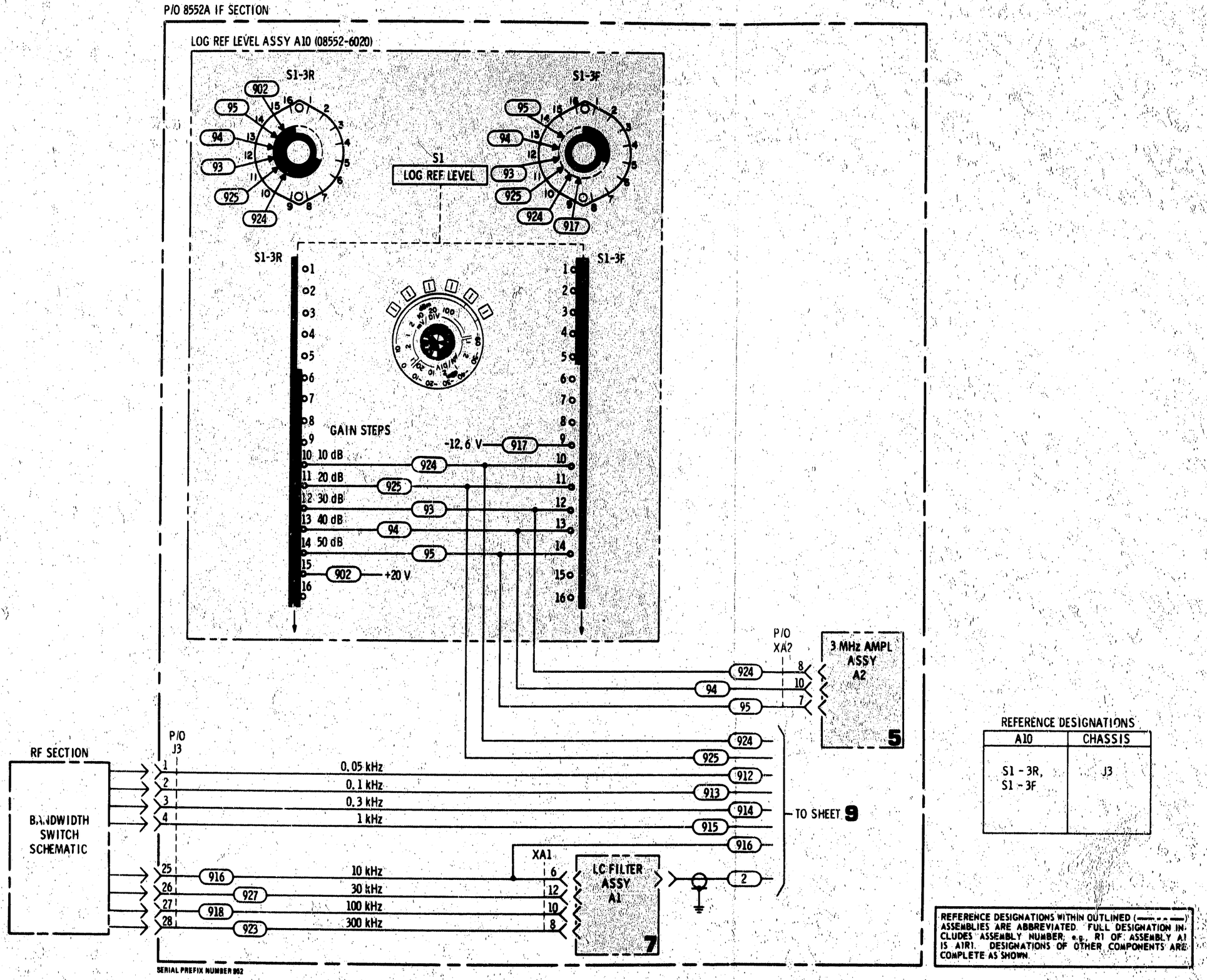
If negative dc levels are missing check the RF Section.

Pin of XA1	Bandwidth Switch Settings								
	.05	0.1	0.3	1	3	10	30	100	300
8*	+ 5	+ 5	+ 5	+ 5	+ 5	+ 5	+ 5	+ 5	- 10
8**	- 10	- 10	- 10	- 10	- 10	- 10	- 10	- 10	- 10
10*	+20	+20	+20	+20	+20	+20	+20	- 10	+20
10**	+20	+20	+20	+20	+20	+20	+20	- 3	+20
12*	+20	+20	+20	+20	+20	+20	- 10	+20	+20
12**	+20	+20	+20	+20	+20	+20	0	+20	+20
6*	+ 5	+0.5	+0.5	+0.5	+0.5	- 10	- 10	- 10	- 10
6**	- 9	- 9	- 9	- 9	- 9	- 9	- 9	- 9	- 9
Pin of XA4									
13*	+0.5	+0.5	+0.5	+0.5	+0.5	- 9	- 9	- 9	- 9
13**	- 9	- 9	- 9	- 9	- 9	- 9	- 9	- 9	- 9
11*	+20	+20	+20	+20	+20	+20	+20	+20	+20
11**	+20	+20	+20	+0.9	+20	+20	+20	+20	+20
10*	+20	+20	- 10	+20	+20	+20	+20	+20	+20
10**	+20	+20	+0.8	+20	+20	+20	+20	+20	+20
8*	+20	- 10	+20	+20	+20	+20	+20	+20	+20
8**	+20	+0.9	+20	+20	+20	+20	+20	+20	+20
7*	- 10	+20	+20	+20	+20	+20	+20	+20	+20
7**	+1.2	+20	+20	+20	+20	+20	+20	+20	+20

*ZERO or PER DIVISION mode ** Preset mode

◀ SERVICE SHEET 7

Figure 8-28. 3 MHz LC/BW Filter



REFERENCE DESIGNATIONS

A10	CHASSIS
S1 - 3R, S1 - 3F	J3

REFERENCE DESIGNATIONS WITHIN OUTLINED (— · · —) ASSEMBLIES ARE ABBREVIATED. FULL DESIGNATION INCLUDES ASSEMBLY NUMBER; e.g., R1 OF ASSEMBLY A1 IS A1R1. DESIGNATIONS OF OTHER COMPONENTS ARE COMPLETE AS SHOWN.

8

Figure 8-29. 3 MHz Crystal Filter Control Circuits

SERVICE SHEET 9

It is assumed that the 3 MHz IF signal from the LC Filter and the dc operating voltages are present and correct and that the 3 MHz output is missing or out of tolerance.

TROUBLESHOOTING PROCEDURE

When trouble has been isolated to the 3 MHz Crystal Filter assembly, the assembly should be removed and reinstalled using the extender board to provide access to components. Test procedures follow descriptions of individual circuits. These Service Sheets (9 and 10) apply to Crystal Filter assemblies in IF Section with serial 852-00465 and above.

EQUIPMENT REQUIRED

Service Kit	HP 11592A
Vector Voltmeter	HP 8405A
Digital Voltmeter	HP 3440A/3443A
VHF Signal Generator	HP 608F

CONTROL SETTINGS

INPUT ATTENUATION	0 dB
BANDWIDTH	3 kHz
LOG REF LEVEL	0 dBm
SCAN WIDTH	ZERO
LOG/LINEAR	LOG
FREQUENCY	30 MHz

[1] SELECTABLE BANDWIDTH CRYSTAL FILTER STAGES

Q9/Y1, Q3/Y2, (and Q8/Y3 on Service Sheet 10 are unity gain, crystal controlled, selectable bandwidth stages. These stages are bypassed by relay contacts when bandwidths of 10 kHz or greater are selected. The basic bandwidth of the crystal filters is 3 kHz. The bandwidth is altered by connecting R/C networks in parallel with the output load of the Crystal Filters. As the resistance of the added R/C network is decreased, the skirt frequencies are sharply attenuated. This effectively narrows the bandpass of the crystal filters without drastically reducing the amplitude of those frequencies closely centered about 3 MHz.

TEST PROCEDURE [1]

With the HP 606B output (30 MHz, -30 dBm) connected to the analyzer RF INPUT, measure the signal levels at TP A, TP B (and TP C on Service Sheet 10) at bandwidths of 3 kHz, 1 kHz, 0.3 kHz and .05 kHz with the HP 8405A. Readjust FINE TUNE for maximum signal during each measurement. Meter readings should be about 29 mV rms.

NOTE

FINE TUNE adjustment is very critical at narrow bandwidths and extreme care will be required to obtain correct measurements.

If the proper signal levels are observed, and the malfunction was detected while trying to adjust the crystal filters in accordance with Paragraph 5-34 proceed to step [3] and if required, step [4].

If signal is incorrect at TP A check the first crystal filter stage.

If the signal is correct at TP A but incorrect at TP B check the second crystal filter stage and isolation amplifier step [2].

If the signal is correct at TP B but incorrect at TP C check the third crystal stage and the step amplifier step [3].

If signal levels are correct and service is required because of gain rather than bandwidth problems proceed to steps [5], [6] and [7].

[2] ISOLATION AMPLIFIER Q1/Q2

Q1/Q2 and associated components comprise a unity gain amplifier which provides isolation between the first and second crystal filter stages to prevent interaction.

TEST PROCEDURE [2]

With the HP 608F connected as in step [1] check the signal level at TP D (Q1-e) with the HP 8405A. If signal was present at TP A, but is not present at TP D, check Q1/Q2 and associated components.

[3] CRYSTAL FILTER BYPASS CIRCUIT

Relays K1, K2 and K3 are energized when the analyzer is operated at bandwidths of 10 kHz or wider. A −12.6 volt dc level is applied to the base of Q10 from the BANDWIDTH switch or from the diode matrix in the LC filter to turn on Q10 and supply an energizing current for the three relays. When the analyzer is operated at narrower bandwidths, the dc level at the base of Q10 is removed and the relays are de-energized.

SERVICE SHEET 8

Figure 8-29. 3 MHz Crystal Filter Control Circuits

TEST PROCEDURE [3]

Connect the HP 3440A/3443A between ground and XA4-13. In the 300, 100, 30, and 10 kHz BANDWIDTH modes the voltage should be approximately −12.6 volts. To check Q10 operation connect the 3440A/3443A to the junction of R5/R9/R27. In the 300, 100, 30, and 10 kHz BANDWIDTH modes the voltage should be about −8.0 volts and in narrower bandwidths it should be 0 volts. Relay contact closure may be checked in-circuit with an ohmmeter.

[4] DIODE SWITCHING AND BANDWIDTH CONTROL NETWORKS

There are three diode switching and bandwidth control networks, one for each of the three crystal filter stages. (The third stage and network is on Service Sheet 10). When the analyzer is operated in the 3 kHz BANDWIDTH mode all of the switching diodes are reverse biased and the inherent characteristics of the filter plus the fixed output load determines the filter bandwidth. As the bandwidth is decreased R/C networks are placed in parallel with the output load of the crystal filter stages. As an example, R24 and C20 are placed across R12 in the output of the first crystal filter when the BANDWIDTH switch is placed in the 1 kHz position by a −12.6 volt dc level which forward biases CR5. Operation of all three crystal filter stages is identical.

TEST PROCEDURE [4]

Using the HP 3440A/3443A check the dc level at XA4 pins 10 and 11. The meter should indicate approximately −12.6 volts when the BANDWIDTH switch is set to the position shown adjacent to each pin and approximately +20 volts in all other switch positions.

If voltages are correct check the individual diode and R/C networks.

If voltages are incorrect see Service Sheet 8.

FACTORY SELECTED COMPONENTS

R12, R31 (and R66 on Service Sheet 10) are selected to provide optimum bandwidth at the 3 kHz bandwidth.

R86 (on Service Sheet 10) is selected to provide gain compensation for differences in Log/Lin amplifier assemblies.

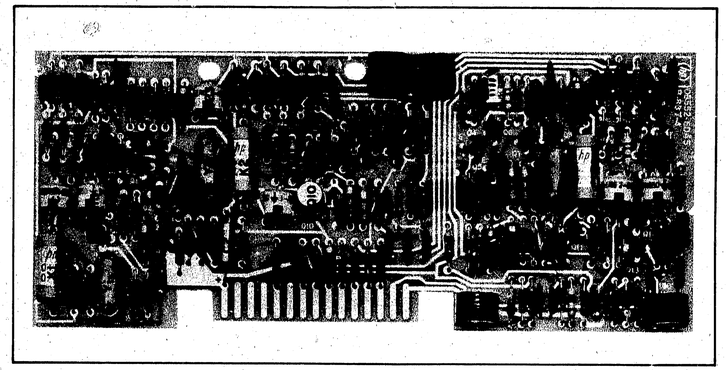


Figure 8-30. P/O Crystal Filter Assembly A4 Component Identification

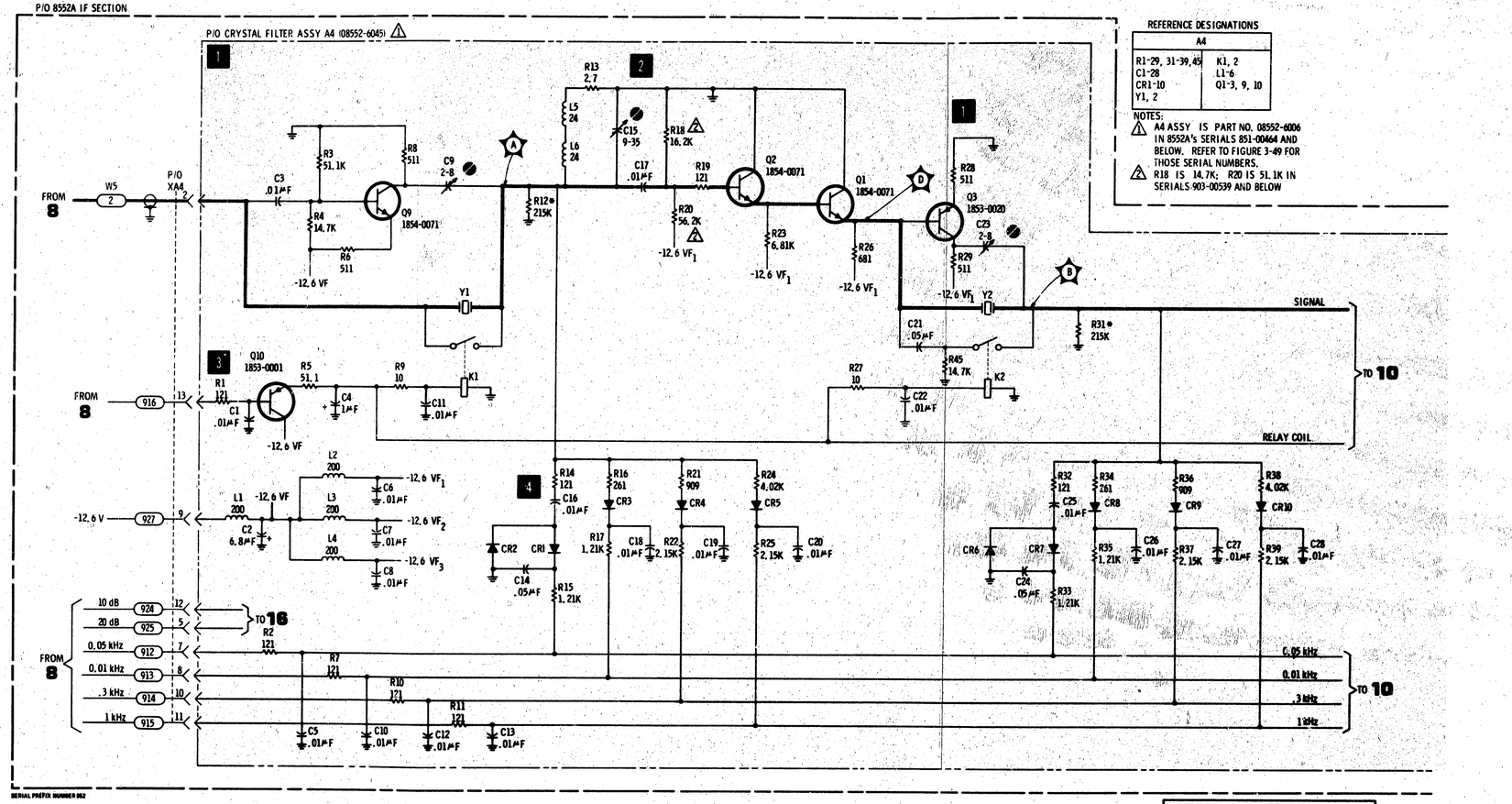


Figure 8-31. 3 MHz Crystal Filter (Sheet 1 of 2)

SERVICE SHEET 10

It is assumed that the 3 MHz IF signal from the LC Filter and the dc operating voltages are present and correct and that the 3 MHz output is missing or out of tolerance.

TROUBLESHOOTING PROCEDURE

When trouble has been isolated to the 3 MHz Crystal Filter assembly, the assembly should be removed and re-installed using the extender board to provide access to components. Test procedures follow descriptions of individual circuits. These Service Sheets (9 and 10) apply to Crystal Filter assemblies in 8552A with serials 852-00465 and above.

EQUIPMENT REQUIRED

Service Kit	HP 11592A
Vector Voltmeter	HP 8405A
Digital Voltmeter	HP 3440A/3443A
VHF Signal Generator	HP 608F

CONTROL SETTINGS

INPUT ATTENUATION	0 dB
BANDWIDTH	3 kHz
LOG REF LEVEL	0 dBm
SCAN WIDTH	ZERO
LOG/LINEAR	LOG
FREQUENCY	30 MHz

[redacted] SELECTABLE BANDWIDTH CRYSTAL FILTER STAGES

Described on Service Sheet 9.

[redacted] ISOLATION AMPLIFIER Q1/Q2

Described on Service Sheet 9.

[redacted] CRYSTAL FILTER BYPASS CIRCUIT

Described on Service Sheet 9.

[redacted] DIODE SWITCHING AND BANDWIDTH CONTROL NETWORKS

Described on Service Sheet 9.

[redacted] 0 dB/10 dB/20 dB STEP AMPLIFIER

Q4/Q5/Q6/Q7 and associated components comprise an amplifier which provides unity gain, 10 dB of gain or 20 dB of gain depending on the position of the LOG REF LEVEL control. When operated as a unity gain amplifier its only purpose is to provide isolation between the second crystal filter stage and the third crystal stage to prevent interaction. Gain of the amplifier is controlled by bias networks in the emitter circuits of Q6 and Q7. The bias networks are switched into the circuit by diode switches which are enabled by a dc level from the LOG REF LEVEL assembly.

TEST PROCEDURE [redacted]

With the HP 608F output (30 MHz, -30 dBm) connected to the analyzer RF INPUT measure the signal level at TP E (Q7-e) with the HP 8405A at LOG REF LEVEL settings of -10 dBm, -20 dBm and -30 dBm. With the analyzer FINE TUNE adjusted for maximum signal the meter readings should be about 28 mV rms, 85 mV rms and 270 mV rms respectively.

If signal levels are correct, the step amplifier and diode-switched bias networks are functioning properly.

If signal levels are incorrect, check Q4/Q5/Q6/Q7 and associated components.

If the diode enabling dc levels are not present, check the Log Ref Level assembly Service Sheet 8.

[redacted] OUTPUT AMPLIFIER GAIN AND COMPENSATION CIRCUIT

Output amplifier Q11/Q12/Q13 provides isolation for the last crystal filter stage and gain compensation for narrow bandwidth circuit losses. The amplifier operates as a conventional feedback controlled amplifier but has supplementary circuits which may be switched in to attenuate the feedback and thus increase the gain. These supplementary circuits are switched into operation by diodes when the analyzer is operated in the 0.3 kHz, 0.1 kHz and .05 kHz BANDWIDTH modes.

TEST PROCEDURE [redacted]

With the HP 608F output (30 MHz, -30 dBm) connected to the analyzer RF INPUT, connect the HP 8405A to TP F (XA4-14) and tune the analyzer for maximum signal level at BANDWIDTH setting of 0.3 kHz. Meter should read about 29 mV rms. Rotate the BANDWIDTH control to the 0.1, 0.3, 1, and 3 kHz positions and adjust FINE TUNE at each setting. Maximum meter reading should remain about 29 mV rms for all bandwidths.

◀ SERVICE SHEET 9

Figure 8-31. 3 MHz Crystal Filter (Sheet 1 of 2)

[redacted] IF ATTENUATOR (P/O) LOG REFERENCE ASSEMBLY A10

The portion of the Log Reference assembly shown on Service Sheet 10 is a step attenuator which is used to control the level of the 3 MHz signal applied to the Lin/Log Amplifier.

TEST PROCEDURE [redacted]

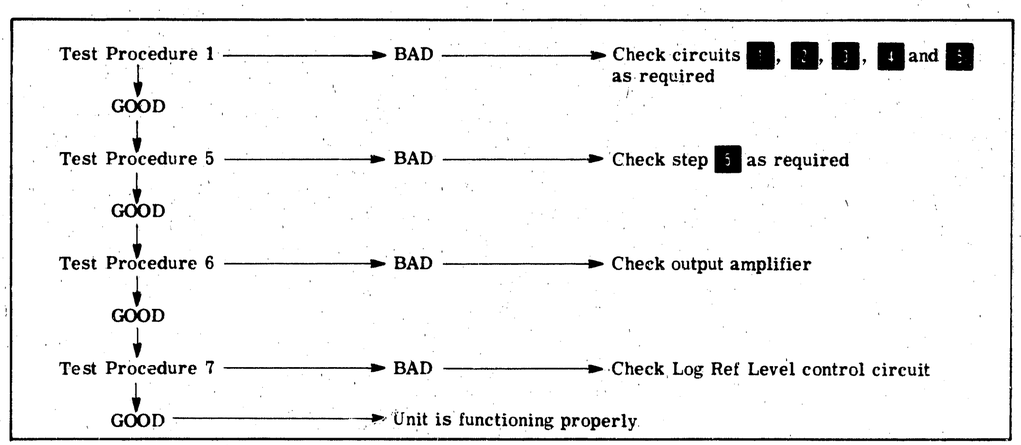
Place the Crystal Filter assembly back in the chassis and install the Lin/Log Amplifier Assembly A8 on the extender board. Use the HP 8405A to monitor the signal level at TP G (XA8-2). Connect the HP 608F signal generator 30 MHz output to the analyzer RF INPUT. Starting at -10 dBm output from the HP 608F, decrease the output in 10 dB steps and track these steps with the LOG REF LEVEL control. (HP 608F—10 dBm; LOG REF LEVEL—10 dBm; HP 608F—20 dBm; LOG REF LEVEL—20 dBm, etc.) HP 8405A should indicate approximately 600 mV rms at all settings.

If levels at TP F (step [redacted]) were correct and the readings at TP G are not, check Log Ref Level assembly A10.

NOTE

After repairing any of the circuits on the Crystal Filter Assembly, the assembly should be adjusted in accordance with Paragraph 5-34 of Section V.

Simplified Test Procedure Tree



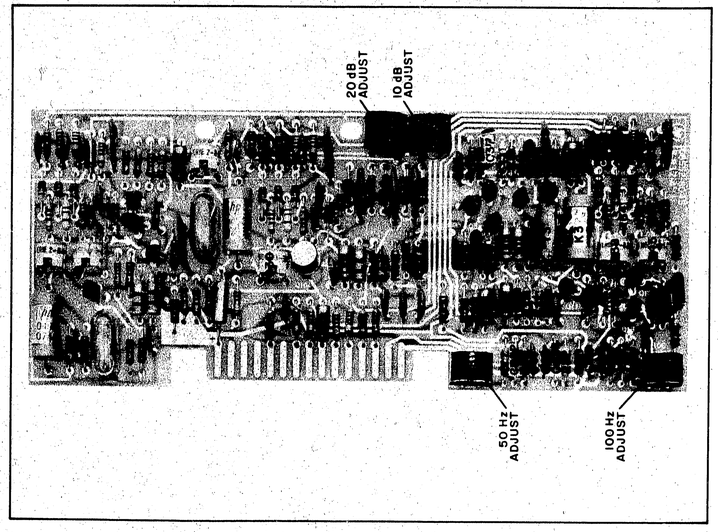
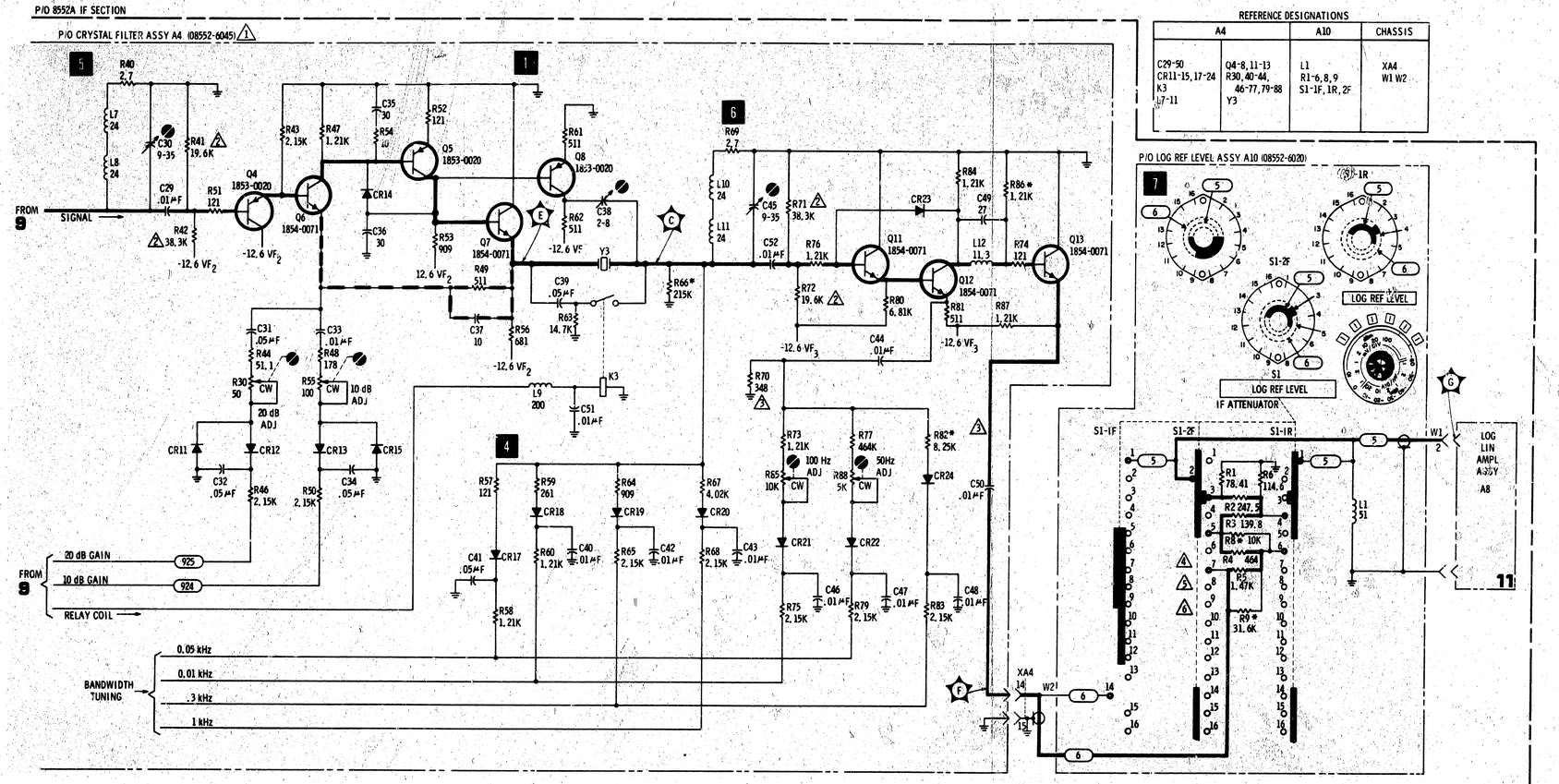


Figure 8-32. P/O Crystal Filter Assembly A4 Component Identification



NOTES:

SERIAL PREFIX NUMBER 862

1. A4 ASSY IS PART NUMBER 08552-6006 IN 8552A's SERIAL 851-00464 AND BELOW. REFER TO FIGURE 7-4 FOR THOSE SERIAL NUMBERS.
2. R41, 72 IS 17.8; R42, 71 IS 34.8K ON SERIALS 903-00539 AND BELOW.
3. R70 IS 511 AND R82 IS 10K ON SERIALS 905-00589 AND BELOW.
4. R4 IS 444.3 OHMS ON SERIALS 905-00814 AND BELOW.
5. R8*, 10K AND R9* 31.6K WERE ADDED ON SERIALS 945-01840 AND ABOVE.
6. R4 IS 436.2 AND R5 IS 1.47K ON SERIALS 945-01859 AND BELOW.

REFERENCE DESIGNATIONS WITHIN OUTLINED (— · — · —) ASSEMBLIES ARE ABBREVIATED. FULL DESIGNATION INCLUDES ASSEMBLY NUMBER, e.g., R1 OF ASSEMBLY A1 IS A1R1. DESIGNATIONS OF OTHER COMPONENTS ARE COMPLETE AS SHOWN.

Figure 8-33. 3 MHz Crystal Filter (Sheet 2 of 2)

SERVICE SHEET 11

It is assumed that the 3 MHz signal from the crystal filter and dc operating voltages are present and correct, and that the output signal is not present or is out of tolerance.

TROUBLESHOOTING PROCEDURE

When trouble has been isolated to the Log/Lin Amplifier assembly, A8, it should be removed from the chassis and re-installed on the extender board to provide access to components. After repairing the assembly the procedures specified in Paragraphs 5-30 and 5-31 of Section V should be performed.

NOTE

Since parts of the circuit appear on Service Sheet 12, Service Sheets 11 and 12 should be used jointly in troubleshooting the assembly.

EQUIPMENT REQUIRED

Oscilloscope	HP 180A/1801A/1821A
Digital Voltmeter	HP 3440A/3443A
Service Kit	HP 11592A
Vector Voltmeter	HP 8405A
Signal Generator	HP 608F

CONTROL SETTINGS

Unless otherwise specified in individual tests.

SCAN WIDTH	ZERO
INPUT ATTENUATION	0 dB
SCAN MODE	INT
FREQUENCY	30 MHz
BANDWIDTH	300 kHz
SCAN TRIGGER	AUTO
LOG/LINEAR	LOG

■ LIN/LOG AMPLIFIER AND CONTROL CIRCUITS (General)

This general discussion covers operation of circuits shown schematically on Service Sheets 11 and 12. The assembly is designed to provide one of two different types of video outputs. Most of the circuit elements are common to both modes of operation.

When the analyzer is operated in the LINEAR mode the Lin/Log amplifier provides a video output which varies in amplitude in direct proportion to the amplitude of the input rf voltage. The CRT display is calibrated in terms of volts (mV or μV).

When the analyzer is operated in the LOG mode the output video signal has a logarithmic relationship to the input rf signal. The CRT display is calibrated in terms of power (dBm).

■ EMITTER FOLLOWER INPUT STAGE Q24

Emitter follower Q24 provides a high impedance input which prevents loading the output of the crystal filter assembly and also provides isolation between the input and the first Lin/Log amplifier.

TEST PROCEDURE ■

With a 30 MHz, -60 dBm signal from the HP 608F connected to the analyzer RF INPUT, connect the HP 8405A to TP A (Q24-e), and tune the analyzer frequency for maximum meter deflection with the LOG REF LEVEL control set to -60 dBm.

Typical meter reading is 608 mV rms. If correct reading is obtained, proceed to step ■.

If correct reading is not obtained, check Q24 and associated components. If Q24 and associated components check good and signal is still not present, check Q25 (see step ■).

■ LIN/LOG AMPLIFIERS IN LOG MODE

When the analyzer is operated in the LOG mode the Lin/Log amplifier has eight cascaded amplifier stages. The first seven amplifiers consist of a differential amplifier followed by an emitter follower. The output of the eighth differential amplifier is applied to the summing amplifier Q26 (see step ■ on Service Sheet 12).

Operation of the first seven cascaded amplifier stages is identical, so only the first stage will be described. The output of the differential amplifier is split and applied to the emitter follower and, at a much lower level, to the base of the output half of the differential amplifier in the following stage. A 100 ohm resistor (R5) from the low level signal path to ground prevents parasitic oscillation. The emitter follower output of each stage provides the input signal to the following stage and signal currents to the summing bus.

The logarithmic relationship of the output signal to the input signal is provided by controlled limiting and saturation (in 10 dB steps) of the eight amplifiers in reverse order. A relatively low level signal (approximately -70 dBm) will saturate the last amplifier stage. An increase of 10 dB in the input signal will cause the seventh stage to saturate. Preceding amplifier stages saturate at each 10 dB increase in the rf input. Finally the first amplifier saturates when the input signal is equal to the LOG REF LEVEL control setting as referenced to the lit index light.

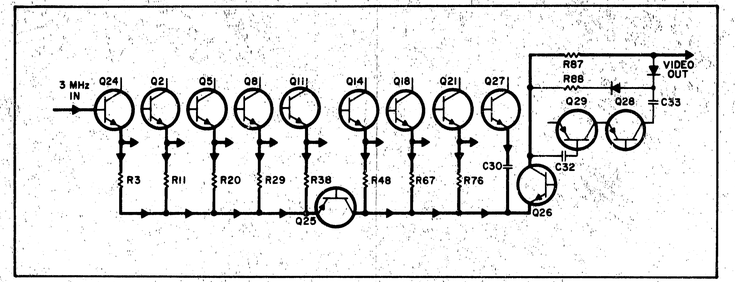


Figure 8-34. Simplified Diagram — Log Mode of Operation

The gain of each stage is 9 dB. When the last stage is saturated the total output of the eight stages consists of the output of the last stage plus the summing bus currents from all preceding stages. As preceding stages saturate each supplies a maximum of 3 mA to the summing bus. This corresponds to a a 10 dB increase in power input. In this manner, the combination of sequential amplifier limiting and current summing provides amplitude compression to force the output signal to remain logarithmically proportional to the input signal.

The simplified diagram above shows signal paths and major circuit components.

TEST PROCEDURE ■

Connect the output of the HP 608F to the analyzer RF INPUT and adjust the signal generator for a 30 MHz, -60 dBm signal. Connect the HP 8405A to TP 1, set the analyzer LOG REF LEVEL control to -30 dBm, and tune the analyzer frequency for maximum signal level on the HP 8405A. Typical level is 58 mV rms.

If the signal is not present check Q23, Q1, Q2 and associated components.

If the correct signal is present, disconnect the HP 8405A and connect it to TP B (Q26-c Service Sheet 12). Rotate the LOG REF LEVEL control and observe the meter readings. Note that readings change by approximately 6 mV rms at adjacent steps.

If readings are correct, the Log portion of the Lin/Log amplifiers and the summing circuits are functioning properly.

If the readings are not correct isolate the defective stage by checking the signal level at TP2, TP3, etc. until the defective stage is found. After repairs are made, repeat the test.

If correct readings are obtained, proceed to step ■.
If not, proceed to following steps on Service Sheets 11 and 12 and repeat this step after repairs are made.

■ SUMMING AND ISOLATION AMPLIFIERS

Q25 sums the output current from the input emitter follower and the output currents from the first four stages of the Lin/Log amplifier. It also provides isolation between the first four Lin/Log stages and following circuits.

Q26 (shown in Service Sheet 12) sums the output from Q25, the output currents from the fifth, sixth and seventh Lin/Log amplifiers and the signal output from the last Lin/Log amplifier. It also provides isolation between the Lin/Log amplifiers and the linear detector.

TEST PROCEDURE ■

Connect the output of the HP 608F to the analyzer RF INPUT and adjust the signal generator for a 30 MHz, -60 dBm signal output. Connect the HP 8405A to TP C (Q25-e), set the analyzer LOG REF LEVEL control to -60 dBm, and tune the analyzer for maximum signal level on the HP 8405A. Typical level is 9 mV rms.

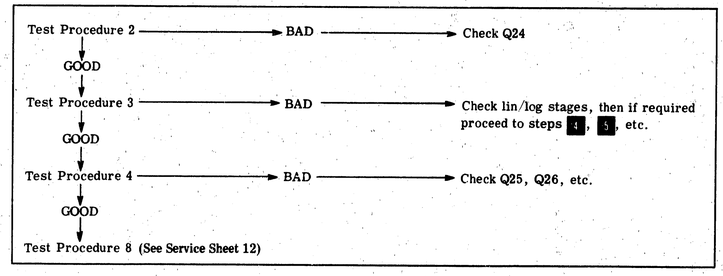
Check the signal level at TP D (Q25-c) with the HP 8405A. Typical level is 33 mV rms.

Check the signal level at TP B (Q26-c Service Sheet 12) with the HP 8405A. Typical level is 50 mV rms.

If correct readings are obtained the summing amplifiers are functioning properly.

If readings are incorrect, check Q25, Q26 and associated components.

Simplified Test Procedure Tree



◀ SERVICE SHEET 10

Figure 8-34. 3 MHz Crystal Filter (Sheet 2 of 2)

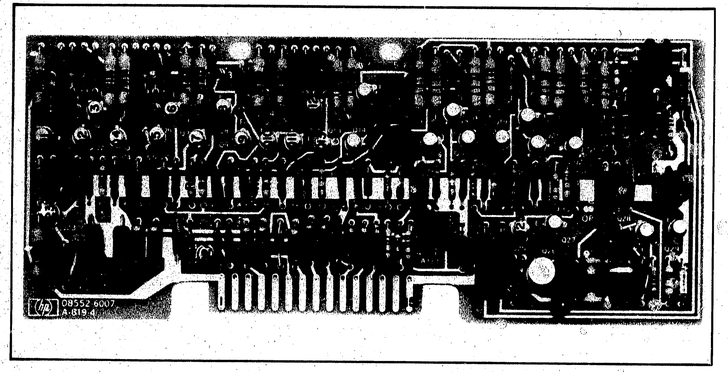
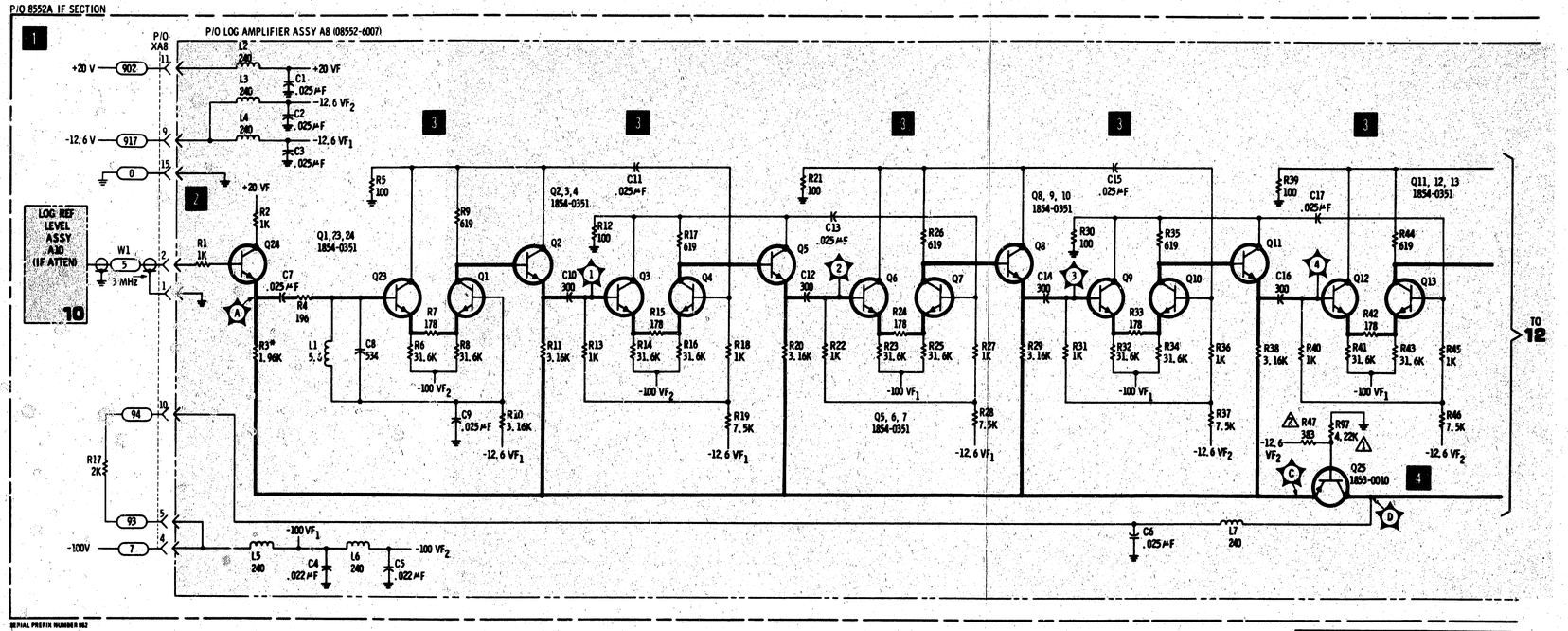


Figure 8-35. P/O Lin/Log Amplifier Assembly A8 Component Identification



NOTES:

⚠1 R97 ADDED SERIAL 844-00340 AND ABOVE

⚠2 R47 IS 100Ω SERIALS 825-00189 AND BELOW

REFERENCE DESIGNATIONS

A8	CHASSIS
C1-17	R17
L1-7	W1
R1-47, 97	XA8
Q1-13, 23-25	

REFERENCE DESIGNATIONS WITHIN OUTLINED (— — —) ASSEMBLIES ARE ABBREVIATED. FULL DESIGNATION INCLUDES ASSEMBLY NUMBER, e.g., R1 OF ASSEMBLY A1 IS A1R1. DESIGNATIONS OF OTHER COMPONENTS ARE COMPLETE AS SHOWN.

11

Figure 8-36. Lin/Log Amplifiers (Sheet 1 of 2)

SERVICE SHEET 12

It is assumed that the 3 MHz signal from the crystal filter and dc operating voltages are present and correct, and that the output signal is not present or is out of tolerance.

TROUBLESHOOTING PROCEDURE

When trouble has been isolated to the Lin/Log amplifier assembly it should be removed from the chassis and reinstalled on the extender board to provide access to components. After repairs the procedures in Paragraphs 5-30 and 5-31 of Section V should be performed.

NOTE

Since parts of the circuit appear on Service Sheet 11, Service Sheets 11 and 12 should be used jointly in troubleshooting the assembly.

EQUIPMENT REQUIRED

Volt-ohm-ammeter	HP 412A
Oscilloscope	HP 180A/1801A/1821A
Digital Voltmeter	HP 3440A/3443A
Service Kit	HP 11592A
Vector Voltmeter	HP 8405A
Signal Generator	HP 608F

CONTROL SETTINGS

Unless otherwise specified in individual tests.

SCAN WIDTH	ZERO
INPUT ATTENUATION	0 dB
SCAN MODE	INT
FREQUENCY	30 MHz
BANDWIDTH	300 kHz
SCAN TRIGGER	LINE

[ ] LIN/LOG AMPLIFIER AND CONTROL CIRCUIT (General)

See Service Sheet 11.

[ ] EMITTER FOLLOWER INPUT STAGE Q24

See Service Sheet 11.

[ ] LIN/LOG AMPLIFIERS IN LINEAR MODE

See Service Sheet 11 for LOG mode.

When the LOG/LINEAR switch is placed in the LINEAR position it accomplishes the following:

a. Supplies -12.6 Vdc to illuminate the (LINEAR) lamp, DS7.

b. Disables the last two log amplifiers by removing their 100 volt source.

c. Provides an added current source to Q15/Q17 to prevent the stage from saturating.

d. Enables Q16, the linear scale factor amplifier.

Operation of the Lin/Log amplifiers for those stages ahead of Q15 is identical for LINEAR and LOG modes of operation. The output of current amplifier Q16 is 180 degrees out of phase with the signals in the summing bus and of sufficient amplitude to cancel them. In the LINEAR mode only the Q16 output drives the summing and isolation stage Q26.

Since the analyzer IF amplifier and attenuation are calibrated in 10 dB increments, compensation must be provided to maintain a linear relationship between the input RF signal and the output from the Lin/Log amplifier. The attenuator selector for the linear mode is calibrated in 1/2/10/20 steps so a fixed amount of compensation cannot be used for all steps. When the LINEAR SENSITIVITY control is stepped from 1 to 2, the current gain is 10 dB (approximately 3:1), but only 6 dB (2:1) is required. The surplus gain of 4 dB is subtracted from the gain of Q16 as follows: Diode CR2 is reverse biased by the +20 volts applied through R64 and R65 to effectively remove the ground return from R63. R63 no longer shunts R50 and the total current Q16 can control is deveased for a total variation of 8 dB (from the 14 dB gain level). The current gain of Q16 is thus 2:1, or 6 dB. When the LINEAR SENSITIVITY control is stepped from 2 to 10 the current gain is 10 dB (about 3:1), but 14 dB (5:1) is required. The additional 4 dB gain is provided as follows: A -12.6 Vdc level is applied to the junction of R64/R65 through contacts of the LOG REF LEVEL and INPUT ATTENUATION controls to disable the +20 volts from R65 and forward bias CR2 to connect R63 to signal ground. This decreases the collector load of Q16 and Q16 can deliver more current. Under these conditions the current gain of Q16 is 5:1 or 14 dB.

[ ] TEST PROCEDURE

This test procedure is based on the assumption that step [ ] on Service Sheet 11 has been satisfactorily conducted. Connect the output of the HP 608F (30 MHz, -30 dBm) to the analyzer RF INPUT. Connect the HP 8405A to TP B (Q26-c), set the LOG-LINEAR switch to LINEAR, the LINEAR SENSITIVITY control fully cw, and tune the analyzer for maximum signal level on the HP 8405A. Below are typical levels at various LINEAR SENSITIVITY and RF INPUT levels.

Millivolts/Div						
LINEAR SENSITIVITY	2	1	.2	.1		
RF INPUT level dBm	-30	-30	-40	-50		
Millivolts rms	24	47	78	45		
Microvolts/Div						
LINEAR SENSITIVITY	20	10	2	1	.2	.1
RF INPUT level dBm	-70	-70	-80	-90	-100	-100
Millivolts rms	23	45	70	50	90	108

If correct signal levels are observed, proceed to step [ ]. If not, check Q15/Q17/Q18 and associated components and proceed to steps [ ], [ ] and [ ]. If required. After repairs repeat this test.

[ ] See Service Sheet 11 for information about Q26.

[ ] LINEAR SCALE FACTOR AMPLIFIER Q16

Operation of Q16 is described as part of step [ ].

[ ] TEST PROCEDURE

Connect the output of the HP 608F to the analyzer RF INPUT and adjust the signal generator for a 30 MHz, -80 dBm signal output. Connect the HP 8405A to TP E (Q16-b), set the analyzer LINEAR SENSITIVITY control to 20 μV/DIV, and tune the analyzer for maximum signal level on the HP 8405A. Check the 3 MHz signal level at base and emitter of Q16 with the LINEAR SENSITIVITY control set to 20, 10 and 2 μV/DIV for the typical values shown below.

LINEAR SENSITIVITY	Q16 Base	Q16 Emitter
20 μV/DIV	6 mV rms	4 mV rms
10 μV/DIV	38 mV rms	24 mV rms
2 μV/DIV	70 mV rms	40 mV rms

If correct levels are observed, proceed to step [ ]. If not, check Q16 and associated components, then proceed to step [ ] and if required, step [ ].

[ ] LOG-LINEAR SWITCH

Operation of the LOG-LINEAR switch in the LINEAR mode is discussed in step [ ]. In the LOG mode the switch does the following:

a. Provides a ground return to illuminate the (LOG) lamp DS8.

b. Grounds the emitter of Q16 to disable Q16.

c. Enables the last two Log amplifiers by connecting them to the -100 volt source.

[ ] TEST PROCEDURE

Since there are no active components in the assembly, continuity tests with the HP 412A should readily isolate the defective components.

[ ] LINEAR STEP GAIN CONTROL

These switch sections control the compensation gain steps of Q16 which are necessary to maintain the linear relationship between input rf signal and Lin/Log amplifier output when the analyzer is operated in the LINEAR mode.

[ ] TEST PROCEDURE

Since there are no active components in the assembly, continuity tests with the HP 412A should readily isolate defective components.

[ ] LINEAR DETECTOR

The linear detector includes a high gain amplifier with a high level of negative feedback. The feedback loop ensures that the detected output current is linear in relationship to input current to enhance the accuracy of the calibrated display. The output of Q28 is applied to CR3 and CR4 180 degrees out of phase with the signals applied to CR3 and CR4 by the output of Q26. The result is that positive half cycles from the collector of Q26 are cancelled when the inverted signal from Q28 forward biases CR3. When the Q26 output is negative the inverted signal from Q28 reverse biases CR3 and the negative signal from Q26 becomes the video output. Simultaneously CR4 is forward biased and the result is improved linearity of the output signal.

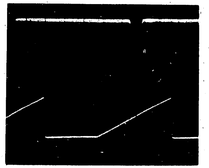
L13/C36 and L14/C37/C38 filter out the rf components of the video output.

[ ] TEST PROCEDURE

Connect the HP 608F set for 30 MHz, -30 dBm to the analyzer RF INPUT. Connect the HP 180A/1801A/1821A Channel A input to TP G (XA8-14) and the Channel B input to the SCAN IN/OUT jack on the front of the analyzer and observe the waveform.

CONTROL SETTINGS:

Oscilloscope:
Channel A:
.02 V/Div
Channel B:
0.5 V/Div
TIME/DIV:
5 msec/div



Analyzer:
SCAN WIDTH: PER DIVISION
PER DIVISION: 20 kHz
BANDWIDTH: 30 kHz
LOG REF LEVEL: -10 dBm
LOG/LINEAR: LOG

If the waveforms are correct the Lin/Log amplifier assembly should be functioning properly. If not, check Q28, Q29, CR3, CR4 and associated components.

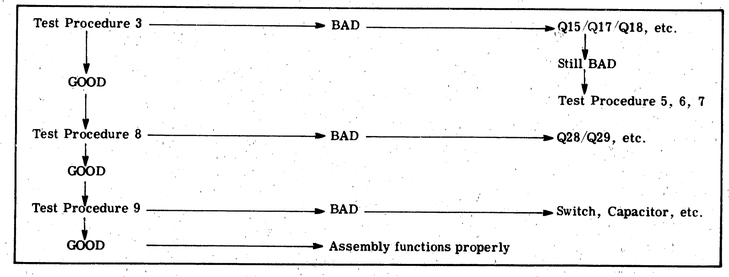
[ ] VIDEO FILTER ASSEMBLY

The video filter switch is a lever type two-pole, three-position switch. The section shown on Service Sheet 12 switches bypass capacitors in the video circuit to bypass signal components down to 10 kHz (0.01 μf) or 100 Hz (1.0 μf). The remainder of the video filter switch assembly is shown on Service Sheet 15.

[ ] TEST PROCEDURE

Use the HP 412A to make point-to-point continuity measurements. Switching the filters into the circuit produces an obvious change in the CRT display. If no change in display occurs when the switch is used, check for an open circuit or faulty capacitor.

Simplified Test Procedure Tree (Cont'd from Service Sheet 11)



SERVICE SHEET 11

Figure 8-36. Lin/Log Amplifiers (Sheet 1 of 2)

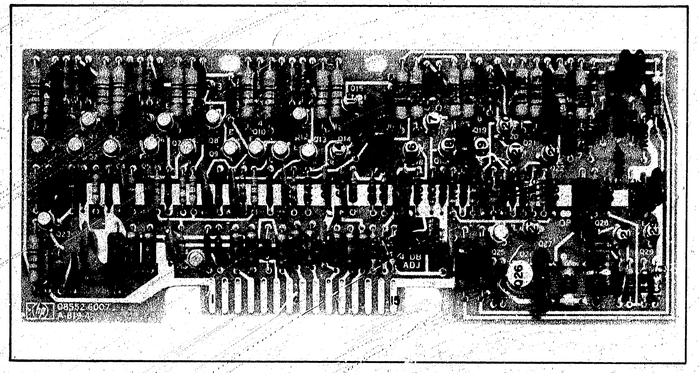


Figure 8-37. P/O Lin/Log Amplifier Assembly A8 Component Identification

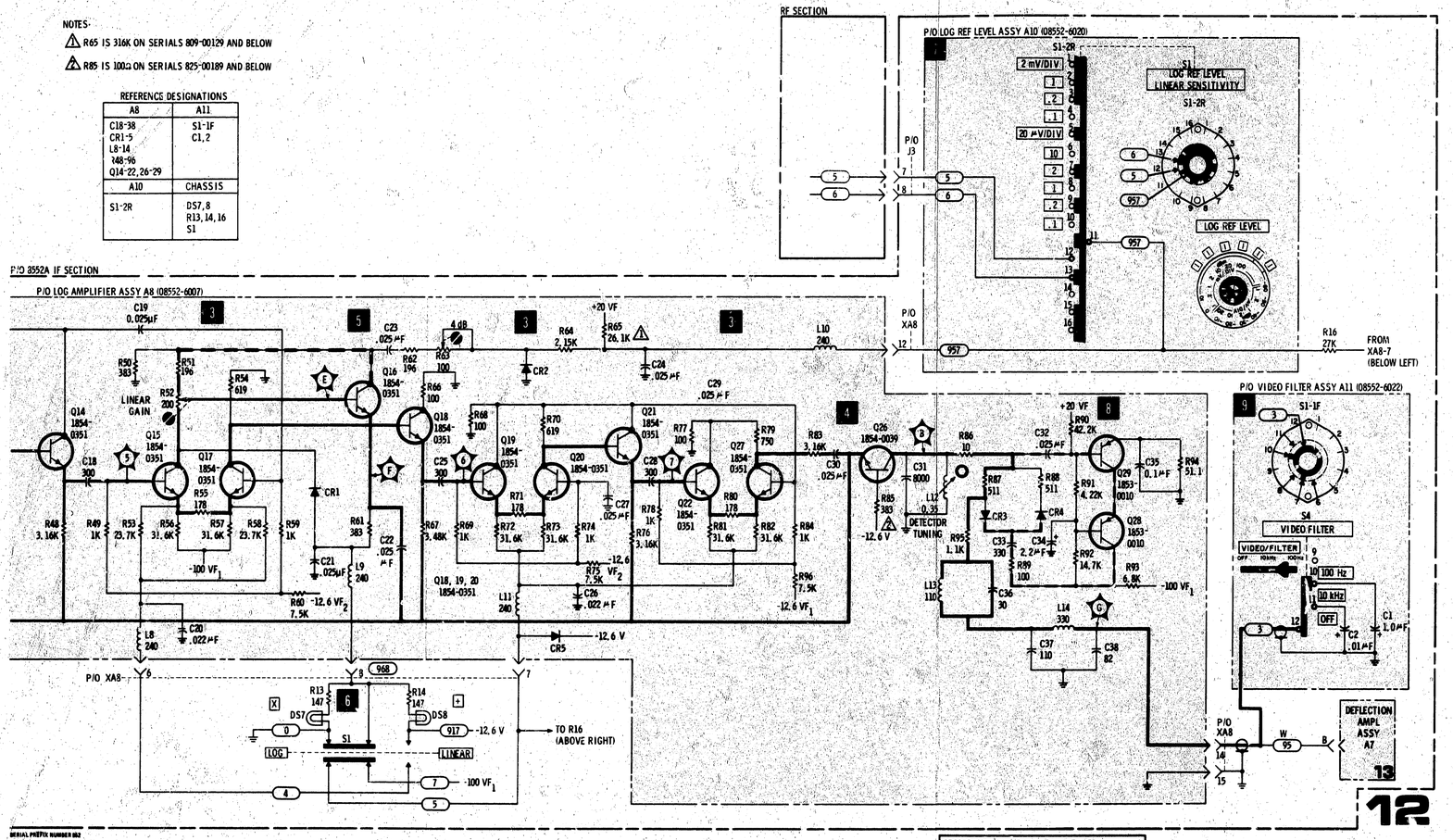


Figure 8-38. Lin/Log Amplifiers (Sheet 2 of 2)

SERVICE SHEET 13

It is assumed that the video signal from the Log/Lin assembly and dc supply voltages are present and correct but that the vertical deflection output signals are not correct.

TROUBLESHOOTING PROCEDURE

When trouble has been isolated to the Deflection Amplifier assembly, the assembly should be removed from the chassis and re-installed using an extender board to provide easy access to components. Test procedures follow the technical discussions of individual circuits.

EQUIPMENT REQUIRED

Service Kit	HP 11592A
Oscilloscope	HP 180A/1801A/1821A
Digital Voltmeter	HP 3440A/3443A

CONTROL SETTINGS
Unless otherwise specified in individual tests.

SCAN WIDTH PER DIVISION	200 kHz
LOG REF LEVEL	-30 dBm
VIDEO FILTER	OFF
SCAN TRIGGER	LINE
INPUT ATTENUATION	0 dB
LOG-LINEAR	LOG
SCAN MODE	INT
SCAN TIME PER DIVISION	2 MILLISECONDS
CAL OUTPUT connected to	RF INPUT
FREQUENCY	30 MHz

■ BLANKING AND BLANKING CONTROL CIRCUITS

Operation of the blanking preamplifier Q12/Q21 is controlled by the scan generator in the INT (internal) mode of operation and by an external source (via J2) in the EXT (external) mode. In the SINGLE mode a -12.6V dc level is applied to the trigger circuit in the scan generator to enable the circuit for one scan only.

Q12/Q21 act as a switch to control the operation of Q11. When Q11 is turned off the CRT is blanked. Blanking is also partially controlled by the baseline clipper and clipper override circuits. See step ■.

TEST PROCEDURE ■

Connect the HP 180A/1801A/1821A to TP A (Q11-e) and observe the waveforms shown in A, B, and C below.

CONTROL SETTINGS:
(Waveform A)

Oscilloscope:
5V/Div
2 msec/Div
10:1 Probe

Analyzer:
BASE LINE
CLIPPER ccw

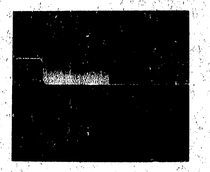
Waveform GOOD: Proceed to waveform B.

Waveform BAD: Check Q11/Q12/Q21 and associated components.

CONTROL SETTINGS:
(Waveform B)

Oscilloscope:
Same as A.

Analyzer:
Same as A except rotate BASE LINE CLIPPER to 10 o'clock

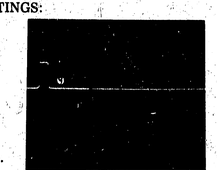


Waveform GOOD or BAD: Proceed to Waveform C.

CONTROL SETTINGS:
(Waveform C)

Oscilloscope:
Same as A.

Analyzer:
Same as above except rotate BALE LINE CLIPPER full cw.



If waveform A was GOOD and B and C were BAD, trouble should be in the baseline clipper circuits.

If correct waveforms were obtained, blanking circuits and the baseline clipper circuit is functioning properly. Proceed to step ■.

■ BASELINE CLIPPER AND CLIPPER OVERRIDE CIRCUITS

Q3/Q13 operates as a comparator in which the video signal is compared to a reference level established by the BASE LINE CLIPPER control and the clipper override circuit.

When R10 is turned fully ccw and marker signals are not present, Q13 conducts heavily and the dc level at the junction of CR5/CR6 reaches approximately +14 volts dc. Under these conditions Q3 cannot conduct and the display CRT is unblanked except when blanking pulses are present.

When the BASE LINE CLIPPER control is turned in a clockwise direction, Q13 conduction decreases, the dc level at the junction of CR5/CR6 decreases, and Q3 conducts when the negative-going deflection pulses are more positive than the established threshold. When Q3 conducts the CRT display is blanked. When a marker signal appears, Q20 inverts the marker and the dc level at the base of Q13 rises. Q13 conduction increases and holds Q3 off while the marker is present regardless of the position of the BASE LINE CLIPPER control.

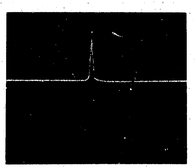
TEST PROCEDURE ■

Operation of the BASE LINE CLIPPER is verified by the test procedure in step ■. To verify operation of the clipper override circuit connect the HP 180A/1801A/1821A to TP B (Q20-c) and observe the waveform.

CONTROL SETTINGS:

Oscilloscope:
Same as step ■ a.

Analyzer:
SCAN WIDTH:
Preset Scan



Rotate the BASE LINE CLIPPER control and observe that marker signal remains regardless of BASE LINE CLIPPER control position.

Waveform GOOD: Clipper override functions properly.

Waveform BAD: Check Q20. (After verifying presence of marker input.)

■ VERTICAL PREAMPLIFIER CIRCUIT

Q6/Q7/Q15/Q16 comprise a variable gain combining amplifier. Vertical gain control R11 directly controls conduction of Q6 and Q7 and establishes the common emitter bias of Q7 and Q15. The gain of Q15/Q16 is thus controlled by Q6/Q7 conduction. Q6 and Q7 also couples the marker signal to Q15 where it is combined with the video pulse from the Log/Lin amplifier assembly. The marker signal is not inverted by Q6/Q7/Q15 and the output of Q15 consists of positive-going video pulses and negative-going marker pulses. Q5 inverts the video signals and supplies negative-going video (positive-going marker pulses) to the baseline clipper comparator and to the vertical deflection power amplifiers. Emitter follower Q17 provides isolation between a front panel VERTICAL OUTPUT and the amplifier circuits.

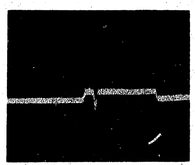
TEST PROCEDURE ■

3-a. Connect the HP 180A/1801A/1821A to TP C (Q15-c) and observe the waveform.

CONTROL SETTINGS:

Oscilloscope:
.01 V/Div
2 msec/Div
1:1 Probes

Analyzer:
Same as basic except frequency 50 MHz



Note positive-going video and negative-going marker pulses. Rotate vertical gain control to verify proper operation.

Waveform GOOD: Proceed to 3-b.

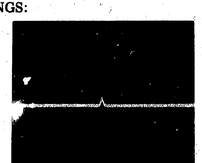
Waveform BAD: Check Q6/Q7/Q15/Q16 and associated components.

3-b. Connect the HP 180A/1801A/1821A to TP D (Q5-c) and observe the waveform.

CONTROL SETTINGS:

Oscilloscope:
0.1 V/Div
2 msec/Div
10:1 Probe

Analyzer:
Same as basic



Waveform GOOD:
Proceed to step ■.

Waveform BAD: Check Q5 and associated components.

■ VERTICAL DEFLECTION POWER AMPLIFIERS

The vertical deflection signals from the vertical preamplifier are dc coupled through VR1 and R34 to output driver stage Q2. VR1 also provides a dc offset level for the vertical signals and Q1 provides a temperature compensation for the voltage control circuit. Q8 inverts the deflection signals to provide negative-going signals at the Q8 collector to drive one of the CRT deflection plates. Q8 also provides a non-inverted signal which is emitter coupled to Q18. Q18 does not invert the signal and it appears at the collector of Q18 as positive-going deflection signals. Thus the signals at the emitters and bases of Q8 and Q18 are in phase and the collector signals are 180 degrees out of phase to provide push-pull deflection. VERTICAL POSITION control R15 controls the vertical position of the CRT trace by controlling the dc level of the pedestal on which the vertical deflection signals are applied to the CRT deflection plates.

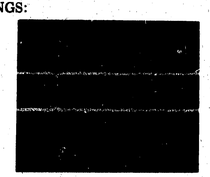
TEST PROCEDURE ■

Connect the HP 180A/1801A/1821A Channel A input to TP E (Q8-c) and the Channel B input to TP F (Q18-c) and observe the waveforms.

CONTROL SETTINGS:

Oscilloscope:
2V/Div
15 msec/Div
10:1 Probe

Analyzer:
5 msec
SCAN TIME



■ HORIZONTAL DEFLECTION AMPLIFIER

Driver stage Q23 inverts the scan ramp and applies it to the base of Q22. Q22 inverts the signal and supplies the positive-going deflection signal. The scan ramp is also emitter coupled to Q14 which supplies the negative-going deflection signal. The signals at the emitters and bases of Q14 and Q22 are in phase but the collector signals are 180 degrees out of phase and provide push-pull deflection signals to the display section to produce the baseline trace on the CRT. Controls are provided to vary the width and position of the CRT baseline trace.

TEST PROCEDURE ■

Connect the HP 180A/1801A/1821A Channel A input to TP G (Q22-c) and the Channel B input to TP H (Q14-c) and observe the waveforms.

Waveform GOOD: Assembly functions properly.

If neither waveform is good, check Q1/Q2/Q8/Q10 and associated components.

If Channel A waveform is good and Channel B waveform is bad, check Q9/Q18/Q19 and associated components.

NOTE

If repairs to the deflection amplifier assembly are required, the FRONT PANEL CHECK PROCEDURE, Paragraph 4-12 of Section IV should be performed.

CONTROL SETTINGS

Oscilloscope:
2V/Div
5 msec/Div
10:1 Probes

Waveform GOOD:
Unit functions properly

Waveform A GOOD and B BAD check Q4/Q14 and associated components.

Both waveforms BAD check Q23/Q22 and associated components.

◀ SERVICE SHEET 12

Figure 8-38. Lin/Log Amplifiers (Sheet 2 of 2)

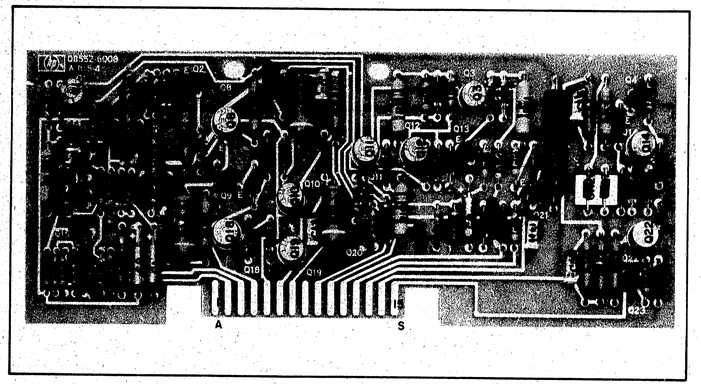


Figure 8-39. Deflection Amplifier Assembly A7 Component Identification

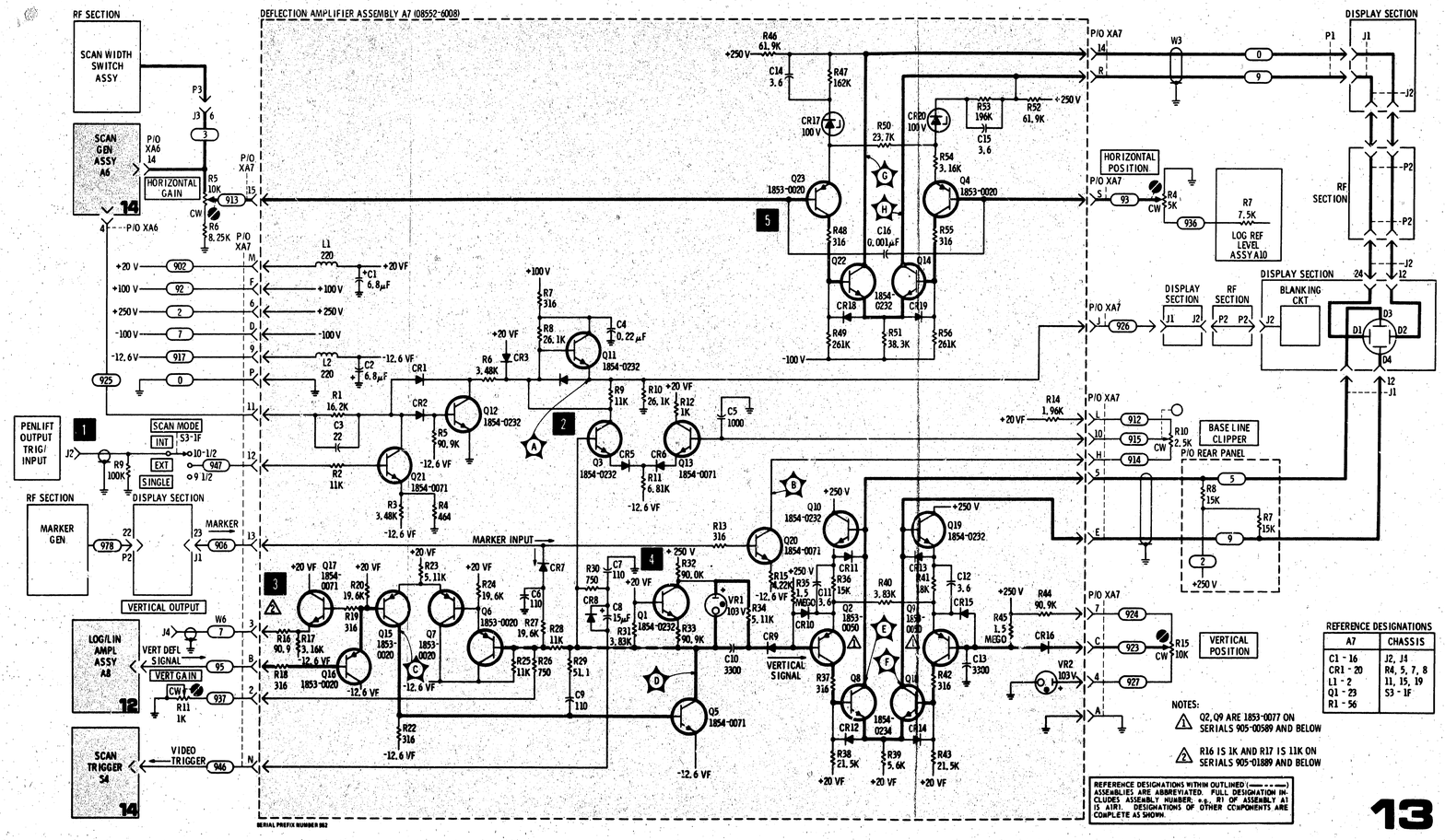


Figure 8-40. Vertical Deflection and Blanking

SERVICE SHEET 14

It is assumed that the scan generator is not being triggered properly and that the correct operating voltages are present.

TROUBLESHOOTING PROCEDURE

When trouble has been isolated to the Scan Generator Assembly A6, it should be removed from the chassis and reinstalled using the extender board to provide easy access to components. Troubleshooting information follows the technical discussion of circuit operation.

NOTE

Some circuits shown on Service Sheet 14 comprise a closed loop. Failure of any of the circuits will result in incorrect waveforms at all test points. However, gain or distortion problems should be easily isolated by observing the waveforms.

EQUIPMENT REQUIRED

Oscilloscope	HP 180A/1801A/1821A
Service Kit	HP 11592A
Volt-ohm-ammeter	HP 412A
Digital Voltmeter	HP 3440A/3443A

CONTROL SETTINGS
Unless otherwise specified in individual tests.

BANDWIDTH	10 kHz
INPUT ATTENUATION	0 dB
CAL OUTPUT connected to	RF INPUT
SCAN WIDTH PER DIVISION	20 kHz
SCAN WIDTH	PER DIVISION
FREQUENCY	30 MHz
SCAN TIME PER DIVISION	2 MILLISECONDS
SCAN TRIGGER	AUTO
SCAN MODE	INT

■ TRIGGER GENERATOR

These circuits control the operation of a flip-flop in the scan generator. When S3 is in the INT (internal) position and S4 is in the AUTO (automatic) position a dc level (-12.6 Vdc) forward biases CR7 to provide an enable signal to the scan generator. The trigger generator Q2/Q3 is passive in this mode and the scan generator cycle is controlled by the scan generator circuits only. With either switch in any other position the -12.6 volts is removed from CR7 and a trigger must be provided to initiate the scan cycle. In the SINGLE scan mode closing the SINGLE pushbutton switch applies the -12.6 volts to the junction of R13 and R14. The abrupt change in the dc level at the junction of R13 and R14 is coupled through C8 to enable the scan generator for one scan only or coupled through C7 to defeat the scan.

When the SCAN MODE switch is in the INT position and the SCAN TRIGGER switch is in the LINE, EXT, or VIDEO positions, Q2/Q3 provides the required triggers to initiate the scan generator cycle. Input triggering to the trigger circuit may be either positive or negative. Input triggers are inverted by Q3 and applied to Q2. Q2 functions as a phase splitter and the output may be taken from collector or emitter. When the input trigger is positive, Q2 is operated as an emitter follower to provide triggers of the right polarity to the scan generator circuit. Q1 disables the trigger circuits during the scan period.

TEST PROCEDURE ■

Connect the HP 180A/1801A/1821A Channel A probe to Q3-base and the Channel B probe to TP 1 and observe the waveforms. If neither waveform is present first check switching, then Q2 circuit.

CONTROL SETTINGS:

Oscilloscope
Channel A:
0.1 V/Div
Channel B:
0.5 V/Div
msec/Div
10:1 probes

Analyzer:
SCAN TRIGGER:
LINE
SCAN MODE:
INT
SCAN TIME PER
DIVISION: 0.1 msec

If the Channel A waveform is correct and Channel B waveform is not, check Q2 circuit. If both waveforms are present and the scan generator is not being triggered check C10 and CR7.

Correct operation of Q2 should be verified by momentarily placing the NORM REV switch in the REV position. The Channel B waveform should be reversed in polarity. (180 degrees out of phase with Channel A). All switch contacts and wiring can be checked with the HP 412A Ohmmeter for continuity after removal of A6 and A7 assemblies.

■ SCAN TIME SWITCH ASSEMBLY WAFERS 1 AND 2

Switch wafer S1-1 (front and rear) and S1-2) are used to select resistive and capacitive components in the ramp generator circuit. These components determine the scan time and the rate of change of the scan ramp voltage. Switch wafer S1-2 rear is used to select a resistor (or resistors) in the delay circuit which determines the time between the end of one scan ramp and the start of the next. The CRT display is blanked for the duration of the delay period.

TEST PROCEDURE ■

Switch contact, wiring, and component malfunctions may be readily detected by removing the scan generator assembly and making point-to-point measurements with the HP 412A ohmmeter. While an ohmmeter cannot measure capacitor values, observing meter deflection will normally reveal shorted or open capacitors when such capacitors are values such as used in this circuit.

■ CONSTANT CURRENT SOURCE Q6

The current available at the collector of Q6 charges a capacitor selected by switch section S1-1F at a rate determined by resistive components selected by switch sections S1-1R and S1-2F.

TEST PROCEDURE ■

Use the HP 3440A/3443A to measure the emitter and base voltages of Q6. At scan times of 10, 5 and 2 seconds the emitter should be at approximately +19.3 volts and the base should be at approximately +18.7 volts. At other scan time settings the readings should be +12.8 volts and +12.2 volts (approximately) for emitter and base respectively.

If correct readings are not obtained check Q6 and associated components.

1 RAMP AMPLIFIER AND RAMP LEVEL DETECTOR CIRCUITS

U1 is a low gain linear amplifier. The high input impedance of the circuit prevents loading of the constant current source, Q6. The output ramp voltage is applied to the SCAN MODE switch. The output ramp from U1 also turns on transistor switch Q7 when the ramp voltage reaches a point high enough to overcome the voltage breakdown point of zener diode CR15 through the base-emitter junction of Q7. When Q7 conducts it turns on Q8 to turn off Q10 in the reset circuit.

TEST PROCEDURE 1

4-a. Connect the HP 180A/1801A/1821A Channel A probe to TP 3 and the Channel B probe to TP 4 and observe the waveforms.

CONTROL SETTINGS:

Oscilloscope:
0.5 V/Div
5 msec/Div
10:1 probes

Analyzer:
SCAN TIME
PER DIVISION:
0.5 msec

Waveform GOOD:
Proceed to 4-b.

Waveform BAD: Check U1 and associated components.

4-b. Connect the oscilloscope Channel A probe to Q7 base and the Channel B probe to TP 5 and observe the waveforms.

CONTROL SETTINGS:

Same as 4-a except
SCAN TIME
PER DIVISION:
2 msec

Waveform GOOD:
Proceed to step 5

Waveform BAD:
Check Q7/Q8 and
associated
components

5 SWEEP RESET CIRCUIT

During the scan period of the scan generator Q10, Q11 and Q14 are all conducting. When the ramp level detector produces positive pulses they turn off Q10. When Q10 stops conducting Q14 and Q11 are also cut off. When Q14 is cut off flip-flop Q15/Q16 changes state (see step 6) which in turn operates the ramp discharge switch (see step 4) to end the scan cycle.

When Q10, Q11 and Q14 are turned off by the trigger from the level detector the Q11 collector voltage level rises in a positive direction and is ac coupled through C11 to hold off Q10. Q10 is held off for a period of time determined by the time constant of C11 and resistor (or resistors) selected by S1-2R. During the delay period the ramp capacitor is discharged and the display CRT is blanked.

TEST PROCEDURE 5

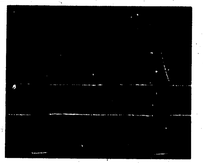
Connect the HP 180A/1801A/1821A Channel A probe to TP 5 and the channel B probe to Q14-c and observe the waveforms.

◀SERVICE SHEET 13

Figure 8-40. Deflection and Blanking

CONTROL SETTINGS:
Same as 4-b.

Waveform A GOOD
& B BAD, check
Q10/Q11/Q14 and
associated
components.
Both waveforms
GOOD, proceed
to step 6



6 SCAN CONTROL FLIP-FLOP

Scan control flip-flop Q15/Q16 controls the ramp discharge switch Q9/Q13 to initiate and end each scan cycle. The scan cycle is ended when the state of Q15/Q16 is changed by Q14 cutting off. The time delay of the reset circuit as mentioned in step 5 is controlled by R/C selection. However, the scan cycle is not necessarily initiated when the reset delay is ended. When the analyzer is operated in the AUTO scan trigger mode the flip flop returns to the scan mode when the reset delay ends because a negative dc level is applied to the base of Q16 from the trigger generator. When the analyzer is operated in the LINE, EXT, or VIDEO scan trigger modes Q15/Q16 initiates the scan cycle on receipt of the first trigger after the end of the reset delay period.

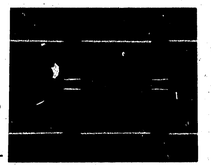
When Q15/Q16 is in the scan state (Q16 off — Q15 on) Q12 is on (see step 4) and Q9/Q13 are off (see step 4). Between scans when Q16 is on and Q15 is off, Q12 is off and the positive dc level at the collector of Q15 provides blanking to the display CRT and turns on ramp discharge switch Q9/Q13.

TEST PROCEDURE 6

Connect the HP 180A/1801A/1821A Channel A probe to Q14-collector and Channel B probe to TP 2 and observe the waveforms.

CONTROL SETTINGS:

Oscilloscope:
0.5V/Div
10 msec/Div
10:1 probes



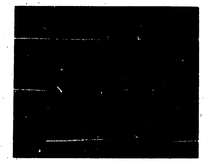
Analyzer:
SCAN MODE to INT
SCAN TRIGGER to
AUTO
SCAN TIME PER DI-
VISION to 2 msec

Waveform 6-a GOOD:
Check waveform 6-b.

Waveform 6-a BAD:
Check Q15/Q16 and
associated
components

Set SCAN TRIGGER to LINE and observe waveform 6-b.

Waveform 6b
GOOD:
Proceed to
step 4



Waveform 6-b
BAD:
Check Q15/Q16
circuit and verify trigger generator operation.

4 RAMP DISCHARGE SWITCH

When Q15/Q16 is in the rest state (Q15 off), Q9 and Q13 are both conducting and the ramp capacitor discharges through Q9. When Q15/Q16 returns to the scan state Q9 and Q13 are turned off and the ramp capacitor begins to charge and provide the ramp signal to the ramp amplifier.

TEST PROCEDURE 4

Connect the HP 180A/1801A/1821A Channel A probe to TP 2 and the Channel B probe to TP 3 and observe the waveforms.

CONTROL SETTINGS:
Same as 6-b.

Waveform GOOD:
Assembly functions properly

Waveform BAD:
Check Q9/Q13
and associated
components

3 SCANNING LAMP DRIVER

When Q15 in the scan control flip-flop is on, the bias developed across R12 turns on Q12 to light the scanning lamp DS9.

TEST PROCEDURE 3

If the CRT display is normal and the scanning lamp is inoperative, check the lamp DS9, Q12 and the input from the A5 power supply.

2 SCAN RAMP AMPLIFIER

The scan ramp amplifier, U1, accepts the output of the ramp generator or an externally generated ramp and provides a 10 volt peak-to-peak (-5V to +5V) ramp for use in the horizontal deflection amplifier and the scan circuits. Adjustment of R49 5V Adj establishes a -5 volt dc level at the SCAN IN/OUT jack when an external ramp generator is used.

SERVICE INFORMATION

CON'T

TEST PROCEDURE 9

Connect the HP 180A/1801A/1821A Channel A probe to Pin P-XA6 and the Channel B probe to Pin 14-XA6 and observe waveforms:

CONTROL SETTINGS:

Oscilloscope:
0.5 V/Div
5 msec/Div
10:1 probes

Analyzer:
SCAN MODE:
INT
SCAN TRIGGER:
AUTO
SCAN TIME
PER DIVISION:
2 msec

Waveforms GOOD: Proceed to Service Sheet 13.

Waveform A GOOD and B BAD: Check U1 and associated components.

Both waveforms BAD: Verify signal at TP-4 and check switching.

10 PENLIFT CIRCUIT

Q4 and Q5 are off during the scan cycle. At the end of the scan cycle Q4 and Q5 turn on providing a current path for the penlift coil in the recorder. When Q4 and Q5 turn off, CR8 and CR9 prevent the counter EMF voltage from the penlift coil from damaging Q5. Penlift output is provided in the following SCAN TRIGGER modes: AUTO, LINE and VIDEO. In the EXT mode a 2 to 20 volt trigger input is required. Penlift output is provided in the following scan modes: INTERNAL, with AUTO, LINE, and VIDEO scan triggers. SINGLE, regardless of SCAN TRIGGER settings. In the EXT scan mode a -1.5 volt input is required to blank the CRT.

TEST PROCEDURE 10

Connect the HP 180A/1801A/1821A Channel A to the PENLIFT output and observe waveform.

CONTROL SETTINGS:

Oscilloscope:
5V/Div
1 msec

Analyzer:
SCAN MODE : INT
SCAN TRIGGER:
AUTO
SCAN TIME
PER DIVISION:
0.2 msec

Waveform BAD:
Check Q4 and Q5.

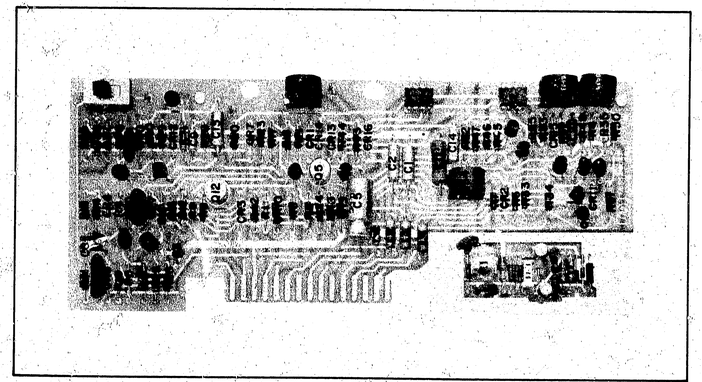


Figure 8-41. P/O Scan Generator Assembly A6 Component Locations

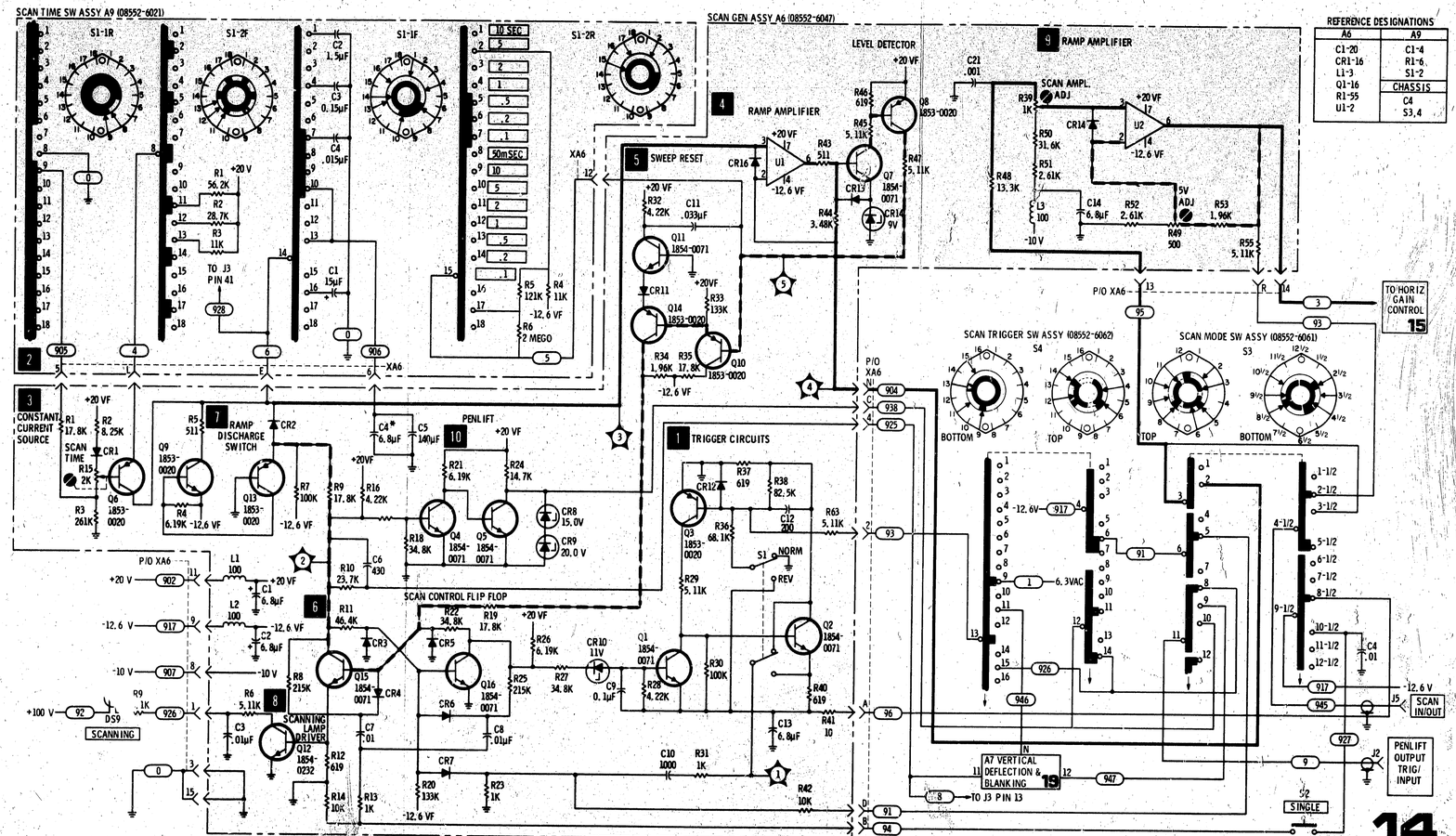


Figure 8-42. Scan Generator Assembly A6 08552-6047

SERVICE SHEET 15

It is assumed that the DISPLAY UNCAL lamp is operating erratically or not at all and that the adjustment procedure in Paragraph 5-41 of Section V will not correct the problem.

TROUBLESHOOTING PROCEDURE

When a malfunction has been isolated to the analogic light driver or switching matrix, the Power Supply Assembly should be removed and reinstalled using the extender board to provide access to components in the light driver circuit.

EQUIPMENT REQUIRED

Service Kit . . . . . HP 11592A
Digital Voltmeter . . . . . HP 3440A/3443A

■ ANALOGIC THRESHOLD AND LIGHT DRIVER CIRCUIT

The RF Section DISPLAY UNCAL light illuminates when the SCAN WIDTH, BANDWIDTH, IF Section SCAN TIME PER DIVISION and VIDEO FILTER switches are set at any combination of positions which do not permit accurate calibration of the analyzer. The DISPLAY UNCAL lamp is caused to illuminate by a simulated signal and has no actual connection to the signal processing circuits.

The SCAN TIME switch, the SCAN WIDTH switch, BANDWIDTH switch, and VIDEO FILTER switch all have wafers that are devoted exclusively to the analogic function. These switches control resistive networks that are connected from the -10 Vdc supply to the inputs of the analogic threshold and light driver circuit. In the SCAN WIDTH PER DIVISION mode of operation, these resistive networks are in parallel. At any time that the total resistance between the -10 Vdc supply and either input to the analogic circuit is low enough to bias Q20 or Q23 into conduction the light driver is enabled.

In the preset mode of operation only the SCAN TIME PER DIVISION switch and the VIDEO FILTER switch control the analogic circuit.

In the ZERO scan mode the analogic circuit is inoperative. (The VIDEO FILTER switch is still in the circuit but cannot, by itself, bias Q20 into conduction.)

TEST PROCEDURE ■

1-a. Connect the HP 3440A/3443A to TP A (Q20-b) and set the analyzer controls as follows:

SCAN WIDTH . . . . . PER DIVISION
BANDWIDTH . . . . . 10 kHz
VIDEO FILTER . . . . . OFF
SCAN WIDTH PER DIVISION . . . . . 20 kHz
SCAN TIME PER DIVISION . 1 MILLISECOND

The voltmeter should read about +580 mVdc - DISPLAY UNCAL lamp off.

Place VIDEO FILTER switch in 10 kHz position. Meter should read about -600 mVdc — DISPLAY UNCAL remains on. Return VIDEO FILTER switch to OFF. Meter reads about +580 mVdc — DISPLAY UNCAL lamp off.

Place SCAN TIME PER DIVISION switch in 0.5 MILLISECONDS position. Meter should read about -2.4 volts — DISPLAY UNCAL on.

If meter readings are correct but DISPLAY UNCAL does not illuminate, check DS1, Q18, Q20, Q22, and associated components.

If voltages are incorrect check switches, resistors, wiring, CR30, Q20, etc.

1-b. Connect the HP 3440A/3443A to TP B (Q25-b) and set the Analyzer controls as initially set in test 1-a. Meter should read about +165 mVdc.

Place VIDEO FILTER switch in the 10 kHz position. Meter should read about +50 mVdc — DISPLAY UNCAL on.

Place VIDEO FILTER switch in the 100 Hz position. Meter should read about -40 mVdc — DISPLAY UNCAL on. Return VIDEO FILTER switch to OFF. Meter reads about +165 mVdc — DISPLAY UNCAL off.

Place SCAN TIME PER DIVISION switch to 0.5 MILLISECONDS. Meter should read about -1.4 volts — DISPLAY UNCAL on. Return SCAN TIME PER DIVISION switch to 1 MILLISECOND. DISPLAY UNCAL off — meter reads about +165 mVdc.

Place BANDWIDTH switch to 3 kHz position. Meter reads approximately -58 mVdc — DISPLAY UNCAL on. Return BANDWIDTH switch to 10 kHz position. DISPLAY UNCAL off — meter reads about +165 mVdc.

If readings are correct but DISPLAY UNCAL does not illuminate, check Q23, DS1 and associated components.

If readings are incorrect check switches, resistors, wiring, etc.

NOTE

A further aid to troubleshooting is Table 5-5 of Section V. Using the table in conjunction with the schematic should aid in localizing cause of malfunction to specific components.

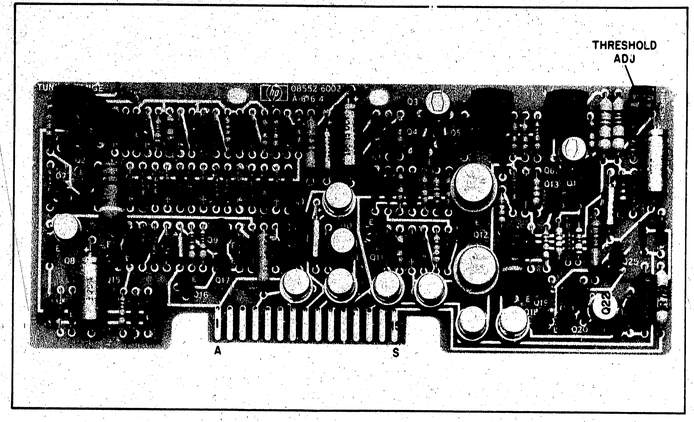
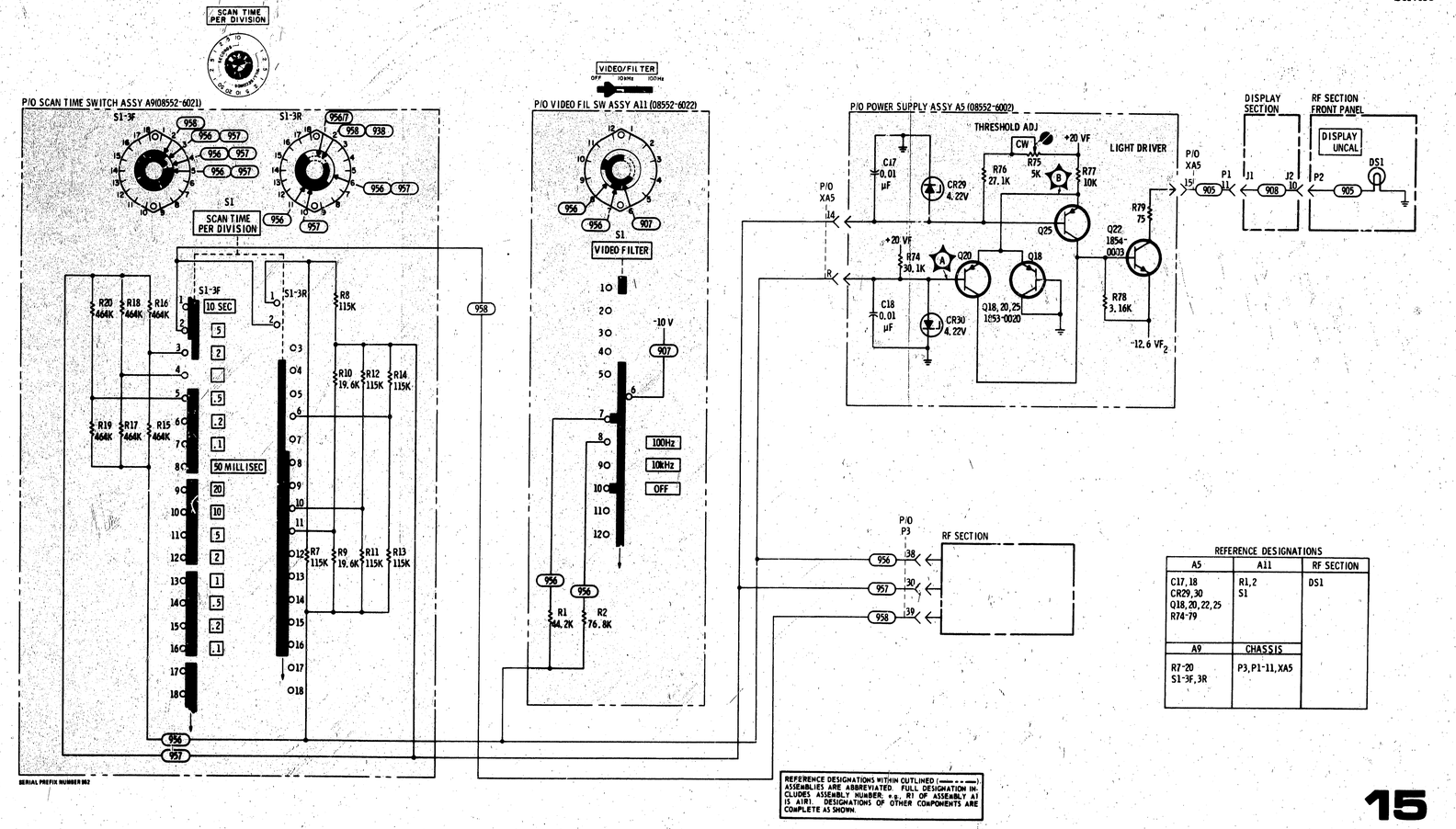


Figure 8-43. P/O Power Supply A5 Test Points and Component Locations



REFERENCE DESIGNATIONS

A5	A11	RF SECTION
C17, 18 CR29, 30 Q18, 20, 22, 25 R74-79	R1, 2 S1	DS1
A9	**CHASSIS**	
R7-20 S1-3F, 3R	P3, P1-11, XA5	

Figure 8-44. Analogic Switching Matrix

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It is assumed that the 30 MHz signal at the CAL OUTPUT jack is out of tolerance (and cannot be brought into tolerance by performing procedures specified in Para. 5-40 of Section V) or missing.

TROUBLESHOOTING PROCEDURE

When it has been determined that the 30 MHz CAL OUTPUT signal is out of tolerance or missing the Scan Generator Assembly A6 should be removed from the frame and reinstalled on the extender board to provide access to components.

EQUIPMENT REQUIRED

Vector Voltmeter	HP 8405A
50-ohm Tee	HP 11536A
Frequency Counter	HP 5245L/5251A
Service Kit	HP 11592A

CONTROL SETTINGS

Any

■ INDEX LIGHT SELECTOR WAFER

Index light selection wafer on the RF Section INPUT ATTENUATION control selects the index light associated with the LOG REF LEVEL/ LINEAR SENSITIVITY control in the analyzer IF Section. In LOG mode, the selected index lamp is opposite the scale factor on the LOG REF LEVEL control that corresponds to full-scale deflection on the display. In LINEAR mode, the selected index light is opposite the LINEAR SENSITIVITY volts per division scale factor. Lights DS1 through DS6 provide a moveable index point, positioned by the RF Section INPUT ATTENUATION control, thus the analyzer's amplitude calibration is maintained for any INPUT ATTENUATION control setting.

■ LINEAR AMPLIFIER COMPENSATION SELECTOR S1-R1

RF connections to pin 7 and 8 are part of an amplifier compensation programming circuit for 10 dB steps of INPUT ATTENUATION control when the analyzer is operated in the LINEAR mode. Refer to Service Sheet 12 for detailed circuit description.

■ 30 MHz CALIBRATION OSCILLATOR

Q17/Q18 and associated components comprise a simple multivibrator designed to provide a 30 MHz, -30 dBm signal for use in calibrating the analyzer. The harmonics are also used in checking the analyzer.

TEST PROCEDURE ■

Use the 50-ohm Tee to connect the HP 8405A and the HP 5245L/5251A to the CAL OUTPUT jack on the front panel of the analyzer.

Instruments should indicate 30 MHz ±0.3 MHz and -30 dBm ±0.3 dBm.*

If indications are correct, the assembly is functioning properly.

If indications are incorrect, check Q17/Q18 and associated components and repeat test after repairing circuit.

---

*Since the basic accuracy of the HP 8405A Vector Voltmeter is of the same order of magnitude as the desired 30 MHz Calibrator amplitude accuracy, amplitude calibration of the HP 8405A Vector Voltmeter at 30 MHz should be known in order to assure a valid measurement.

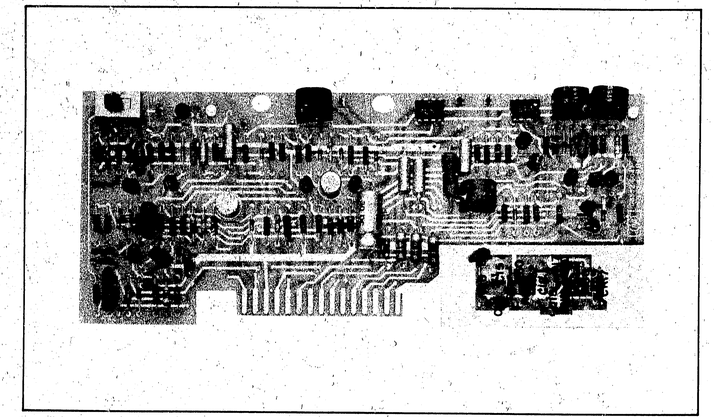
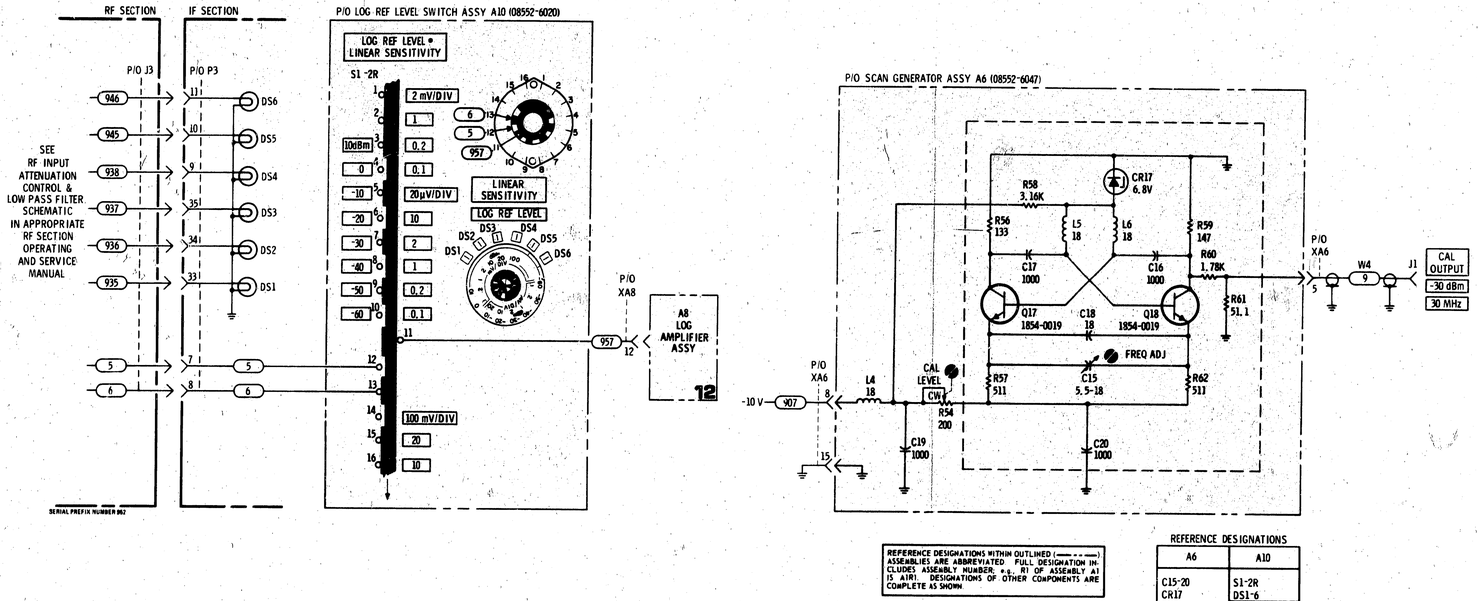


Figure 8-45. P/O Scan Generator Assembly A6 Component Identification



REFERENCE DESIGNATIONS WITHIN OUTLINED (— — —) ASSEMBLIES ARE ABBREVIATED. FULL DESIGNATION INCLUDES ASSEMBLY NUMBER, e.g., R1 OF ASSEMBLY A1 IS A1R1. DESIGNATIONS OF OTHER COMPONENTS ARE COMPLETE AS SHOWN

REFERENCE DESIGNATIONS

A6	A10
C15-20	S1-2R
CR17	DS1-6
L4-5	CHASSIS:
Q17-18	J1 J3
R54, 56-62	W4 DS1-6

Figure 8-46. 30 MHz Calibration Oscillator

SERVICE SHEET 17.

It is assumed that the -12.6 volt, -100 volt, and +100 volt inputs from the display unit are present and that one or more of the outputs (-12.6 volts, -10 volts, and +20 volts) is missing or out of tolerance.

TROUBLESHOOTING PROCEDURE

When trouble has been isolated to the -10 Vdc or +20 Vdc regulators the Power Supply assembly A5 should be removed from the frame and reinstalled on the extender board to provide access to components.

EQUIPMENT REQUIRED

Digital Voltmeter	HP 3440A/3443A
Volt-ohm-ammeter	HP 412A
Service Kit	HP 11592A

CONTROL SETTINGS

Any

VOLTAGE REGULATOR

The +20 and -10 volt regulators are conventional voltage regulation circuits. In each of them, a voltage divider from the output to ground is used as a sensing circuit to provide one input to a comparison amplifier. The other input to the comparison amplifier is a reference level established by diode clamping circuits.

When the current requirements of the external circuit increases, the regulated output voltage will decrease and cause a reduction in the dc input to the comparison amplifier. The comparison amplifier detects the unbalanced condition between its two inputs and provides an output to change the operating bias of the control amplifier. The control amplifier then causes the series regulator to conduct more heavily, providing more current to the external circuit to allow the voltage to return to the proper level.

The series regulator acts like a variable resistance in series with the power supply output. When the external circuit requires more current (as evidenced by a decrease in output voltage) the series regulator is caused to present less impedance to the current flow.

The Silicon Control Rectifiers CR4 and CR10 act as "crowbar" protectors to protect external circuits in the event of a shorted Series Regulator. Should a series regulator short, the output voltage would be limited only by the output of the rectifier and the current in the external circuit would increase in proportion to the increase in output voltage. When this occurs, the SCR's are turned on and they short out the regulator output voltage. The SCR's remain in conduction until the regulator output voltage has reached zero.

TEST PROCEDURE

Voltage regulators function as a "closed loop." Generally, malfunction of almost any component may affect dc levels at all points in the circuit. For this reason, typical voltage levels would be little, if any, help in servicing the assembly.

The HP 3440A/3443A should be used to check for the presence or absence of dc levels at obvious points. The HP 412A should be used for point-to-point resistance measurements.

Generally, if the output is completely missing or consistently high, the series regulator should be checked first for an open or shorted condition. Also, if voltage is high the SCR crowbar should be checked.

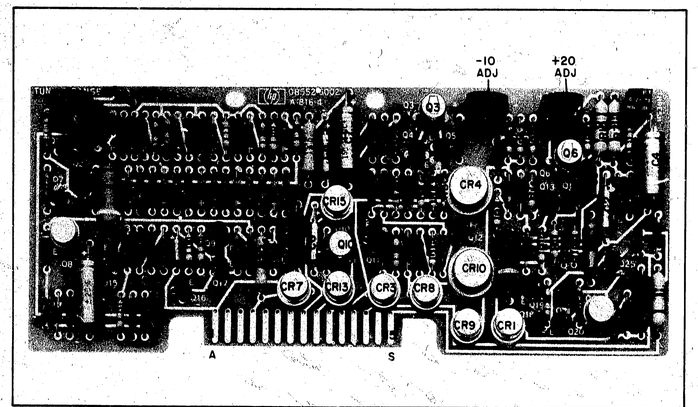
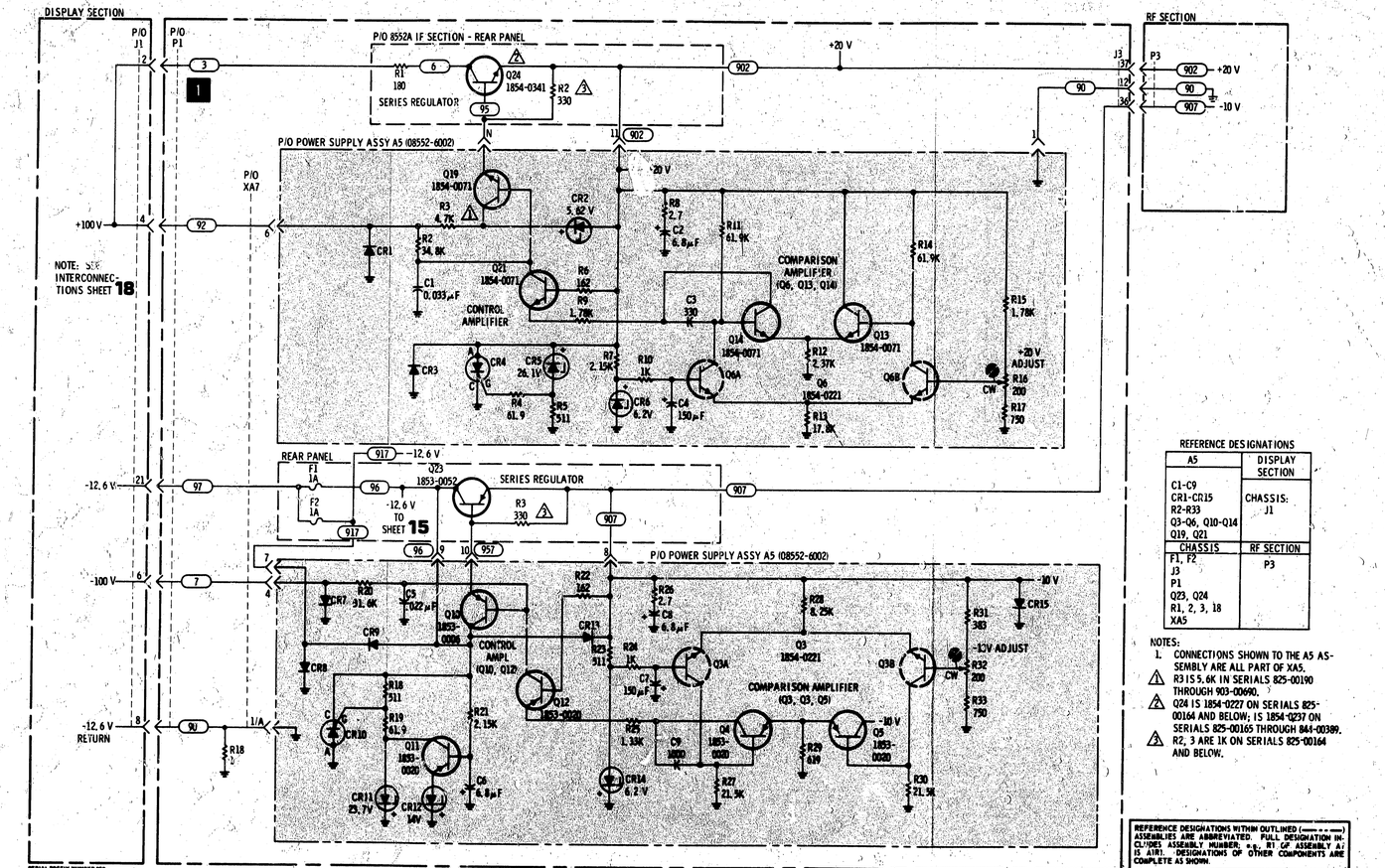


Figure 8-47. P/O Power Supply Assembly A5 Component Identification



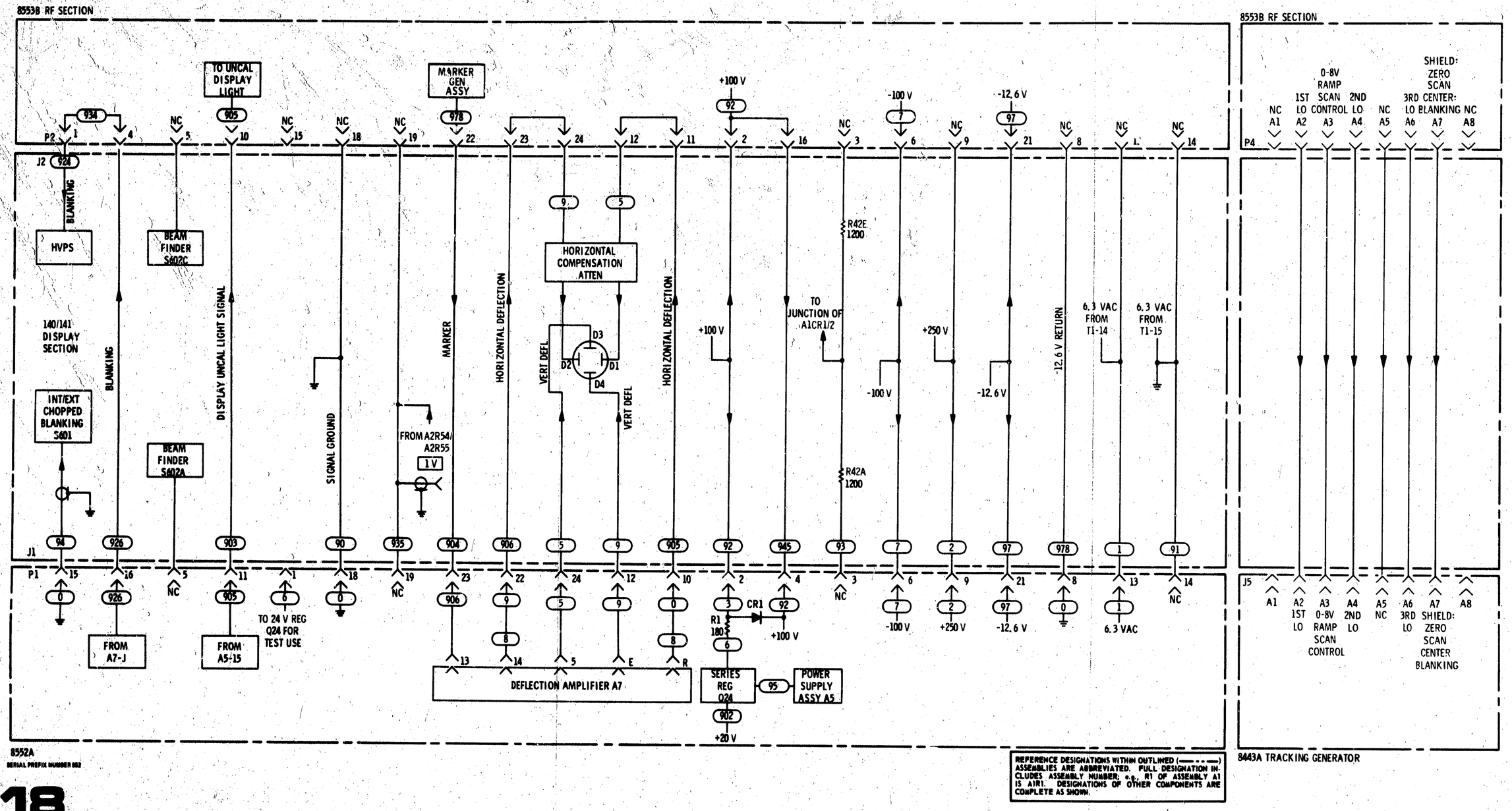
REFERENCE DESIGNATIONS

A5	DISPLAY SECTION
C1-C9 CR1-CR15 R2-R33 Q3-Q6, Q10-Q14 Q19, Q21	CHASSIS: J1
CHASSIS	RF SECTION
F1, F2 J3 P1 Q23, Q24 R1, 2, 3, 18 XA5	P3

NOTES:
1. CONNECTIONS SHOWN TO THE A5 ASSEMBLY ARE ALL PART OF XA5.
⚠1 R3 IS 5.6K IN SERIALS 825-00190 THROUGH 903-00690.
⚠2 Q24 IS 1854-0227 ON SERIALS 825-00164 AND BELOW; IS 1854-0237 ON SERIALS 825-00165 THROUGH 844-00389.
⚠3 R2, 3 ARE 1K ON SERIALS 825-00164 AND BELOW.

REFERENCE DESIGNATIONS WITHIN OUTLINED (— · — · —) ASSEMBLIES ARE ABBREVIATED. FULL DESIGNATION INCLUDES ASSEMBLY NUMBER, e.g., R1 OF ASSEMBLY A7 IS A7R1. DESIGNATIONS OF OTHER COMPONENTS ARE COMPLETE AS SHOWN.

Figure 8-48. Voltage Regulator Circuits



18

SERVICE SHEET 18

Figure 8-49. RF Section/IF Section/Display Section Interconnections

SERVICE SHEET 17

Figure 8-48. Voltage Regulator Circuits

MANUAL CHANGES

MANUAL CHANGES

MANUAL IDENTIFICATION

Model Number: 8552A
Date Printed: May 1970
Part Number: 08552-90023

This supplement contains important information for correcting manual errors and for adapting the manual to instruments containing improvements made after the printing of the manual.

To use this supplement:

Make all ERRATA corrections

Make all appropriate serial number related changes indicated in the tables below.

Serial Prefix or Number	Make Manual Changes
All	ERRATA
952-02695 to 02744	1
952-02745 to -02791	1,2
991-02792 to -02844	1,2,3
991-02845 to -02944	1,2,3,4
991-02945 to -02994	1,2,3,4,5
1101A	1,2,3,4,5,6
1110A03095 to -03294	1–7
1110A03295 to -03544	1–8
1144A03545 to -03594	1–9
1144A03595 to -03694	1–10
1213A	1–11
1220A03795 to -04294	1–12
1220A04295 to -04644	1–13
1352A	1–14
1501A	1–15
1509A04995 to -05044	1–16
1509A05045 thru 1509A05144	1–17
1509A05145 to -05044	1–16
1509A prefix	1–18
1612A	1–19
1649A	1–20
1716A	1–21
2003A05705 to -05754	1–22
2003A05755 to -05884	1–23

Serial Prefix or Number	Make Manual Changes
2143A	1–24
► 2228A	1–25

► NEW ITEM

NOTE

Manual change supplements are revised as often as necessary to keep manuals as current and accurate as possible. Hewlett-Packard recommends that you periodically request the latest edition of this supplement. Free copies are available from all HP offices. When requesting copies quote the manual identification information from your supplement, or the model number and print date from the title page of the manual.

12 JULY 1982
10 Pages Text

Printed in U.S.A.

HEWLETT PACKARD

ERRATA

On title page, under SERIAL PREFIXES:
Change "855-" to "844-".

Page 1-2, Table 1-1, under "Penlift Characteristics" add:
(0 volts pen down).

Page 4-2, Paragraph 4-14, change to read:
"SCAN TIME PER DIVISION.....5 MILLISECONDS".

Pages 4-6, 4-8, and 4-9, paragraphs 4-24, 4-25, and 4-26:
Add the following:

NOTE

Some RF and LF Sections do not use all of the bandwidths provided in the IF Section. See your RF and LF Section manuals to find which bandwidths are used with each input section.

Page 4-8, Paragraph 4-25, change to read as follows:

3. Compute the bandwidth at the -60 dB graticule line (SCAN WIDTH PER DIVISION setting times the number of divisions separating the signal's slopes). Compute the 60 dB/3 dB IF bandwidth ratio using the 3 dB bandwidth found in Paragraph 4-24.

$$\frac{\text{60 dB bandwidth}}{\text{3 dB bandwidth}} < \frac{20}{1} \qquad \text{20:1}$$

4. To check the remaining BANDWIDTH settings, refer to Table 4-3 for control settings and test limits. Compute the 60 dB/3 dB IF bandwidth ratios using the 3 dB bandwidths found in Paragraph 4-24. (NOTE: Table 4-3 is included at the back of this Manual Changes supplement.)

Page 4-13, Table 4-5:
Replace appropriate portion of Table 4-5 with P/O Table 4-5, Paragraph 4-25 (ERRATA), included in this Manual Changes supplement.
Under Paragraph 4-24, change to read:

1 kHz Bandwidth	divisions	1.6	2.4

Page 5-2, Paragraph 5-23:
Change "Table 5-4" to read "Table 5-5".

Page 5-12, Paragraph 5-31:
Change Step 10 to read:
10. With the analyzer power off, remove the A7 Deflection Amplifier Assembly.

At the back of Section V add new Table 5-5 (ERRATA) included in this Manual Changes supplement.

Page 6-1, Table 6-1:
Change A4 Crystal Filter Exchange Board Stock Number to 08552-60066.

Page 6-3, Table 6-3:
Add to A1R7: (FACTORY SELECTED PART; TYPICAL VALUE SHOWN).

Page 6-4, Table 6-3:
Change A1Q1 through A1Q4 to HP Part Number 1854-0404, TRANSISTOR NPN SI TO-18 PD=360MW.
Change A1R16 to HP Part Number 0757-0422, R:FXD MET FLM 909 OHM 1% 1/8W (FACTORY

SELECTED PART; TYPICAL VALUE SHOWN).
Add to A1R25: (FACTORY SELECTED PART; TYPICAL VALUE SHOWN).

Page 6-7, Table 6-3:
Change A2R42 to HP Part Number 0757-0199, R:FXD 21.5K OHM.
Change A2R45 to HP Part Number 0698-0084, R:FXD 2.15K OHM

Page 6-9, Table 6-3:
Change A3A1 "REPLACEMENT" to read "REPAIR".

Page 6-10, Table 6-3:
After A3A2, change "REPLACEMENT" to read "REPAIR".
Change A3A2L1 to HP Part Number 9100-2815, INDUCTOR: FXD 0.70 UH 5%.
Change A3A2Q1 to HP Part Number 1854-0485, Check Digit 7, TRANSISTOR NPN SI TO-104 PD=175MW (Recommended Replacement).

Page 6-17, Table 6-3:
Change A5Q22 to HP Part Number 1854-6037, Check Digit 1, TRANSISTOR NPN 2N2219A SI TO-5 PD=800MW (Recommended Replacement).

Page 6-18, Table 6-3:
Change A5R34 and A5R46 to HP Part Number 0698-8961, R:FXD MET FLM 909K OHM 1% 1/8W (Preferred Replacement).

Page 6-23, Table 6-3:
Change A7Q2 and A7Q9 to HP Part Number 1853-0451, TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW.

Page 6-24, Table 6-3:
Change A7R54 to HP Part Number 0757-0200, Check Digit 7, RESISTOR 5.62K 1% .125W F TC=0+-100.

Page 6-30, Table 6-3:
Change A10R8 to HP Part Number 0757-0440, Check Digit 7, R:FXD MET FLM 7.50K OHM 1% 1/8W (FACTORY SELECTED PART).
Change A10R9 to HP Part Number 0698-3158, Check Digit 4, R:FXD MET FLM 23.7K OHM 1% 1/8W (FACTORY SELECTED PART).

Page 6-31, Table 6-3:
Change J1 to 1250-0102, Check Digit 5, CONNECTOR: BNC, FRONT MOUNTED (P/O W4).

Page 6-32, Table 6-3:
Change W4 to 08552-6027, Check Digit 5, CABLE ASSY: CAL OUTPUT (INCLUDES J1).
Delete all other W4 entries.
Delete 0403-0026, GLIDE: NYLON.
Add 8960-0079, Check Digit 5, PLUG: HOLD NYLON.
Change S3 description to SWITCH ASSY: SCAN TRIGGER.
Change S4 description to SWITCH ASSY: SCAN MODE.

Page 6-34, Table 6-4:
Delete 0683-9145.

Page 6-35, Table 6-4:
Add 0698-8961, R:FXD MET FLM 909K OHM 1% 1/8W.

Page 6-36, Table 6-4:
Change TQ for 0757-0280 to 31.
Change TQ for 0757-0422 to 8.

Page 6-37, Table 6-4:
Delete HP Part Number 1853-0050.
Add HP Part Number 1853-0451, TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW.

Add HP Part Number 1854-0485, TRANSISTOR NPN SI TO-104 PD=175MW.
Add HP Part Number 1854-0637, TRANSISTOR NPN 2N2219A SI TO-5 PD=800MW.

Page 8-2, Paragraph 8-17:
Change "see Table 5-4" to "see Table 5-5".

Page 8-6, Paragraph 8-38:
Change "Figure 8-4" to read "Figure 8-5".

Page 8-23, Figure 8-16:
Change A3A2Q1 to HP Part Number 1854-0485.

Page 8-25, Figure 8-19, SERVICE SHEET 4:
Change the value of A5R34 to 909K.
Change the value of A5R46 to 909K.

Pages 8-30, 8-32, 8-34, and 8-36:
Add the following:

NOTE

Some RF and LF Sections do not use all of the bandwidths provided in the IF Section. See your RF and LF Section manuals to find which bandwidths are used with each input section.

Page 8-31, Figure 8-28, SERVICE SHEET 7:
Change A1R7 to A1R7* (factory selected part).
Change the value of A1R16* to 909.
Change A1R25 to A1R25* (factory selected part).
Move CR9 to between R39 and connection to CR10.
Delete connection between Q6e/L9 and ground.

Page 8-37, Figure 8-33, SERVICE SHEET 10:
Change value of A10R8* to 7.5K.
Change value of A10R9* to 23.7K.

Page 8-43, Figure 8-40, SERVICE SHEET 13:
Change A7Q2 and A7Q9 to HP Part Number 1853-0451.
Add "-12.6" next to A10R7 on Log Ref Level Assembly.
Change value of R54 to 5.62K.

Page 8-45, Figure 8-42:
Replace appropriate sections of SERVICE SHEET 14 with partial schematic Figure 8-42 (ERRATA) included in this Manual Changes supplement.

Page 8-46, step 1, second paragraph:
Change to read:
"Any time the total resistance between the -10 Vdc supply and either input to the analogic circuit is low enough to bias Q20 or Q25 into conduction, the light driver is enabled."

Page 8-47, Figure 8-44:
Change A5Q22 to HP Part Number 1854-0637.

Page 8-49, Figure 8-46, SERVICE SHEET 16:
Change XA6 pin 5 to pin S.

CHANGE 1

Page 6-15, Table 6-3:
Change A4R73 to HP Part Number 0757-0280, Check Digit 3, R:FXD MET FLM 1.0K OHM.

Page 6-35, Table 6-4:
Delete 0757-0274 (entire line)
Add 0757-0280, Check Digit 3, F:FXD MET FLM 1.0K OHM 1% 1/8W.

Page 8-37, Figure 8-33:
Change A4R73 to 1.0K OHM.

CHANGE 2

Page 6-21, Table 6-3:
Change A6R15 to HP Part Number 2100-1760, R:VAR 5K OHM.

Page 6-38, Table 6-4:
Delete 2100-1759 (entire line).
Change 2100-1760 TQ column to 4.

Page 8-45, Figure 8-42:
Change R15 to 5K.

CHANGE 3

At the back of Section V, make the following changes to Table 5-5 (added in ERRATA):
Delete A4R86 (entire file).
Add: (Component) A4R89; (Service Sheet) 10; (Basis of Selection) Crystal filter assy gain adjustment: 100 ohm to 10 kohm.

Pages 6-11 through 6-15, Table 6-3:
Replace A4 parts list with new A4 Replaceable Parts (CHANGE 3) included in this Manual Changes supplement.

Page 8-35:
Replace Figure 8-30 with Figure 8-30 (CHANGE 3) included in this Manual Changes supplement.
Replace Figure 8-31, SERVICE SHEET 9, with Figure 8-31 (CHANGE 3) included in this Manual Changes supplement.

Page 8-37:
Replace Figure 8-32 with Figure 8-32 (CHANGE 3) included in this Manual Changes supplement.
Replace Figure 8-33, SERVICE SHEET 10, with Figure 8-33 (CHANGE 3) included in this Manual Changes supplement.

CHANGE 4

Page 6-11, Table 6-3:
Change A3A2R8 to HP Part Number 0757-0401, Check Digit 0, R:FXD MET FLM 100 OHM.
Change A3A2R10 to HP Part Number 0757-0346, Check Digit 2, R:FXD MET FLM 10 OHM.

Page 6-36, Table 6-4:
Delete 0757-0382 (entire line).
Delete 0757-0399 (entire line).
Change 0757-0346 TQ column to 13.
Change 0757-0401 TQ column to 25.

Page 8-23, Figure 8-16:
Change A3A2R8 to 100 OHM.
Change A3A2R10 to 10 OHM.

CHANGE 5

Page 6-22, Table 6-3:

Change A6U1 and A6U2 to HP Part Number 1826-0013, Check Digit 8.

Page 6-37, Table 6-4:
Delete 1820-0216 (entire line).
Add 1826-0013, Check Digit 8, IC OP AMP.

CHANGE 6

Page 8-41, Figure 8-38, SERVICE SHEET 12:
Replace appropriate portions of schematic with P/O Figure 8-38 (CHANGE 6) included in this Manual Changes supplement. (The white-blue-gray wire connecting XA8-8 to J3-40 is 24 AWG.

CHANGE 7

Pages 6-11 and 6-12, Table 6-3:
Change A4C14, A4C21, A4C24, A4C31, A4C32, A4C34, A4C39 and A4C41 to HP Part Number 0160-3460, C:FXD .05 UF.
Change A4C1, A4C3, A4C5-8, A4C10-13, A4C16-20, A4C22, A4C25-29, A4C33, A4C40, A4C42-44, A4C46-48 and A4C50-52 to HP Part Number 0160-2055, Check Digit 9, C:FXD .01UF.

Page 6-15, Table 6-3:
Change A4R73 to HP Part Number 0757-0280, Check Digit 3, R:FXD 1K OHM.
Change A4R82 to HP Part Number 0757-0200, Check Digit 7, R:FXD 5.62K OHM.

Page 6-23, Table 6-3:
Change A7Q10 and A7Q19 to HP Part Number 1854-0234, Check Digit 4, (TSTR:SI NPN).

Page 6-30, Table 6-3:
Add A10R10, HP Part Number 0757-0001, Check Digit 6, R:FXD MET FLM 13.3 OHM 1% 1/2W.

Page 6-32, Table 6-3:
Change 13 to HP Part Number 0698-3399, Check Digit 5, R:FXD 133 OHM.
Change S1 to HP Part Number 3101-1560, Check Digit 8.

Page 6-33, Table 6-4:
Delete 0160-2917 (entire line).
Change 0160-2930 TQ to read 53.
Add 0160-2055, Check Digit 9, C:FXD CER .01 UF +80-20% 100VDCW.
Add 0160-3460, Check Digit 2, C:FXD CER .05UF +80-20% 100VDCW.

Page 6-35, Table 6-4:
Change 0698-3400 TQ to read 1.
Change 0757-0200 TQ to read 3.
Change 0757-0274 TQ to read 13.
Add 0698-3399, R:FXD MET FLM 133 OHM 1% 1/2W.
Add 0757-0001, Check Digit 6, R:FXD MET FLM 13.3 OHM 1% 1/2W.

Page 6-36, Table 6-4:
Change 0757-0280 TQ to read 33.
Change 0757-0441 TQ to read 3.

Page 8-37, Figure 8-33:
Change A4R73 to 1.0 kohm.
Change A4R82 to 5.62 kohm.

Page 8-41, Figure 8-38, SERVICE SHEET 12:
Replace appropriate portions of schematic with P/O Figure 8-38 (CHANGE 7) included in this Manual Changes supplement (R13 changed and A10R10 added).

CHANGE 8

Page 6-19, Table 6-3:
Add A5Z1, HP Part Number 9170-0016, BEAD: MAGNETIC SHIELDING.

Page 6-23, Table 6-3:
Change A7Q2 and A7Q9 to HP Part Number 1853-0314, Check Digit 9.
Change A7R7 to HP Part Number 0675-6811, Check Digit 4, R:FXD COMP 680 OHM 1% 1/8W.

Page 8-43, Figure 8-40, SERVICE SHEET 13:
Change A7Q2 and Q9 to 1853-0314. Change A4R7 to 680 ohms.

Page 8-51, Figure 8-48, SERVICE SHEET 17:
Place ferrite bead symbol and designator Z1 in base lead of A5Q10.

CHANGE 9

Page 6-32, Table 6-3:
Add 08552-0001, Check Digit 5, FRONT PANEL-LIGHT GRAY.
Add 08552-00032, Check Digit 7, FRONT PANEL-MINT GRAY.
Add 08552-00104, Check Digit 4, PLATE: CONNECTOR-BLACK.
Add 08552-00131, Check Digit 7, PLATE: CONNECTOR-OLIVE BLACK.

CHANGE 10

Pages 6-22 and 6-23, Table 6-3:
Change A7C4 to HP Part Number 0180-0269, Check Digit 5, C:FXD ELECT 1.0 UF 150V.
Change A7R7 to HP Part Number 0675-1021, Check Digit 8, R:FXD MET FLM 1.0K OHM.

Page 8-43, Figure 8-40, SERVICE SHEET 13:
Change A7R7 to 1.0K and A7C4 to 1.0 UF.

CHANGE 11

Page 6-28 and 6-32, Table 6-3:
Add A8R98, HP Part Number 0757-0438, Check Digit 3, R:FXD MET FLM 5.11K OHM 1% 1/8W.
Add W9, HP Part Number 08552-60083, Check Digit 4, CABLE ASSY: 3 MHz.

Page 8-41, Figure 8-38, SERVICE SHEET 12:
Replace appropriate portions of schematic with P/O Figure 8-38 (CHANGE 11) included in this Manual Changes supplement.

CHANGE 12

Page 8-39, Figure 8-35, SERVICE SHEET 11:
Exchange "R8" and "R10" on the photo.

CHANGE 13

Page 6-31, Table 6-3:
Change J1 to 1250-0252, Check Digit 6, CONNECTOR: BNC, REAR MOUNTED (P/O W4).

CHANGE 14

Page 6-16, Table 6-3:
Add A5C19, HP Part Number 0160-2055, Check Digit 9, C:FXD 0.01 UF +80-20% 100WVDC.

Page 6-17, Table 6-3:
Delete A5R18 (entire line).

Page 6-33, Table 6-4:
Add 0160-2055, Check Digit 9, C:FXD 0.01 UF +80-20% 100WVDC.

Page 6-36, Table 6-4:
Change 0757-0416 TQ to 16.

Page 8-51, Figure 8-48, SERVICE SHEET 17:
Change A5R18 to A5C19 .01 UF as shown in P/O Figure 8-48 (CHANGE 14) included in this Manual Changes supplement.
Add A5C19 in REFERENCE DESIGNATIONS table.
Add "Deleted: A5R18" directly under REFERENCE DESIGNATIONS table.

CHANGE 15

Page 6-21, Table 6-3:
Change A6R23 to HP Part Number 0698-0083, Check Digit 8, R:FXD MET FLM 1.96K 1% 1/8W.
Change A6R42 to HP Part Number 0698-3157, Check Digit 3, R:FXD MET FLM 19.6K 1% 1/8W.

Page 8-45, Figure 8-42, SERVICE SHEET 14:
Change value of R23 to 1.96K.
Change value of R42 to 19.6K.

CHANGE 16

Pages 6-3 and 6-4, Table 6-3:
Change A1R7 and A1R25 to HP Part Number 0757-0421, Check Digit 4, R:FXD MET FLM 825 OHM 1% 1/8W.

Page 8-31, Figure 8-28:
Change the value of A1R7 and A1R25 to 825 ohms.

CHANGE 17

Page 6-28, Table 6-3:
Change A9 to HP Part Number 08552-00036, Check Digit 1, DIAL-KNOB ASSY: SCAN TIME.

Page 6-30, Table 6-3:
Change A10 to HP Part Number 08552-00037, Check Digit 2, DIAL-KNOB ABBY: LOG REF FINE.

Page 6-31, Table 6-3:
Change R10 to HP Part Number 08552-00035, Check Digit 0, DIAL-KNOB ASSY: IF LEVEL.

CHANGE 18

Page 6-31, Table 6-3:
Change Q23, SOCKET: TRANSISTOR, to HP Part Number 1200-0569, Check Digit 3.
Change Q24, SOCKET: TRANSISTOR, to HP Part Number 1200-0569, Check Digit 3.

Page 6-37, Table 6-4:
Change 1200-0168 to 1200-0569, Check Digit 3.

Page 6-39, Table 6-4:
Change 08552-0025 TQ to 2.

CHANGE 19

Page 6-22, Table 6-3:
Change A6U1 and A6U2 to HP Part Number 1826-0261, Check Digit 8.

NOTE

The 1826-0261 is a high reliability replacement for the 1826-0013.

Page 6-28, Table 6-3:
Add A8R99, HP Part Number 0698-0084, Check Digit 9, R:FXD MET FLM 2.15K OHM 1% 1/8W.

Page 8-41, Figure 8-38, SERVICE SHEET 12:
Add A8R99, 2.15K, on A8 LOG AMPLIFIER ASSY, between XA8 pin 8 and XA8 pin 9. Connection XA8 pin 9 is on SERVICE SHEET 11.

CHANGE 20

Page 1-6, Table 1-2:
Change Tuning Tool, Slot, Nonmetallic, 2.5-inch shaft HP Part Number 8710-0722.

Page 5-21, Paragraph 5-35:
Under EQUIPMENT, change Tuning Tool HP Part Number to 8710-0772.

Page 6-6, Table 6-3:
Change A2L7 to HP Part Number 08552-80106, Check Digit 4.
Change A2L9 to HP Part Number 08552-80107, Check Digit 5.

Page 6-40, Table 6-4:
Change 08552-6011 to 08552-80106, Check Digit 4.
Change 08552-6012 to 08552-80107, Check Digit 5.

CHANGE 21

Page 6-25, Table 6-3:
Change A8CR5 to HP Part Number 1901-1067, Check Digit 6.
Add A8CR6, HP Part Number 1901-1067, Check Digit 6, DIODE: SILICON.

Page 6-37, Table 6-4:
Add 1901-1067, Check Digit 6, DIODE: SILICON.

Page 8-41, Figure 8-38, SERVICE SHEET 12:
Add A8CR6 in parallel with A8L11 so that anode of A8CR6 is connected to anode of A8CR5 (XA8-pin 7).

CHANGE 22

Page 6-31, Table 6-3:
Change Q24 to HP Part Number 1854-0311, Check Digit 8, TRANSISTOR NPN 2N4240 SI TO-66 PD=35W (Recommended Replacement).

Page 8-51, Figure 8-48:
Change part number of +20V power supply transistor Q24 to 1854-0311 (Recommended Replacement).

CHANGE 23

Page 6-21, Table 6-3:
Change A6R44 to HP Part Number 0698-3154, Check Digit 0, RESISTOR 4.22K 1% .125W F TC=0+-100 (Recommended Replacement).

Page 8-45, Figure 8-42:
Change value of R44 to 4220.

CHANGE 24

Page 6-22, Table 6-3:
Replace entire A7 Replaceable Parts list (A7 through A7U3) with new A7 Replaceable Parts (CHANGE 24) included in this Manual Changes supplement.

Page 8-43, Figure 8-39:
Replace Figure 8-39, Deflection Amplifier A7 Component Identification, with new Figure 8-39 (CHANGE 24) included in this Manual Changes supplement.

Page 8-43, Figure 8-40:
Replace Figure 8-40, Vertical Deflection and Blanking, with new Figure 8-40 (CHANGE 24) included in this Manual Changes supplement.

►CHANGE 25

Page 6-24, Table 6-3:
Change A8 to HP Part Number 08552-60192, Check Digit 6.

Page 8-39, Figure 8-36:
Change part number of LOG AMPLIFIER ASSY A8 to 08552-60192. At lower left of schematic, under -100V line, add new input line: -100VF1, wire 97, pin 3. On-board connection is common to L5 and C4.

Page 8-41, Figure 8-36:
Change part number of LOG AMPLIFIER ASSY A8 to 08552-60192. At bottom of schematic, to left of -100VF1, change wire 7 to wire 97.

Table 4-3. Bandwidth Selectivity Checks (ERRATA)

BANDWIDTH	SCAN WIDTH PER DIVISION	SCAN TIME PER DIVISION	60 dB BANDWIDTH DIVISIONS	RATIO FREQUENCY 60 dB/3 dB BANDWIDTHS
100 kHz	0.5 MHz	50 MILLISECONDS	_____	_____ < 20
30 kHz	0.1 MHz	50 MILLISECONDS	_____	_____ < 20
10 kHz	0.05 MHz	50 MILLISECONDS	_____	_____ < 20
3 kHz	5 kHz	50 MILLISECONDS	_____	_____ < 20
1 kHz	2 kHz	0.1 SECONDS	_____	_____ < 20
0.3 kHz	0.5 kHz	0.2 SECONDS	_____	_____ < 25
0.1 kHz	0.2 kHz	0.2 SECONDS	_____	_____ < 25
.05 kHz	0.2 kHz	0.5 SECONDS	_____	_____ < 25

P/O Table 4-5. Performance Test Check Record (ERRATA)

Para No.	Test Description	Measurement Unit	Min	Actual	Max
4-25.	**Bandwidth Selectivity**				
	Bandwidths	ratio		_____	20:1
	300 kHz	ratio		_____	20:1
	100 kHz	ratio		_____	20:1
	30 kHz	ratio		_____	20:1
	10 kHz	ratio		_____	20:1
	1 kHz	ratio		_____	20:1
	0.3 kHz	ratio		_____	25:1
	0.1 kHz	ratio		_____	25:1
	0.05 kHz	ratio		_____	25:1

Table 5-5. Factory Selected Components (ERRATA)

Component	Service Sheet	Basis of Selection
A1R16	7	Compensates for variations in A1L3 - 6, A1C3, 9, 15 and 21: 750 to 1200 ohms.
A1R38	7	Equalizes gain for 10 - 300 kHz bandwidths.
A3R9	3	50 MHz Converter gain adjustment: 18 to 52 ohms (4 ohm/dB change).
A4R12, 31 and 66	9, 10	3 kHz bandwidth adjustment. 100K ohms to ∞.
A4R82	10	0.3 kHz bandwidth gain adjustment: ± 5K ohms.
A4R86	10	Crystal filter assembly gain adjustment: 880 to 4K ohms.
A5R54 - 63	4	Optimizes exponential tuning voltage curve for 47 MHz LO.
A8R3	11	Optimizes 10 dB gain step: ± 500 ohms.
A10R8, 9	10	Ensures 10 dB/step attenuation: R8 - 6.81 to 16.2K, R9 - 21.5 to 51.1K

A4 Replaceable Parts List (1 of 4) (CHANGE 3)

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr. Part Number
A4	08552-6065	1	Board Assembly: Crystal Filter	28480	08552-6065
A4C1	0160-2930	32	C:FXD Cer 0.01 μF +80 -20% 100 VDCW	91418	TA
A4C2	0180-0116	1	C:FXD Elect 6.8 μF 10% 35 VDCW	56289	150D685X-9035B2-DYS
A4C3	0160-2930		C:FXD Cer 0.01 μF +80 -20% 100 VDCW	91418	TA
A4C4	0180-0291	1	C:FXD Elect 1.0 μF 10% 35 VDCW	56289	150D105X-9035A2-DYS
A4C5—C8	0160-2930		C:FXD Cer 0.01 μF +80 -20% 100 VDCW	91418	TA
A4C9	0121-0059	3	C:VAR Cer 2—8 pF 300 VDCW	28480	0121-0059
A4C10—13	0160-2930		C:FXD Cer 0.01 μF +80 -20% 100 VDCW	91418	TA
A4C14	0160-2917	8	C:FXD Cer 0.05 μF +80 -20% 100 VDCW	84411	Type TA
A4C15	0121-0105	3	C:VAR Cer 9—35 pF NPO	28480	0121-0105
A4C16—20	0160-2930		C:FXD Cer 0.01 μF +80 -20% 100 VDCW	91418	TA
A4C21	0160-2917		C:FXD Cer 0.05 μF +80 -20% 100 VDCW	84411	Type TA
A4C22	0160-2930		C:FXD Cer 0.01 μF +80 -20% 100 VDCW	91418	TA
A4C23	0121-0059		C:VAR Cer 2—8 pF 300 VDCW	28480	0121-0059
A4C24	0160-2917		C:FXD Cer 0.05 μF +80 -20% 100 VDCW	84411	Type TA
A4C25—29	0160-2930		C.FXD Cer 0.01 μF +80 -20% 100 VDCW	91418	TA
A4C30	0121-0105		C:VAR Cer 9—35 pF NPO	28480	0121-0105
A4C31, 32	0160-2917		C:FXD Cer 0.05 μF +80 -20% 100 VDCW	84411	Type TA
A4C33	0160-2930		C:FXD Cer 0.01 μF +80 -20% 100 VDCW	91418	TA
A4C34	0160-2917		C:FXD Cer 0.05 μF +80 -20% 100 VDCW	84411	Type TA
A4C35, 36	0160-2199	2	C:FXD Mica 30 pF 5% 300 VDCW	28480	0160-2199
A4C37	0160-2257	1	C:FXD Cer 10 pF 5% 500 VDCW	72982	301-000-C0H0-100J
A4C38	0121-0059		C:VAR Cer 2--8 pF 300 VDCW	28480	0121-0059
A4C39	0160-2917		C:FXD Cer 0.05 μF +80 -20% 100 VDCW	84411	Type TA
A4C40	0160-2930		C:FXD Cer 0.01 μF +80 -20% 100 VDCW	91418	TA
A4C41	0160-2917		C:FXD Cer 0.05 μF +80 -20% 100 VDCW	84411	Type TA
A4C42—44	0160-2930		C:FXD Cer 0.01 μF +80 -20% 100 VDCW	91418	TA
A4C45	0121-0105		C:VAR Cer 9—35 pF NPO	28480	0121-0105
A4C46—48	0160-2930		C:FXD Cer 0.01 μF +80 -20% 100 VDCW	91418	TA
A4C49	0160-2101	1	C:FXD Mica 27 pF 2% 300 VDCW	72136	RDM15E270-G3C
A4C50—52	0160-2930		C:FXD Cer 0.01 μF +80 -20% 100 VDCW	91418	TA
A4C53—55*	0160-2202	3	C:FXD Mica 75 pF 5% 300 VDCW	28480	0160-2202
A4CR1—10	1901-0047	14	DIODE:SI 20 WV	28480	1901-0047
A4CR11—13	1901-0040	7	DIODE:SI 30 WV 30 mA	07263	FDG 1088
A4CR14	1910-0016	1	DIODE:GERMANIUM 60 WIV	93332	D2361
A4CR15	1901-0040		DIODE:SI 30 WV 30 mA	07263	FDG 1088
A4CR16			Not Assigned		
A4CR17—20	1901-0047		DIODE:SI 20 WV	28480	1901-0047
A4CR21—22	1901-0040		DIODE:SI 30 WV 30 mA	07263	FDG 1088
A4CR23	1901-0179	1	DIODE:SI 15 WIV	28480	1901-0179

*Factory selected part

A4 Replaceable Parts List (2 of 4) (CHANGE 3)

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A4CR24	1901-0040		DIODE:SI 30 WV 30 mA	07263	FDG 1088
A4K1–3	0490-0743	3	RELAY REED:SPST	28480	0490-0743
A4L1–4	9140-0237	5	COIL/CHOKE 200 µH 5%	28480	9140-0237
A4L5–8	9100-1622	6	COIL: 24.0 µH 5%	28480	9100-1622
A4L9	9140-0237		COIL/CHOKE: 200 µH 5%	28480	9140-0237
A4L10, 11	9100-1622		COIL: 24.0 µH 5%	28480	9100-1622
A4L12	9100-2475	1	COIL: 11.3 to 2.5 µH	82142	10132-15
A4L13, 14	9140-0118	2	COIL:FXD 500 µH 5%	28480	9140-0118
A4Q1, 2	1854-0071	8	TSTR:SI NPN (selected from 2N3704)	28480	1854-0071
A4Q3–5	1853-0020	4	TSTR:SI PNP (selected from 2N3702)	28480	1853-0020
A4Q6–7	1854-0071		TSTR:SI NPN (selected from 2N3704)	28480	1854-0071
A4Q8	1853-0020		TSTR:SI PNP (selected from 2N3702)	28480	1853-0020
A4Q9	1854-0071		TSTR:SI NPN (selected from 2N3704)	28480	1854-0071
A4Q10	1853-0001		TSTR:SI PNP (selected from 2N1132)	28480	1853-0001
A4Q11–13	1854-0071	1	TSTR:SI NPN (selected from 2N3704)	28480	1854-0071
A4R1, 2	0757-0403	9	R:FXD FLM 121 ohm 1% 1/8W	28480	0757-0403
A4R3	0757-0458	3	R:FXD FLM 51.1K ohm 1% 1/8W	28480	0757-0458
A4R4	0698-3156	3	R: FXD MET FLM 14.7K ohm 1% 1/8W	28480	0698-3156
A4R5	0757-0394	2	R:FXD FLM 51.1 ohm 1% 1/8W	28480	0757-0394
A4R6	0757-0416	8	R:FXD FLM 511 ohm 1% 1/8W	28480	0757-0416
A4R7	0757-0403		R:FXD FLM 121 ohm 1% 1/8W	28480	0757-0403
A4R8	0757-0416		R:FXD FLM 511 ohm 1% 1/8W	28480	0757-0416
A4R9	0757-0346	3	R:FXD FLM 10 ohm 1% 1/8W	28480	0757-0346
A4R10, 11	0757-0403		R:FXD FLM 121 ohm 1% 1/8W	28480	0757-0403
A4R12*	0757-0470	3	R:FXD MET FLM 162K ohm 1% 1/8W	28480	0757-0470
A4R13	0683-0275	3	R:FXD COMP 2.7 ohm 5% 1/4W	01121	CB 27G5
A4R14	0698-3438	3	R:FXD MET FLM 147 ohm 1% 1/8W	28480	0698-3438
A4R15	0757-0274	12	R: FXD FLM 1.21K ohm 1% 1/8W	28480	0757-0274
A4R16	0698-3444	3	R:FXD MET FLM 316 ohm 1% 1/8W	28480	0698-3444
A4R17	0757-0274		R:FXD FLM 1.21K ohm 1% 1/8W	28480	0757-0274
A4R18	0757-0199	1	R: FXD FLM 21.5K ohm 1% 1/8W	28480	0757-0199
A4R19	0757-0403		R:FXD FLM 121 ohm 1% 1/8W	28480	0757-0403
A4R20	0757-0462	1	R:FXD MET FLM 75K ohm 1% 1/8W	28480	0757-0462
A4R21	0757-0424	3	R:FXD MET FLM 1.10K ohm 1% 1/8W	28480	0757-0424
A4R22	0698-0084	12	R:FXD MET FLM 2.15K ohm 1% 1/8W	28480	0698-0084
A4R23	0757-0439	2	R:FXD MET FLM 6.81K ohm 1% 1/8W	28480	0757-0439
A4R24	0698-3155	3	R:FXD MET FLM 4.64K ohm 1% 1/8W	28480	0698-3155
A4R25	0698-0084		R:FXD MET FLM 2.15K ohm 1% 1/8W	28480	0698-0084
A4R26	0757-0419	3	R:FXD MET FLM 681 ohm 1% 1/8W	28480	0757-0419
A4R27	0757-0346	3	R:FXD MET FLM 10 ohm 1% 1/8W	28480	0757-0346
A4R28, 29	0757-0416		R:FXD MET FLM 511 ohm 1% 1/8W	28480	0757-0416
A4R30	2100-1754	1	R:VAR WW 50 ohm 5% Type V 1W	28480	2100-1754
A4R31*	0757-0470		R:FXD MET FLM 162K ohm 1% 1/8W	28480	0757-0470
A4R32	0698-3438		R:FXD MET FLM 147 ohm 1% 1/8W	28480	0698-3438
A4R33	0757-0274		R:FXD MET FLM 1.21K ohm 1% 1/8W	28480	0757-0274

*Factory selected part

A4 Replaceable Parts List (3 of 4) (CHANGE 3)

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A4R34	0698-3444		R:FXD MET FLM 316 ohm 1% 1/8W	28480	0698-3444
A4R35	0757-0274		R:FXD FLM 1.21K ohm 1% 1/8W	28480	0757-0274
A4R36	0757-0424		R:FXD MET FLM 1.10K ohm 1% 1/8W	28480	0757-0424
A4R37	0698-0084		R:FXD MET FLM 2.15K ohm 1% 1/8W	28480	0698-0084
A4R38	0698-3155		R:FXD MET FLM 4.64K ohm 1% 1/8W	28480	0698-3155
A4R39	0698-0084		R:FXD MET FLM 2.15K ohm 1% 1/8W	28480	0698-0084
A4R40	0683-0275		R: FXD COMP 2.7 ohm 5% 1/4W	01121	CB 27G5
A4R41	0698-3159	2	R:FXD MET FLM 26.1K ohm 1% 1/8W	28480	0698-3159
A4R42	0757-0458		R:FXD FLM 51.1K ohm 1% 1/8W	28480	0757-0458
A4R43	0698-0084		R:FXD MET FLM 2.15K ohm 1% 1/8W	28480	0698-0084
A4R44	0757-0394		R:FXD MET FLM 51.1 ohm 1% 1/8W	28480	0757-0394
A4R45	0698-3156		R:FXD MET FLM 14.7K ohm 1% 1/8W	28480	0698-3156
A4R46	0698-0084		R:FXD MET FLM 2.15K ohm 1% 1/8W	28480	0698-0084
A4R47	0757-0274		R:FXD FLM 1.21K ohm 1% 1/8W	28480	0757-0274
A4R48	0698-3439	1	R:FXD MET FLM 178 ohm 1% 1/8W	28480	0698-3439
A4R49	0757-0416		R:FXD MET FLM 511 ohm 1% 1/8W	28480	0757-0416
A4R50	0698-0084		R:FXD MET FLM 2.15K ohm 1% 1/8W	28480	0698-0084
A4R51	0757-0403		R:FXD FLM 121 ohm 1% 1/8W	28480	0757-0403
A4R52	0757-0403		R:FXD FLM 121 ohm 1% 1/8W	28480	0757-0403
A4R53	0757-0422	1	R:FXD MET FLM 909 ohm 1% 1/8W	28480	0757-0422
A4R54	0757-0346		R:FXD FLM 10 ohm 1% 1/8W	28480	0757-0346
A4P55	2100-1755	1	R:VAR WW 100 ohm 5% Type V 1W	28480	2100-1755
A4R56	0757-0419		R:FXD MET FLM 681 ohm 1% 1/8W	28480	0757-0419
A4R57	0698-3438		R:FXD MET FLM 147 ohm 1% 1/8W	28480	0698-3438
A4R58	0757-0274		R:FXD FLM 1.21K ohm 1% 1/8W	28480	0757-0274
A4R59	0698-3444		R:FXD MET FLM 316 ohm 1% 1/8W	28480	0698-3444
A4R60	0757-0274		R:FXD FLM 1.21K ohm 1% 1/8W	28480	0757-0274
A4R61	0757-0416		R:FXD MET FLM 511 ohm 1% 1/8W	28480	0757-0416
A4R62	0757-0416		R:FXD MET FLM 511 ohm 1% 1/8W	28480	0757-0416
A4R63	0698-3156		R:FXD MET FLM 14.7K ohm 1% 1/8W	28480	0698-3156
A4R64	0757-0424		R:FXD MET FLM 1.10K ohm 1% 1/8W	28480	0757-0424
A4R65	0698-0084		R:FXD MET FLM 2.15K ohm 1% 1/8W	28480	0698-0084
A4R66*	0757-0470		R:FXD MET FLM 162K ohm 1% 1/8W	28480	0757-0470
A4R67	0698-3155		R:FXD MET FLM 4.64K ohm 1% 1/8W	28480	0698-3155
A4R68	0698-0084		R:FXD MET FLM 2.15K ohm 1% 1/8W	28480	0698-0084
A4R69	0683-0275		R:FXD COMP 2.7 ohm 5% 1/4W	01121	CB 27G5
A4R70	0698-3445	1	R:FXD MET FLM 348 ohm 1% 1/8W	28480	0698-3445
A4R71	0757-0458		R:FXD FLM 51.1K ohm 1% 1/8W	28480	0757-0458
A4R72	0698-3159		R:FXD MET FLM 26.1K ohm 1% 1/8W	28480	0698-3159
A4R73	0757-0274		R:FXD FLM 1.21K ohm 1% 1/8W	28480	0757-0274
A4R74	0757-0403		R:FXD FLM 121 ohm 1% 1/8W	28480	0757-0403
A4R75	0698-0084		R:FXD MET FLM 2.15K ohm 1% 1/8W	28480	0698-0084
A4R76	0757-0274		R:FXD FLM 1.21K ohm 1% 1/8W	28480	0757-0274
A4R77	0698-0082	1	R:FXD FLM 464 ohm 1% 1/8W	28480	0698-0082
A4R78			Not Assigned		

*Factory selected part

A4 Replaceable Parts List (4 of 4) (CHANGE 3)

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A4R79	0698-0084		R:FXD MET FLM 21.5K ohm 1% 1/8W	28480	0698-0084
A4R80	0757-0439		R:FXD MET FLM 6.81K ohm 1% 1/8W	28480	0757-0439
A4R81	0757-0416		R:FXD MET FLM 511 ohm 1% 1/8W	28480	0757-0416
A4R82	0757-0441	1	R:FXD MET FLM 8.25K ohm 1% 1/8W	28480	0757-0441
A4R83	0698-0084		R:FXD MET FLM 2.15K ohm 1% 1/8W	28480	0698-0084
A4R84	0757-0274		R:FXD FLM 1.21K ohm 1% 1/8W	28480	0757-0274
A4R85	2100-1761	1	R:VAR WW 10K ohm 5% Type V 1W	28480	2100-1761
A4R86	0757-0274		R:FXD FLM 1.21K ohm 1% 1/8W	28480	0757-0274
A4R87	0757-0274		R:FXD FLM 1.21K ohm 1% 1/8W	28480	0757-0274
A4R88	2100-1760	1	R:VAR WW 5K ohm 5% Type V 1W	28480	2100-1760
A4R89	0757-0419		R:FXD MET FLM 681 ohm 1% 1/8W	28480	0757-0419
A4Y1-3	0410-0411	1	CRYSTAL:QUARTZ, Matched Set	28480	0410-0411

A7 Replaceable Parts List (1 of 2) (CHANGE 24)

Reference Designator	HP Part Number	C D	Qty	Description	Mfr. Code	Mfr. Part Number
A7	08552-60191	5		BOARD ASSY: DEFLECTION AMPLIFIER	28480	08552-60191
A7C1	0180-0116	1	2	C:FXD ELECT 6.8UF 10% 35VDCW TA	56289	150D685X9035B2
A7C2	0180-0116	1		C:FXD ELECT 6.8UF 10% 35VDCW TA	56289	150D685X9035B2
A7C3	0160-2265	3	1	C:FXD 2PF 500VDCW CER	28480	0160-2265
A7C4	0180-0269	5	1	C:FXD 1UF 150VDCW AL	56289	30D105F150BA2
A7C5	0160-3448	6	1	C:FXD 1000PF 1000VDC CER	56289	C067B251F102KS25
A7C6	0140-0194	1	2	C:FXD 110PF 5% MICA	72136	RDM15F111J3C
A7C7	0160-[illegible]46	0	2	C:FXD 3.6PF 5[illegible]VDC MICA	72982	301-000-C0J0-369C
A7C8	0160-2246	0		C:FXD 3.6PF 500VDC MICA	72982	301-000-C0J0-369C
A7C9	0160-0153	4	1	C:FXD MY 0.001UF 10% 200VDCW	28480	0160-0153
A7C10	0160-0194	3	1	C:FXD .015UF 200VDC PE	56289	192P15392-PTS
A7C11	0160-2201		2	C:FXD 51PF 300VDC MICA	72136	RDM15E510J1C
A7C12	0180-0197	8	2	C:FXD 2.2UF 20V TA	56289	150D225X9020A2
A7C13	0160-3450	0	1	C:FXD 5000PF 250V CER	28480	0160-3450
A7C14	0180-0197	8		C:FXD 2.2UF 20V TA	56289	150D225X9020A2
A7C15	0140-0194	1		C:FXD 110PF 5% MICA	72136	RDM15F111J3C
A7C16	0180-1746	5	1	C:FXD 15UF 20VDC TA	56289	150D156X9020B2
A7C17	0160-2256	2	2	C:FXD 3.6PF 500VDC CER	72982	301-000-C0K0-919C
A7C18	0160-2256	2		C:FXD 3.6PF 500VDC CER	72982	301-000-C0K0-919C
A7C19	0160-2201	7		C:FXD 51PF 300VDC MICA	72136	RDM15E510J1C
A7C20	0160-0155	6	1	C:FXD 3300PF 200VDC PE	28480	0160-0155
A7CR1	1901-0096	7	2	DIODE-SWITCHING 120V 50MA	01295	UG-888
A7CR2	1901-0081	0	7	DIODE-SWITCHING 50V 75MA	07263	FD1415
A7CR3	1901-0050	3	1	DIODE-SWITCHING 80V .2A	28480	1901-0050
A7CR4	1901-0096	7		DIODE-SWITCHING 120V 50 MA	01295	UG-888
A7CR5	1901-0081	0		DIODE-SWITCHING 50V 75MA	07263	FD1415
A7CR6	1901-0081	0		DIODE-SWITCHING 50V 75MA	07263	FD1415
A7CR7	1901-0081	0		DIODE-SWITCHING 50V 75MA	07263	FD1415
A7CR8	1902-0683	8	2	DIODE-ZNR 100.0V 2% PD=1.0W	28480	1902-0683
A7CR9	1902-0683	8		DIODE-ZNR 100.0V 2% PD=1.0W	28480	1902-0683
A7CR10	1901-0081	0		DIODE-SWITCHING 50V 75MA	07263	FD1415
A7CR11	1901-0081	0		DIODE-SWITCHING 50V 75MA	07263	FD1415
A7CR12	1902-0025	4	1	DIODE-ZNR 10.0V 5% PD=.4W	28480	1902-0025
A7CR13	1901-0040	1	6	DIODE-SWITCHING 30V 50MA	07263	FDG1088
A7CR14	1901-0040	1		DIODE-SWITCHING 30V 50MA	07263	FDG1088
A7CR15				NOT ASSIGNED		
A7CR16	1901-0081	0		DIODE-SWITCHING 50V 75MA	07263	FD1415
A7CR17	1901-0040	1		DIODE-SWITCHING 30V 50MA	07263	FDG1088
A7CR18	1901-0040	1		DIODE-SWITCHING 30V 50MA	07263	FDG1088
A7CR19	1901-0040	1		DIODE-SWITCHING 30V 50MA	07263	FDG1088
A7CR20	1901-0040	1		DIODE-SWITCHING 30V 50MA	07263	FDG1088
A7K1				NOT ASSIGNED		
A7L1	9140-0129	1	2	COIL:FXD RF 220UH 5%	28480	9140-0129
A7L2	9140-0129	1		COIL:FXD RF 220UH 5%	28480	9140-0129
A7MP1	1205-0011	0	2	HEAT DISSIPATOR:FOR TO-5 AND TO-9 CASES	98978	TXBF-032-025B
A7MP2	1205-0011	0		HEAT DISSIPATOR:FOR TO-5 AND TO-9 CASES	98978	TXBF-032-025B
A7Q1	1853-0034	0	1	TRANSISTOR PNP 2N3251	28480	1853-0034
A7Q2	1854-0404	0	4	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A7Q3				NOT ASSIGNED		
A7Q4	1854-0232	2	11	TRANSISTOR NPN SI TO-39 PD=1W FT=15MHZ	28480	1854-0232
A7Q5	1854-0232	2		TRANSISTOR NPN SI TO-39 PD=1W FT=15MHZ	28480	1854-0232
A7Q6	1854-0232	2		TRANSISTOR NPN SI TO-39 PD=1W FT=15MHZ	28480	1854-0232
A7Q7	1854-0232	2		TRANSISTOR NPN SI TO-39 PD=1W FT=15MHZ	28480	1854-0232
A7Q8	1854-0232	2		TRANSISTOR NPN SI TO-39 PD=1W FT=15MHZ	28480	1854-0232
A7Q9	1854-0232	2		TRANSISTOR NPN SI TO-39 PD=1W FT=15MHZ	28480	1854-0232
A7Q10	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A7Q11	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A7Q12	1854-0232	2		TRANSISTOR NPN SI TO-39 PD=1W FT=15MHZ	28480	1854-0232
A7Q13	1854-0232	2		TRANSISTOR NPN SI TO-39 PD=1W FT=15MHZ	28480	1854-0232
A7Q14	1854-0232	2		TRANSISTOR NPN SI TO-39 PD=1W FT=15MHZ	28480	1854-0232
A7Q15	1853-0007	7	2	TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	80131	2N3251
A7Q16	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	80131	2N3251
A7Q17	1854-0232	2		TRANSISTOR NPN SI TO-39 PD=1W FT=15MHZ	28480	1854-0232
A7Q18	1854-0232	2		TRANSISTOR NPN SI TO-39 PD=1W FT=15MHZ	28480	1854-0232
A7Q19	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A7Q20	1854-0882	8		TRANSISTOR NPN PD=300MW FT=200MHZ	28480	1854-0882

A7 Replaceable Parts List (2 of 2) (CHANGE 24)

Reference Designator	HP Part Number	C D	Qty	Description	Mfr. Code	Mfr. Part Number
A7Q21	1854-0882	8		TRANSISTOR NPN PD=300MW FT=200MHZ	28480	1854-0882
A7Q22	1854-0882	8		TRANSISTOR NPN PD=300MW FT=200MHZ	28480	1854-0882
A7R1	0757-0447	4	1	RESISTOR 16.2K 1% .125W F TC=0+—100	28480	0757-0447
A7R2	0757-0443	0	5	RESISTOR 11K 1% .125W F TC=0+—100	28480	0757-0443
A7R3	0698-3152	8	4	RESISTOR 3.48K 1% .125W F TC=0+—100	28480	0698-3152
A7R4	0698-0082	7	1	RESISTOR 464 1% .125W F TC=0+—100	28480	0698-0082
A7R5	0757-0464	5	1	RESISTOR 90.9K 1% .125W F TC=0+—100	28480	0757-0464
A7R6	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+—100	28480	0698-3152
A7R7	0698-3444	1	4	RESISTOR 316 1% .125W F TC=0+—100	28480	0698-3444
A7R8	0698-3418	9	2	RESISTOR 26.1K 1% .5W F TC=0+—100	28480	0698-3418
A7R9	0757-0443	0		RESISTOR 11K 1% .125W F TC=0+—100	28480	0757-0443
A7R10	0698-3418	9		RESISTOR 26.1K 1% .5W F TC=0+—100	28480	0698-3418
A7R11	0757-0439	4	1	RESISTOR 6.81K 1% .125W F TC=0+—100	28480	0757-0439
A7R12	0757-0280	3	3	RESISTOR 1K 1% .125W F TC=0+—100	28480	0757-0280
A7R13	0698-3444	1		RESISTOR 316 1% .125W F TC=0+—100	28480	0698-3444
A7R14	0698-3154	0	1	RESISTOR 4.22K 1% .125W F TC=0+—100	28480	0698-3154
A7R15	0757-0460	7	2	RESISTOR 61.9K 1% .125W F TC=0+—100	28480	0757-0460
A7R16	0757-0470	3	1	RESISTOR 162K 1% .125W F TC=0+—100	28480	0757-0470
A7R17	0698-3158	4	1	RESISTOR 23.7K 1% .125W F TC=0+—100	28480	0698-3158
A7R18	0698-3444	1		RESISTOR 316 1% .125W F TC=0+—100	28480	0698-3444
A7R19	0698-3455	4	2	RESISTOR 261K 1% .125W F TC=0+—100	28480	0698-3455
A7R20	0698-3421	4	1	RESISTOR 38.3K 1% .5W F TC=0+—100	28480	0698-3421
A7R21	0757-0200	7	1	RESISTOR 5.62K 1% .125W F TC=0+—100	28480	0757-0200
A7R22	0698-3444	1		RESISTOR 316 1% .125W F TC=0+—100	28480	0698-3444
A7R23	0698-3455	4		RESISTOR 261K 1% .125W F TC=0+—100	28480	0698-3455
A7R24	0698-3453	2	1	RESISTOR 196K 1% .125W F TC=0+—100	28480	0698-3453
A7R25	0757-0460	7		RESISTOR 61.9K 1% .125W F TC=0+—100	28480	0757-0460
A7R26	0757-0463	4	1	RESISTOR 82.5K 1% .125W F TC=0+—100	28480	0757-0463
A7R27	0757-0443	0		RESISTOR 11K 1% .125W F TC=0+—100	28480	0757-0443
A7R28	0698-3132	4	1	RESISTOR 261 1% .125W F TC=0+—100	28480	0698-3132
A8R29	0757-0290	5	3	RESISTOR 6.19K 1% .125W F TC=0+—100	28480	0757-0290
A8R30	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+—100	28480	0757-0290
A8R31	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+—100	28480	0757-0280
A8R32	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+—100	28480	0757-0280
A8R33	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+—100	28480	0698-3152
A7R34				NOT ASSIGNED		
A7R35				NOT ASSIGNED		
A7R36				NOT ASSIGNED		
A7R37				NOT ASSIGNED		
A7R38	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+—100	28480	0698-3152
A7R39	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+—100	28480	0757-0290
A7R40	0757-0400	9	1	RESISTOR 90.9 1% .125W F TC=0+—100	28480	0757-0400
A7R41	0698-3162	9	1	RESISTOR 46.4K 1% .125W F TC=0+—100	28480	0698-3162
A7R42	0757-0458	7	1	RESISTOR 51.1K 1% .125W F TC=0+—100	28480	0757-0458
A7R43				NOT ASSIGNED		
A7R44				NOT ASSIGNED		
A7R45	0757-0465	6	1	RESISTOR 100K 1% .125W F TC=0+—100	28480	0757-0465
A7R46	0698-3157	3	1	RESISTOR 19.6K 1% .125W F TC=0+—100	28480	0698-3157
A7R47	0757-0443	0		RESISTOR 11K 1% .125W F TC=0+—100	28480	0757-0443
A7R48	0757-0420	3	2	RESISTOR 750 1% .125W F TC=0+—100	28480	0757-0420
A7R49	0757-0443	0		RESISTOR 11K 1% .125W F TC=0+—100	28480	0757-0443
A7R50	0757-0420	3		RESISTOR 750 1% .125W F TC=0+—100	28480	0757-0420
A7R51	0698-3450	9	2	RESISTOR 42.2K 1% .125W F TC=0+—100	28480	0698-3450
A7R52	0698-3450	9		RESISTOR 42.2K 1% .125W F TC=0+—100	28480	0698-3450
A7R53	0764-0012	4	1	RESISTOR 6.8K 5% 2W	28480	0764-0012
A7R54	0757-0436	1	2	RESISTOR 4.32K 1% .125W F TC=0+—100	28480	0757-0436
A7R55	0757-0436	1		RESISTOR 4.32K 1% .125W F TC=0+—100	28480	0757-0436
A7R56	0698-3150	6	1	RESISTOR 2.37K 1% .125W F TC=0+—100	28480	0698-3150
A7R57	0757-0442	9	1	RESISTOR 10K 1% .125W F TC=0+—100	28480	0757-0442
A7R58	0698-0083	8	2	RESISTOR 1.96K 1% .125W F TC=0+—100	28480	0698-0083
A7R59	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+—100	28480	0698-0083
A7R60	0698-3446	3	2	RESISTOR 383 1% .125W F TC=0+—100	28480	0698-3446
A7R61	0698-3446	3		RESISTOR 383 1% .125W F TC=0+—100	28480	0698-3446
A7U1	1821-0001	4	1	TRANSISTOR ARRAY 14-PIN PLSTC DIP	02735	CA3046
A7U2				NOT ASSIGNED		
A7U3	1826-0081	0	1	IC OP AMP .VB TO-99 PKG	12040	LM318H

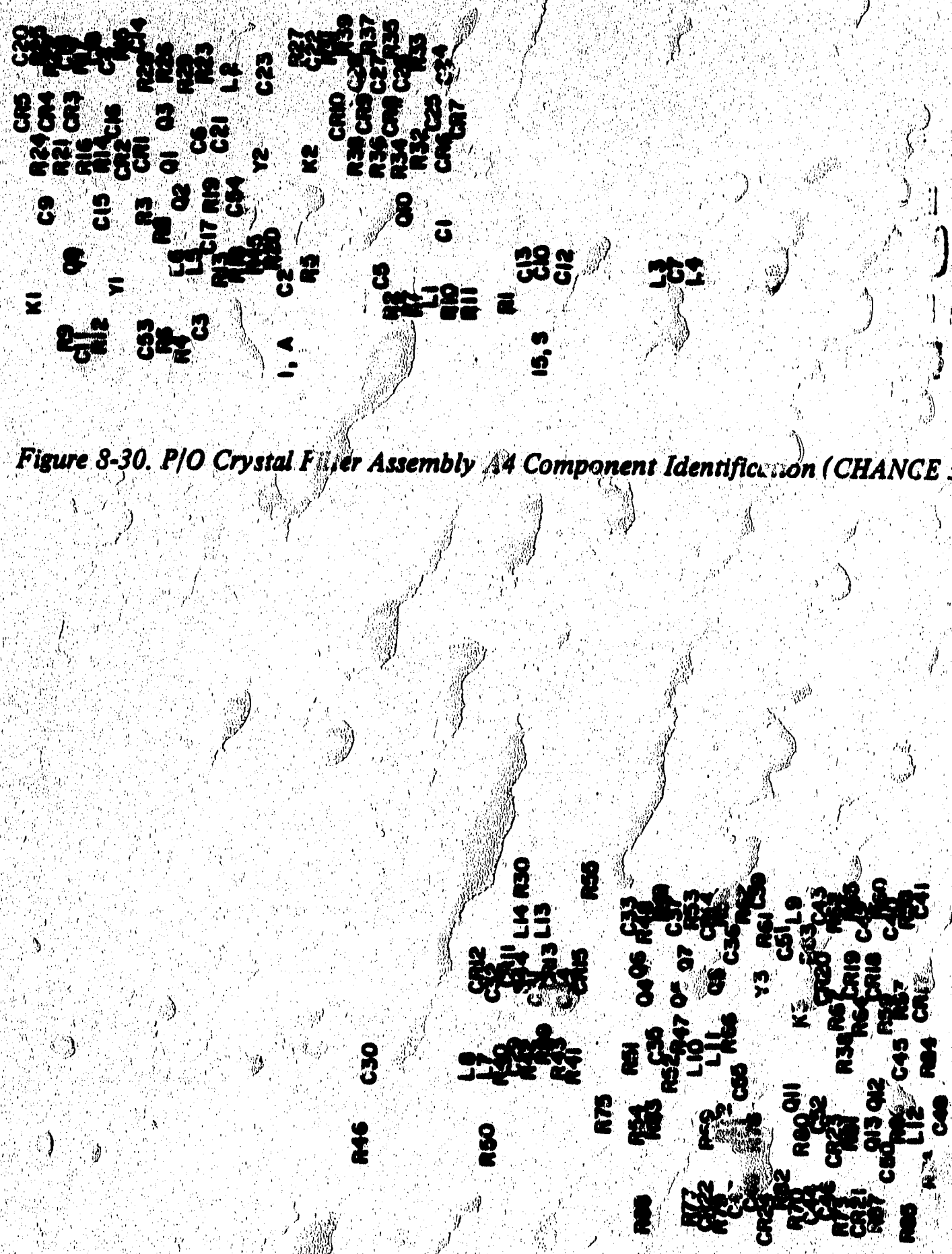


Figure 8-30. P/O Crystal Filter Assembly A4 Component Identification (CHANGE 3)

Figure 8-32. P/O Crystal Filter Assembly A4 Component Identification (CHANGE 3)

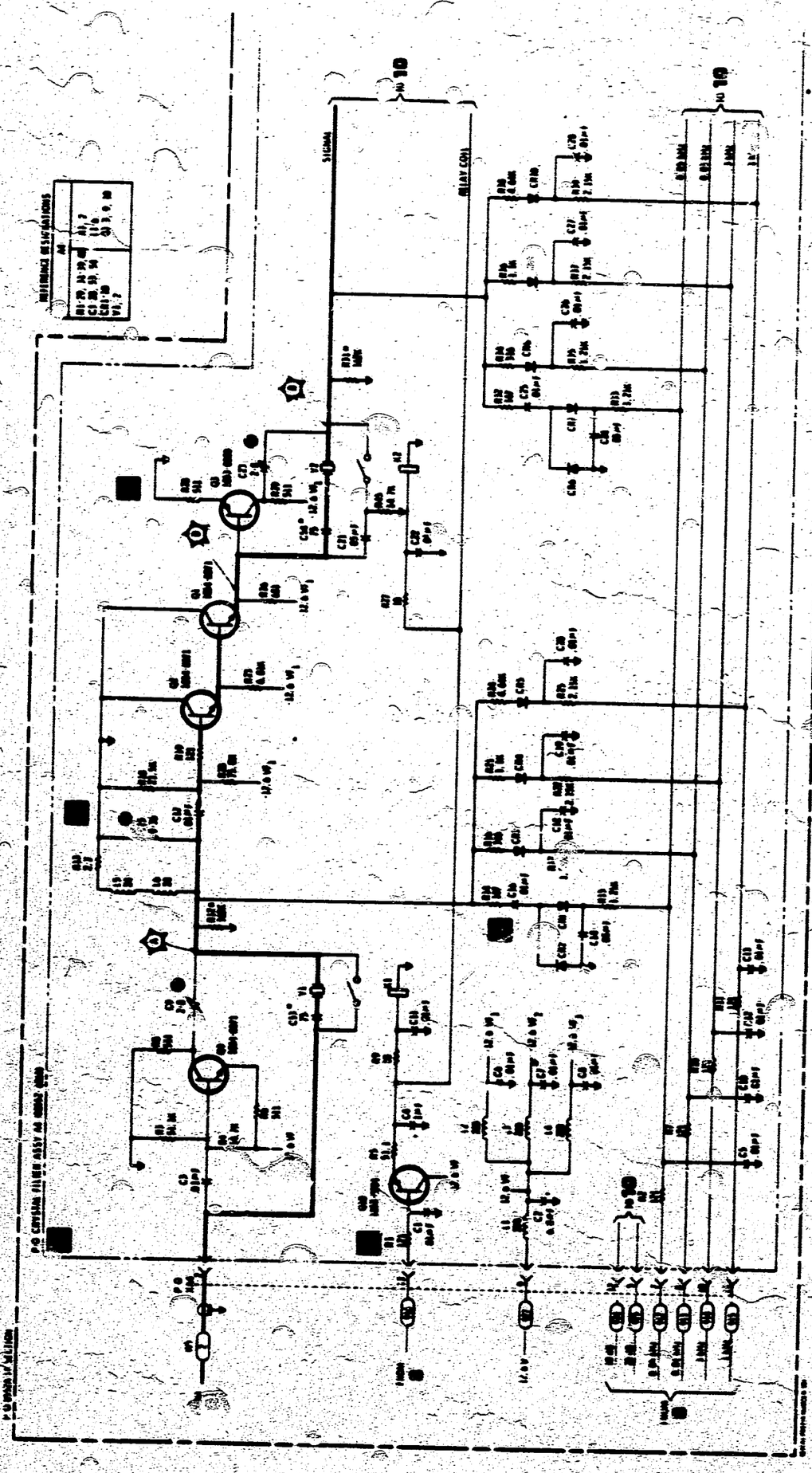


Figure 8-31. 3 MHz Crystal Filter (Sheet 1 of 2) (CHANGE 3)

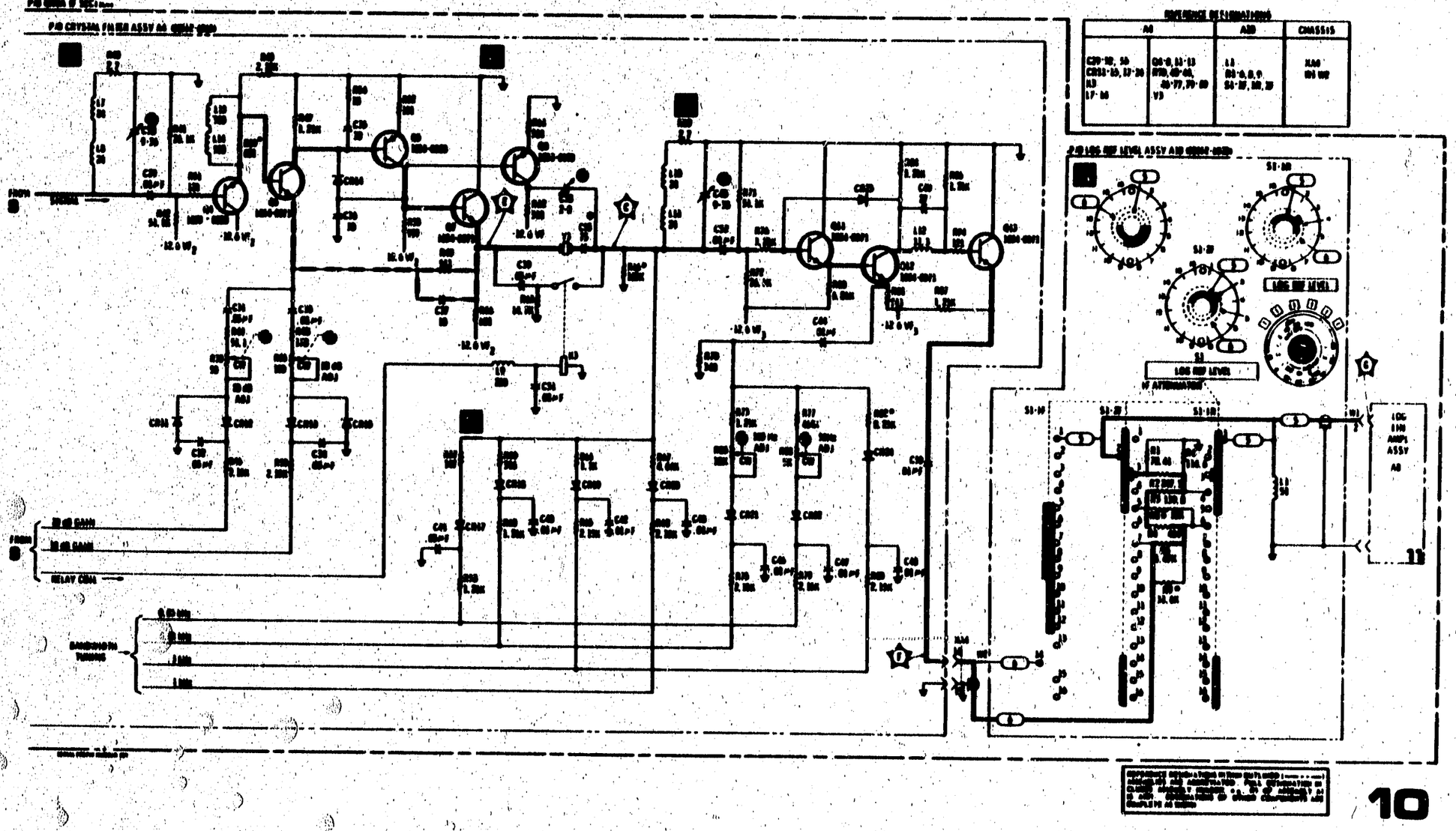


Figure 8-33. 3 MHz Crystal Filter (Sheet 2 of 2) (CHANGE 3)

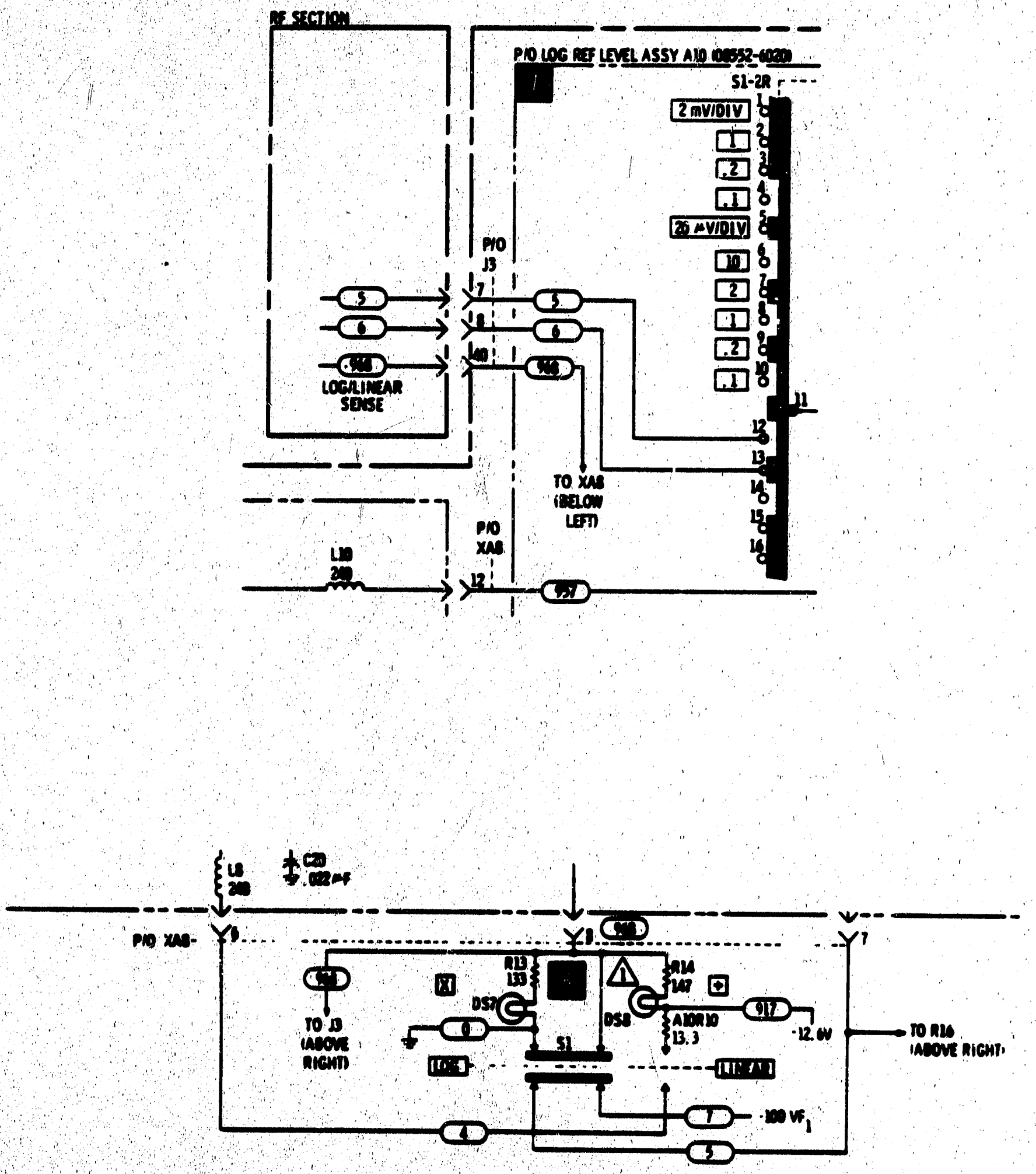


Figure 8-38. Lin/Log Amplifiers (Sheet 2 of 2) (CHANGE 7)

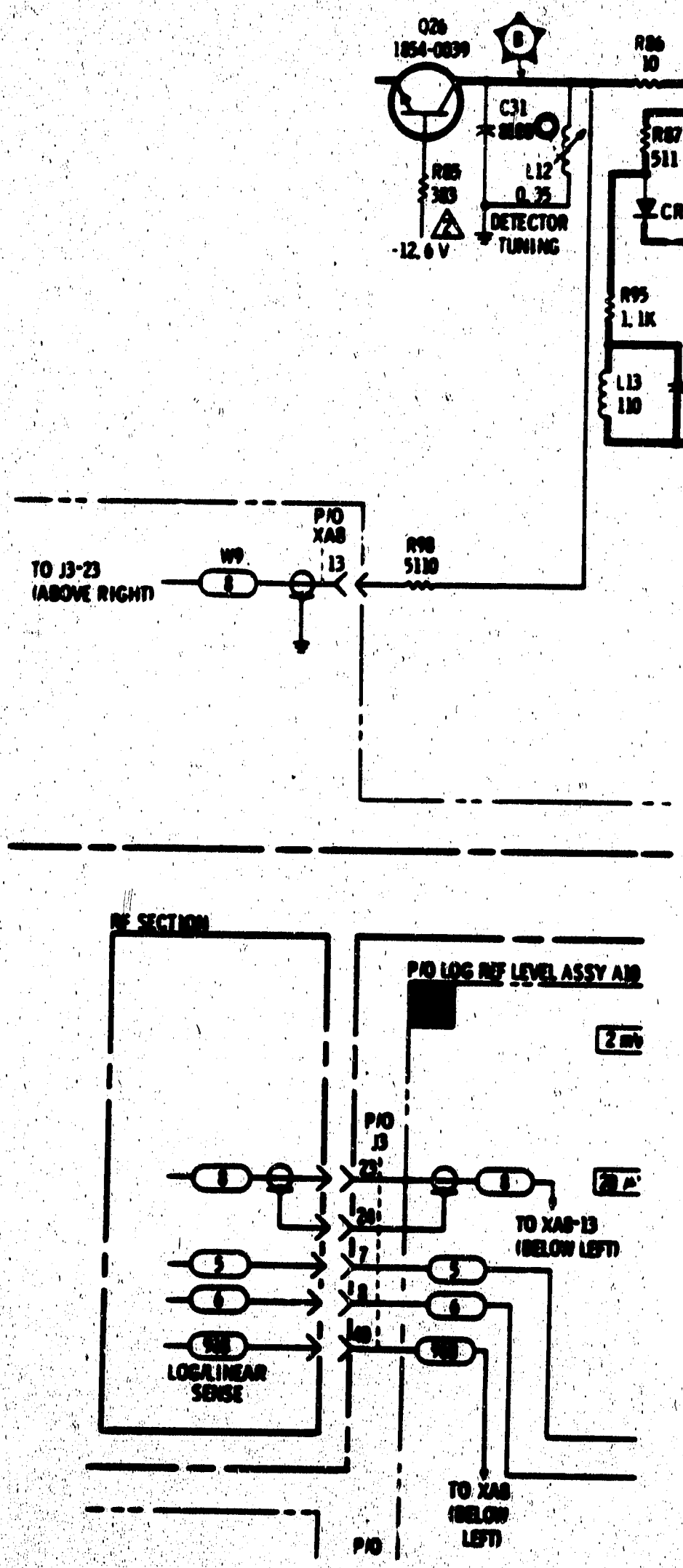


Figure 8-38. Log/Linear Amplifier (Sheet 2 of 2) (CHANGE 11)

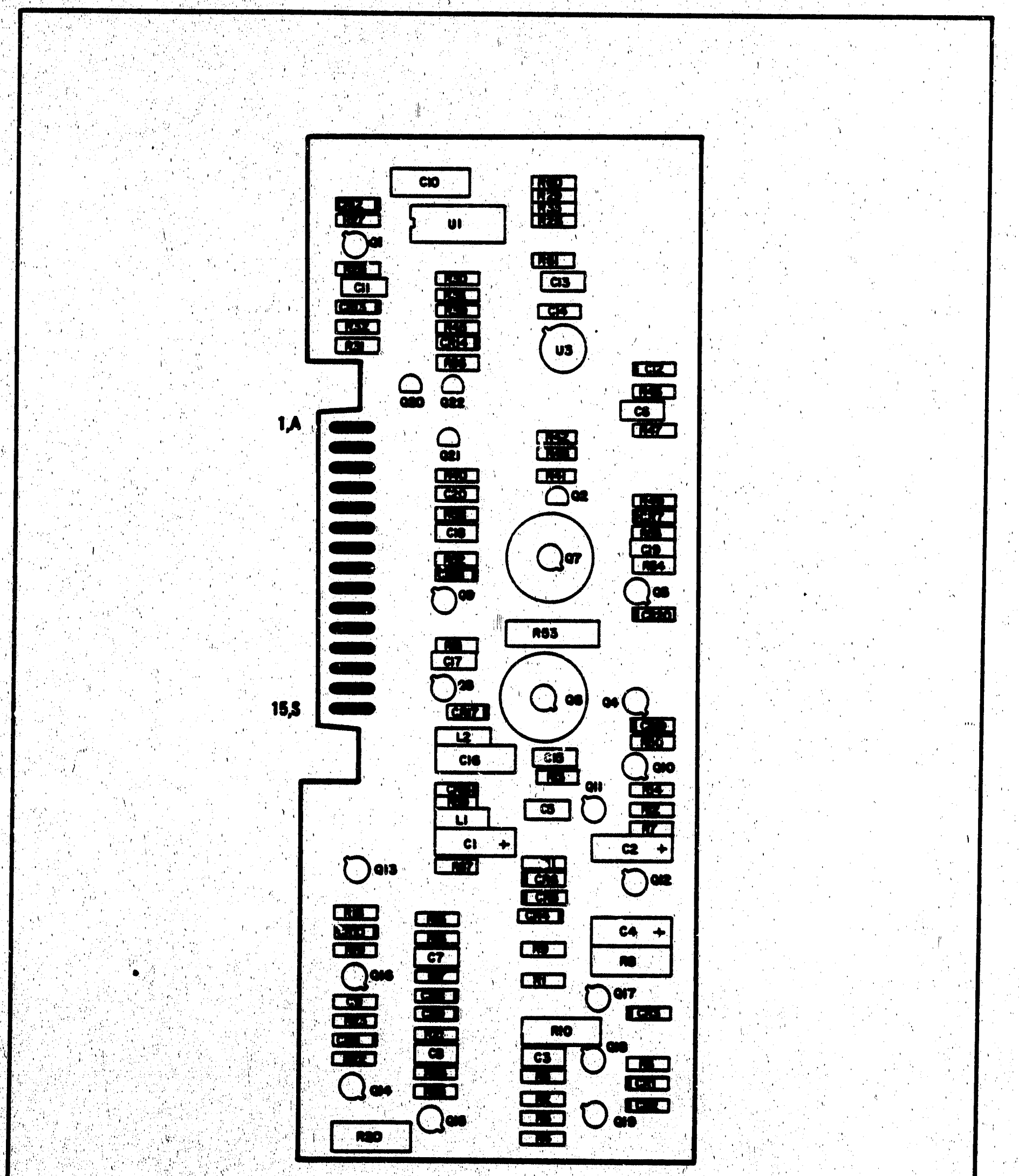


Figure 8-39. Deflection Amplifier Assembly A7 Component Identification (CHANGE 24)

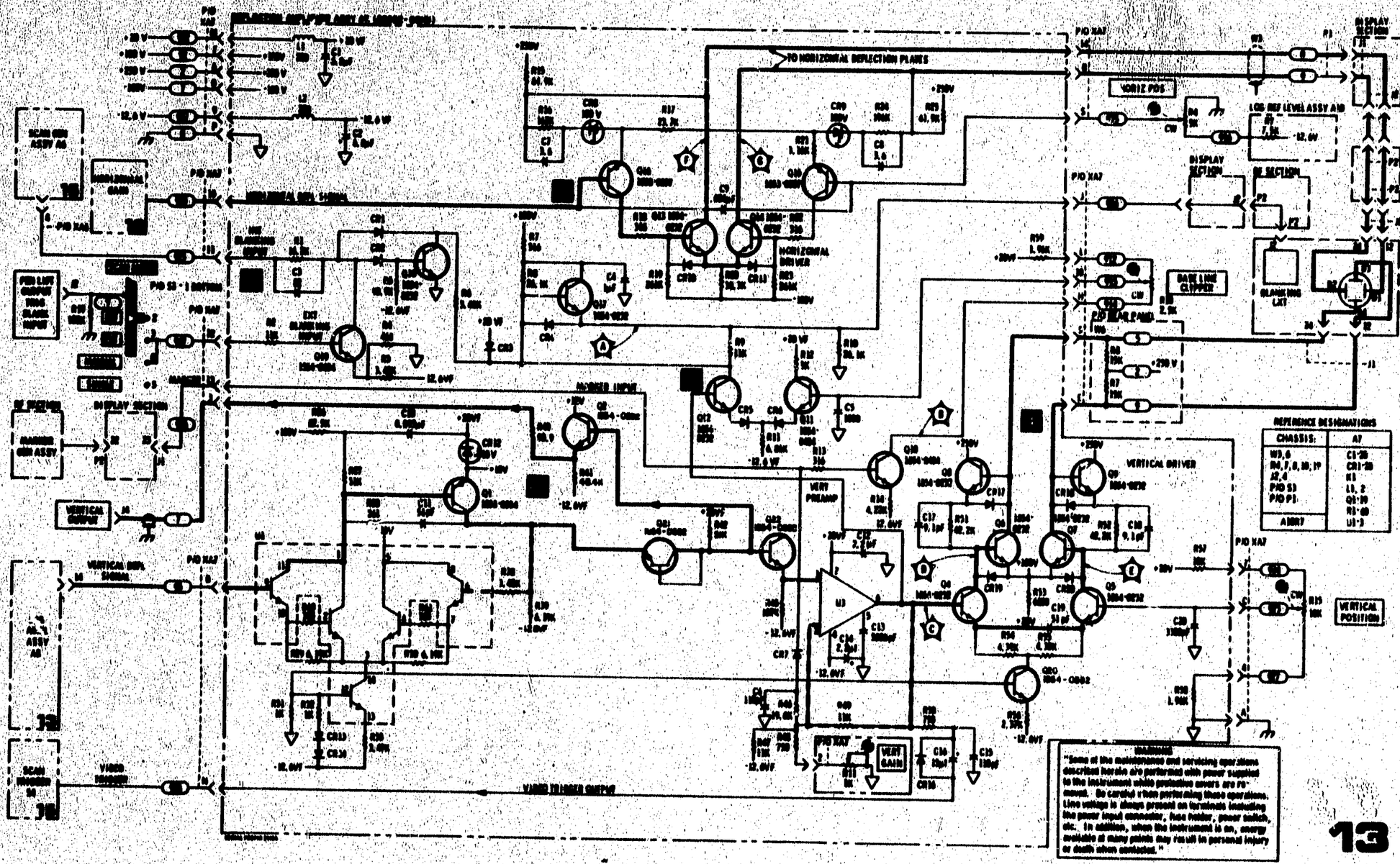
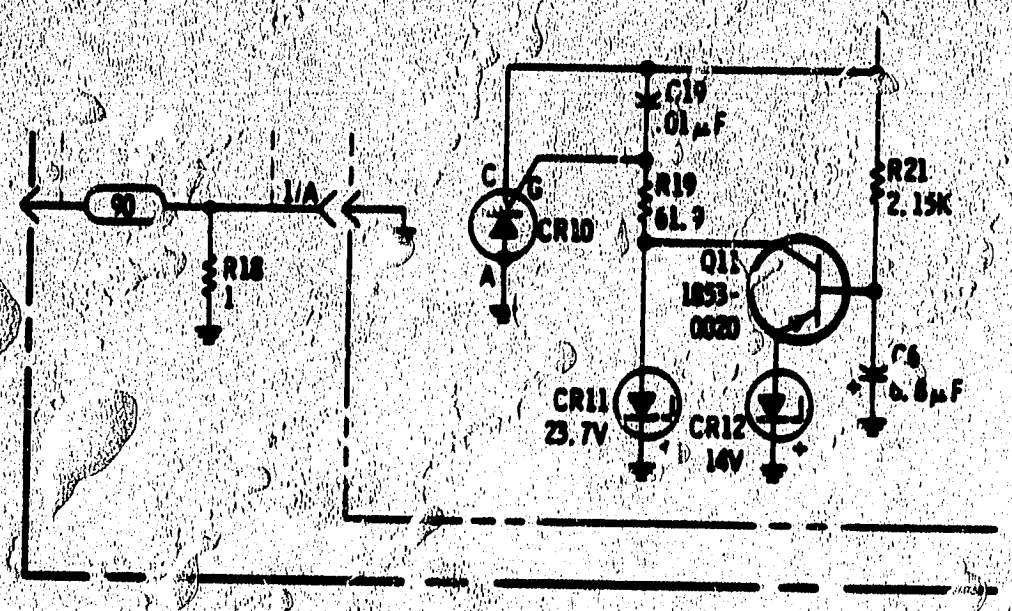
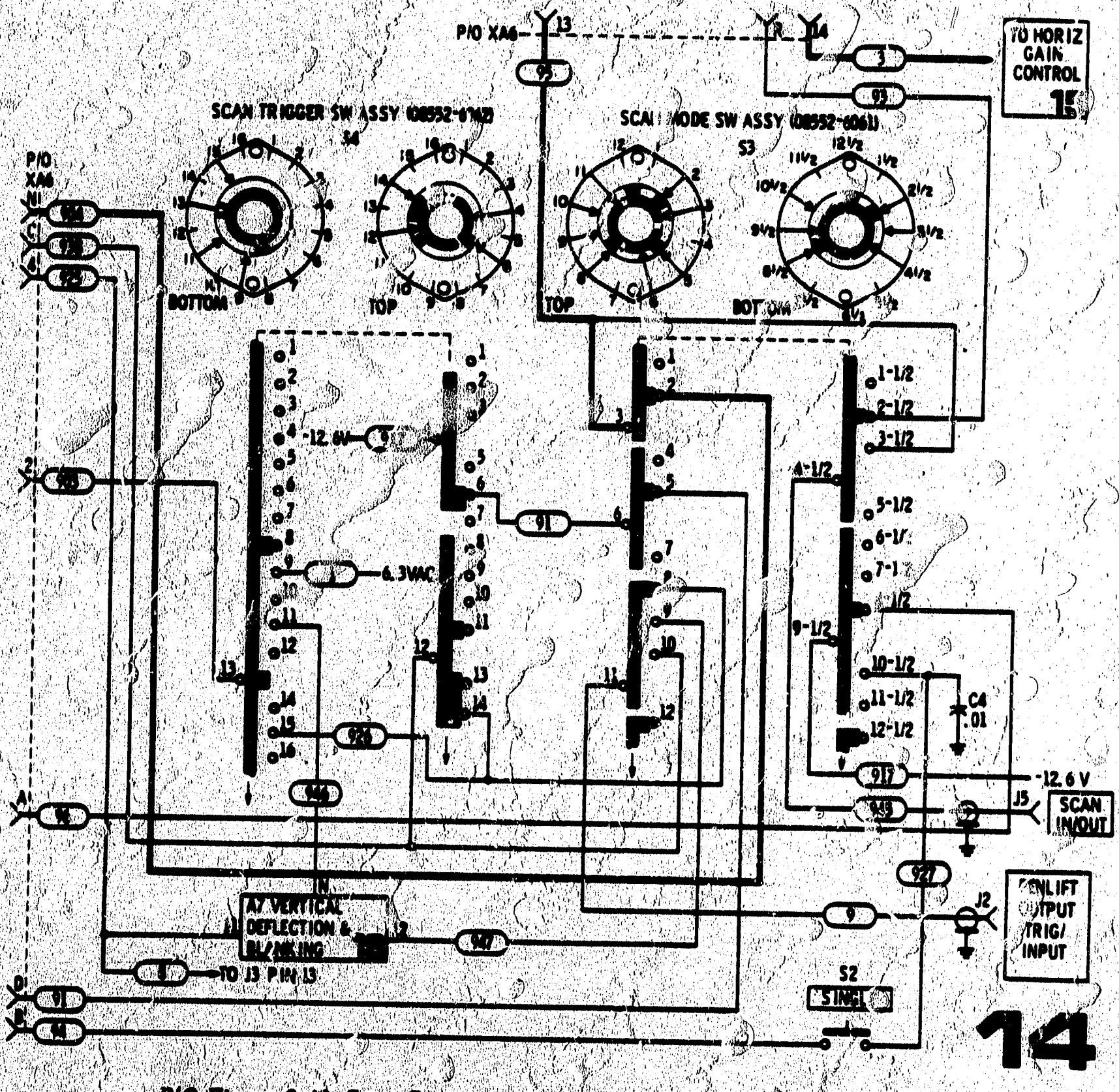


Figure 8-40. Vertical Deflection and Blanking (CHANGE 24)



P/O Figure 8-48. A5 Power Supply Assembly (CHANGE 14)



P/O Figure 8-42. Scan Generator Assembly A6 08552-6147 (ERRATA)