

TECHNICAL MANUAL

**OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL
SUPPORT MAINTENANCE MANUAL**

FOR

**PLUG-IN UNIT, ELECTRONIC TEST EQUIPMENT PL1388/U
(HEWLETT-PACKARD MODEL 8552B)
(NSN 6625-00-431-9939)**

**HEADQUARTERS, DEPARTMENT OF THE ARMY
SEPTEMBER 1978**

TECHNICAL MANUAL }
No. 11-6625-2781-14-1 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC 18 September 1978

OPERATORS, ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT
MAINTENANCE MANUAL
FOR
PLUG-IN UNIT, ELECTRONIC TEST EQUIPMENT PL-1388/U
(HEWLETT-PACKARD MODEL 8552B)
(NSN 6625-00-431-9939)

REPORTING OF ERRORS

You can improve this manual by recommending improvements using DA Form 2028-2 located in the back of the manual. Simply tear out the self-addressed form, fill it out as shown on the sample, fold it where shown, and drop it in the mail.

If there are no blank DA Forms 2028-2 in the back of your manual, use the standard DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forward to the Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-MA-Q, Fort Monmouth, NJ 07703.

In either case a reply will be furnished direct to you.

This manual is an authentication of the manufacturer's commercial literature which, through usage, has been found to cover the data required to operate and maintain this equipment. Since the manual was not prepared in accordance with military specifications, the format has not been structured to consider levels of maintenance.

CONTENTS

Section	Page	Section	Page
0 INTRODUCTION 00000	0-1	V ADJUSTMENTS (cont'd)	
I GENERAL INFORMATION 11111	1-1	5-11. HP 11592A Service Kit	5-1
1-1. Introduction	1-1	5-14. Extender Cable Installation	5-1
1-8. Instruments Covered by Manual	1-1	5-17. Plug-in Cover Removal	5-1
1-12. Description	1-2	5-19. Extender Connections	5-2
1-16. Options.	1-2	5-22. Factory Selected Components	5-2
1-21. Equipment Required but not Supplied	1-2	5-24. Related Adjustments	5-2
1-23. RF Section.	1-2	5-26. Checks and Adjustments	5-3
1-25. Display Section	1-2	5-27. Power Supply Check and Adjustment	5-3
1-27. Equipment Available	1-4	5-28. Horizontal Scan Check and Adjustment	5-4
1-29. Recommended Test Equipment	1-4	5-29. Final Scan Check	5-6
II INSTALLATION	2-1	5-30. Vertical Deflection Amplifier Check	5-8
2-1. Shipping Information	2-1	5-31. Log/Linear Amplifier Check and	
2-3. Initial Inspection	2-1	Adjustment	5-11
2-4. Mechanical Check	2-1	5-32. 300 kHz Bandpass Filter Adjustment	5-14
2-6. Performance Check	2-1	5-33. LC Filter Adjustment	5-15
2-8. Claims for Damage	2-1	5-34. Crystal Filter Fine Adjustment	5-16
2-10. Power Requirements.	2-1	5-35. Crystal Filter Coarse Adjustment	5-20
2-12. Connections	2-1	5-36. 3 MHz IF Gain Adjustment	5-22
2-14. Installation Check	2-1	5-37. 47 MHz LO Automatic Phase Lock	
2-16. Storage and Shipment	2-1	Check and Adjustment	5-25
2-17. Original Packaging	2-1	5-38. 50 MHz IF Bandpass Check and	
2-21. Other Packaging Materials	2-1	Adjustment	5-29
III OPERATION	3-1	5-39. 44 MHz Rejection Adjustment	5-32
3-1. Introduction	3-1	5-40. 30 MHz Calibration Oscillator	
3-3. Panel Features	3-1	Check and Adjustment	5-34
3-5. Operator's Checks	3-1	5-41. Analogic Check and Adjustment	5-37
3-8. Operational Adjustments	3-1	VI REPLACEABLE PARTS DELETED	
3-10. H01/H02 Instruments	3-1	VII MANUAL CHANGES	7-1
3-12. H04 Instruments	3-1	7-1. Introduction	7-1
3-14. Operating Instructions	3-1	7-5. Manual Change Instructions	7-4
3-16. Operating Tips	3-1	VIII SERVICE	8-1
3-19. Operator's Maintenance	3-2	8-1. Introduction	8-1
IV PERFORMANCE TESTS	4-1	8-3. Line Voltage Requirements	8-1
4-1. Introduction	4-1	8-5. Maintenance Aids	8-1
4-5. Front Panel Checks	4-1	8-7. Test Equipment and Accessories Required.	8-1
4-7. Performance Tests	4-1	8-10. Adjustments	8-2
4-12. Front Panel Check Procedure	4-1	8-12. General Procedures	8-2
4-13. preset Adjustments	4-1	8-15. General Service Information	8-2
4-16. Display Section Adjustments	4-2	8-23. Etched Circuits	8-2
4-17. IF Section Display Adjustments	4-2	8-26. Component Replacement	8-4
4-18. Ampl Cal Adjustment RF Section	4-3	8-27. Transistor Replacement	8-5
4-19. Ampl Cal Check for Linear		8-31. Diode Replacement	8-6
Sensitivity Accuracy.	4-3	8-33. Switching Information	8-6
4-23. Calibrator Output.	4-5	SERVICE SHEETS	
4-24. Bandwidth Accuracy.	4-7	1. Block Diagram	8-20
4-25. Bandwidth Selectivity	4-9	2. RF Section/IF Section/Display Section	
4-26. Switching Between Bandwidths		Interconnections	8-22
Accuracy	4-11	3. 50 MHz Converter	8-24
4-27. Amplitude Display Accuracy	4-12	4. 47 MHz Automatic Phase Control and	
4-28. Scan Time Accuracy.	4-13	2 MHz Voltage Tuned Oscillator.	8-26
V ADJUSTMENTS	5-1	5. 2 MHz VTO Shaping Circuit	8-28
5-1. Introduction	5-1	6. 3 MHz Amplifier (Sheet 1).	8-30
5-3. Equipment Required	5-1	7. 3 MHz Amplifier (Sheet 2).	8-32
5-5. Posidriv Screwdriver	5-1		
5-7. Slug Tuning Tools	5-1		
5-9. Blade Tuning Tools	5-1		

CONTENTS (cont'd)

SERVICE SHEETS (cont'd)

8. LC Bandwidth Filter	8.34	14. Deflection Amplifier	8-46
9. Amplifier Filter Control Circuits.	8.36	15. Scan Generator and Trigger Circuits	8-48
10. Crystal Filter (Sheet 1)	8-38	16. Scan Driver and Pen Lift Driver	8-52
11. Crystal Filter (Sheet 2)	8.40	17. Analogic Circuit	8-52
12. Log/Linear Amplifier (Sheet 1)	8.42	18. Reference Oscillator & LOG REFERENCE Index Light Circuit	8-54
13. Log/Linear Amplifier (Sheet 2)	8-44	19. Power Supply	8-56

ILLUSTRATIONS

Figure	Page	Figure	Page
1-1. Model 8552B Spectrum Analyzer IF Section	1-0	7-9. Log/Linear Amplifier Partial Schematic (Part of Change U)	7-19
1-2. HP 11592A Service Kit Required for Maintenance	1-7	7-10. Log/Linear Amplifier Partial schematic (Part of Change U)	7-19
2-1. Model 8552B Spectrum Analyzer IF Section with 8553B RF Section and 141T Display Section	2-0	7-11.50 MHz Converter (Part of Change X)	7-24
3-1. 82552B Spectrum Analyzer IF Section Controls, Indicators and Connectors.	3-3	7-12. Power Supply Partial Schematic (Part of Change Y)	7-25
4-1. 30 MHz Calibrator Signal & Harmonica	4-2	8-1. 8552B IF Section with Circuit Board Extended for Maintenance.	8-1
4-2. Vertical Gain Adjustment	4-2	8-2. Diagram of Modular Exchange Program	8-3
4-3. Calibrator Amplitude Test Setup	4-5	8-3. Examples of Diode and Transistor Marking Methods.	8-5
4-4. Calibrator Frequency Check Test Setup	4-7	8-4. Integrated Circuit Packaging	8-6
4-5. 10 kHz Bandwidth Accuracy Test Setup	4-8	8-5. Evolution of Straight-Line Switch presentation	8-7
4-6. Scan Time Accuracy Test Setup	4-13	8-6. Three Positions of Typical Switch Wafers	8-7
4-7. Scan Time Modulation Peaks	4-14	8-7. Wafer Switch Presentation Versus Straight-Line Presentation	8-8
5-1. Power Supply Check & Adjustment Test Setup	5-3	8-8. 8553B Component, Assembly and Adjustment Locations	8-19
5-2. Scan Generator Check & Adjustment Test Setup	5-4	8-9. Simplified Block Diagram	8-20
5-3. Scan Voltage Waveform Measurement	5-5	8-10. 8552B Block Diagram	8-21
5-4. Final Scan Time Adjustment Test Setup	5-6	8-11. Video Filter Assembly All,	8-22
5-5. Vertical Deflection Amplifier Test Setup	5-9	8-12. Log Reference Level Switch Assembly A10,	8-22
5-6. Log/Linear Amplifier Check and Adjustment Test Setup	5-11	8.13. Scan Time Switch Assembly A9	8-22
5-7. Crystal Filter Fine Adjustment Test Setup	5-17	8.14. RF Section/IF Section/Display Section Interconnections	8-23
5-8. Crystal Filter Bypass Network	5-21	8-15. 50 MHz Bandpass Filter A3A1, Component Identification,	8-25
5-9. 3 MHz IF Gain Adjustment Test Setup	5-22	8-16. 47 MHz LO A3A2 Component Identification	8-25
5-10.47 MHz LO Automatic Phase Lock Test Setup	5-26	8-17. 50 MHz Converter A3 Component Identification,	8-25
5-11. Search Waveform	5-28	8-18. 50 MHz Converter, Schematic Diagram.	8-25
6.12.50 MHz IF Bandpass Adjustment Test Setup	5-30	8-19. 47 MHz APC A1 2 Component Identification.	8-27
5-13.50 MHz Bandpass Display for 10 MHz and 3 MHz Sweeps	5-31	8-20. 2 MHz VTO A13 Component Identification	8-27
5-14.50 MHz Bandpass Flatness Display	5-32	8-21. 47 MHz Automatic Phase Control and 2 MHz Voltage Tuned Oscillator.	8-27
5-15.44 MHz Rejection Adjustment Test Setup	5-33	8-22. P/O Power Supply A5 Component Identification	8-29
5-16.30 MHz Calibration Amplitude Adjustment setup	5-35	8-23. 2 MHz VTO Shaping Circuit	8-29
7-1. Power Supply Partial Schematic (Part of Change F)	7-5	8-24 P/O 3 MHz Amplifier A2 Component Identification	8-31
7-2. Deflection Amplifier A7 Component Identification (Part of Change H)	7-12	8-25. 3 MHz Amplifier (Sheet 1 of 2)	8-31
7-3. Deflection Amplifier (Part of Change H)	7-13	8-26. P/O 3 MHz Amplifier A2 Component Identification	8-33
7-4. Log/Linear Amplifier Partial Schematic (Part of Change J)	7-14	8-27. 3 MHz Amplifier (Sheet 2 of 2)	8-33
7-5. Log/Linear Amplifier Partial Schematic (Part of Change J)	7-14	8-28. LC Filter A1 Component Identification	8-35
7-6. Deflection Amplifier A7 Component Identification (Part of Change O).	7-16	8-29. LC Bandwidth Filter	8-35
7-7. Deflection Amplifier Partial Schematic (Part of Change O)	7-17	8-30. Amplifier/Filter Control Circuits	8-37
7-8. Deflection Amplifier Partial Schematic (Part of Change O)	7-17		

ILLUSTRATIONS (cont'd)

Figure	Page	Figure	Page
8-31. P/O Crystal Filter A4 Component Identification	8-39	8-42. P/O Scan Generator A6 Component Identification	8-49
8-32. Crystal Filter (1 of 2)	8-39	8-43. Scan Generator and Trigger Circuits	8-49
8-33. P/O Crystal Filter A4 Component Identification	8-41	8-44. P/O Scan Generator A6 Component Identification	8-51
8-34. Crystal Filter (2 of 2)	8-41	8-45. Scan Driver and Pen Lift Driver	8-51
8-35. Simplified Diagram, Log Mode of Operation	8-42	8-46. P/O Power Supply A5 Component Identification	8-53
8-36. P/O Log/Linear Amplifier A8 Component Identification	8-43	8-47. Analogic Circuit	8-53
8-37. Log/Linear Amplifier (1 of 2)	8-43	8-48. P/O Scan Generator A6 Component Identification	8-55
8-38. P/O Log/Linear Amplifier A8, Component Identification	8-45	8-49. Reference Oscillator and LOG REFERENCE Index Light Circuit	8-55
8-39. Log/Linear Amplifier (2 of 2)	8-45	8-50. P/O Power Supply A5 Component Identification	8-57
8-40. Deflection Amplifier A7 Component Identification	8-47	8-51. Power Supply	8-57
8-41. Deflection Amplifier	8-47		

TABLES

Table	Page	Table	Page
1-1. 8552B Specifications	1-3	7-1. Manual Changes by Serial Number	7-1
1-2. Test Equipment and Accessories.	1-4	7-2. Summary of Changes by Component	7-2
4-1. Front Panel Checks	4-4	7-3. Replaceable Parts (Part of Change H)	7-10
4-2. Bandwidth Checks	4-8	7-4. Replaceable Parts (Part of Change X)	7-22
4-3. Bandwidth Selectivity Checks	4-10	8-1. Etched Circuit Soldering Equipment	8-4
4-4. Modulation Frequencies for Checking Scan Time	4-14	8-2. System Test and Troubleshooting Procedure	8-9
4-5. Performance Check Test Record.	4-15	8-3. Schematic Diagram Notes	8-16
5-1. Modulation Frequencies for Checking Scan Time.	5-7	8-4. IF Section Assy & Component Location	8-17
5-2. Analogic Threshold Adjustment	5-37	8-5. Gain Changes when LOG REF LEVEL Switch is Adjusted.	8-21
5-3. Display Calibration Conditions	5-38	8-6. IF-to-RF Sections Interconnecting Jack Identification	8-23
5-4. Factory Selected Components	5-39	8-7. IF-to-Display Sections Interconnecting Plug Identification	8-23
5-5. Check and Adjustment Test Record	5-40		

APPENDIXES

A. REFERENCE	A - 1
B. COMPONENTS OF END ITEM LIST (Not Applicable)	
C. ADDITIONAL AUTHORIZATION LIST (Not Applicable)	
D. MAINTENANCE ALLOCATION	
E. EXPENDABLE SUPPLIES AND MATERIALS LIST (Not Applicable)	

SECTION O

INTRODUCTION

0-1. SCOPE .

This manual describes Plug-in Unit, Electronic Test Equipment PL-1388/U and provides instructions for operation and maintenance. Throughout this manual, the PL-1388/U is referred to as Hewlett-Packard Model 8552B Spectrum Analyzer IF Section.

0-2. INDEXES OF PUBLICATIONS.

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

0-3. FORMS AND RECORDS.

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/NAVSUPINST 4030.29/AFR 71-13/MCO P4030.29A and DLAR 4145.8.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33B/AFR 75-18/MCO P4610.19C and DLAR 4500.15.

0-4. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR).

EIR's will be prepared using DA Form 2407, Maintenance Request. Instructions for preparing EIR's are provided in TM 38-750, The Army Maintenance Management System. EIR's should be mailed directly to Commander, US Army CERCOM, ATTN: DRSEL-MA-Q, Fort Monmouth, NJ 07703. A reply will be furnished directly to you.

0-5. ADMINISTRATIVE STORAGE.

"Administrative storage of equipment issued to and used by Army activities shall be *in* accordance with paragraph 4-7.

0-6. DESTRUCTION OF ARMY ELECTRONICS MATERIEL.

Destruction of Army electronics materiel to prevent enemy use shall be *in* accordance with TM 750-244-2.

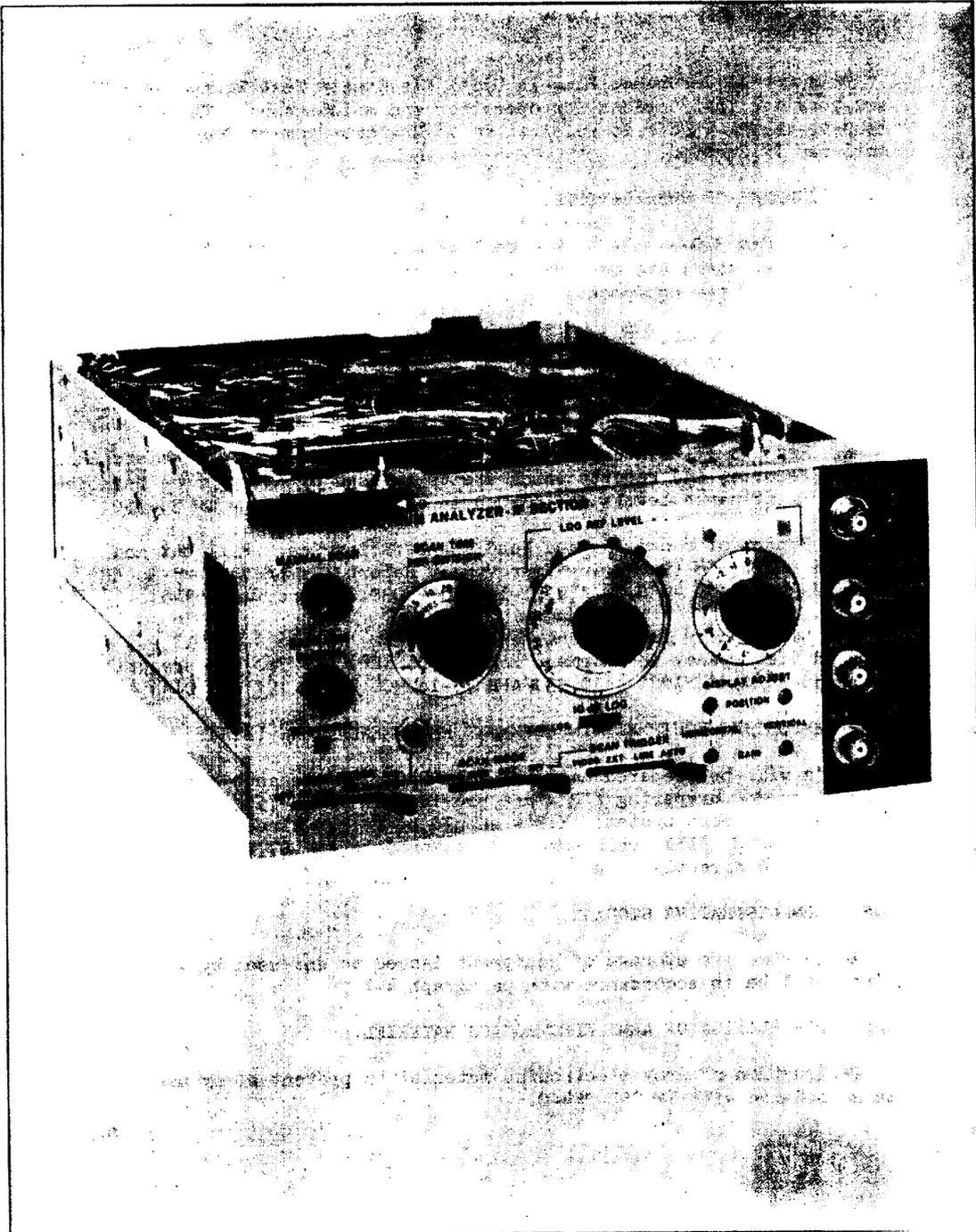


Figure 1-1. Model 8552B Spectrum Analyzer IF Section

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 8552B Spectrum Analyzer IF Section. This section covers instrument identification, description, accessories, specifications and other basic information. A more complete discussion of overall operation of the Spectrum Analyzer system is given in RF Section manuals.

1-3. Figure 1-1 shows the Hewlett-Packard Model 8552B Spectrum Analyzer IF Section.

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

SECTION II, INSTALLATION, provides information relating 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 whether the instrument is performing in accordance with published specifications.

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

SECTION VI, REPLACEABLE PARTS, **deleted. Refer to TM 11-6625-2781-24P-1 for replaceable parts.**

SECTION VII, MANUAL CHANGES, provides backdating information.

SECTION VIII, SERVICE, provides information required to service the instrument.

1-5. Deleted.

1-8. Instrument specifications are listed in Table 1-1. These specifications are the performance standards, or limits against which the instrument

may be tested. Table 1-1 also lists supplemental characteristics. Supplemental characteristics are not specifications but are typical characteristics included as additional information for the user.

1-7. INSTRUMENTS COVERED BY MANUAL

1-8. This instrument has a two-part serial number. The first four digits and the letter or the first three digits and the hyphen comprise the serial number prefix. The last five digits form the sequential suffix that is unique to each instrument. The contents of this manual apply directly to instruments having the **serial prefix 1410A**.

1-9. An instrument manufactured after the printing of this manual may have a serial prefix that is **different from that indicated above. If so, refer to Section VII and make the applicable manual changes.**

1-10. In addition to change information, **Section VII** may contain information for correcting errors in the manual. To keep this manual as current and accurate as possible, Hewlett-Packard recommends that you periodically request the latest Manual Changes supplement.

1-11. For information concerning a serial number prefix **not covered in this manual, contact your nearest Hewlett-Packard office.**

1-12. DESCRIPTION

1-13. The HP Model 8552B Spectrum Analyzer IF Section was designed to be used in conjunction with an RF Section and a Display Section.

1-14. The complete 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 (μ accordingly, absolute and relative measurements of both amplitude and frequency can be made.

1-15. The instrument controls are arranged for easy operation. For wide spectrum analysis, the operator can use the preset scan of the RF Section used, or for a more detailed study, the spectrum width can be progressively narrowed. The frequency scan can be stopped to allow use of 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.

1-16. OPTIONS

1-17. The standard 8552B provides -30 ± 0.3 dBm calibrator output (7.07 mV into 50 ohms) at 30 ± 0.003 MHz. A standard BNC connector is used.

1-18. Option HO1. The calibrator output impedance is 75 ohms with an output of 8.66 mV (-30 dBm). The CAL OUTPUT Connector is equivalent to the Western Electric WE-560A.

1-19. Option H02. The calibrator output impedance is 75 ohms with an output of 8.66 mV (-30 dBm). The CAL OUTPUT connector is a BNC.

1-20. Option H04. The Log Amplitude reference is calibrated in dB μ V (0 dB μ V is 1 μ V across 50 ohms).

1-21. EQUIPMENT REQUIRED BUT NOT SUPPLIED

1-22. The Model 8552B must be mated with a standard 8550 series RF Section and a 140 series Display Section before it can function as a spectrum analysis system.

1-23. RF Sections

1-24. The available 8552B Options must be mated with the following RF Sections:

- | | |
|------------------------|--|
| 1) 8552B-H01 | 8553B-H01 |
| 2) 8553B-H02 | 8553B-H02 |
| 3) 8552B-H04 | 8553,8554,8555 (standard)
8556A-H11 (special) |

1-25. Display Sections

1-26. The 140 Display Sections are equipped with a fixed-persistence, non-storage CRT. 141T Display Sections are equipped with a variable persistence, storage CRT. The 143 Display Sections have a large screen (8 x 10 inch) fixed-persistence, non-storage CRT.

Table 1-1. 8552B Specifications

SPECIFICATIONS	
FREQUENCY	
Resolution:	Bandwidth Selectivity: 60 dB/3 dB IF bandwidth ratio <11:1 for IF bandwidths from 30 Hz to 3 kHz and <20:1 for IF bandwidths from 10 kHz to 300 kHz, 60 dB points separated by <100 Hz for 10 Hz bandwidth.
Bandwidth: IF bandwidths of 10 Hz to 300 kHz provided in a 1, 3 sequence.	
Bandwidth Accuracy: Individual IF bandwidths' 3 dB points calibrated to *20%(10 kHz bandwidth ±5%).	
AMPLITUDE	
Absolute Amplitude Calibration Range:	Amplitude Accuracy:
Log: From -130 to +10 dBm, 10 dB/div on a 70 dB display or 2 dB/div expand below LOG reference.	Switching between bandwidths (at 20°C):
H04: From -23 to +117 dBV, 10 dB/div on a 70 dB display or 2 dB/div expand below LOG reference.	0.1-300 kHz ±0.5 dB ±5.8%
	0.03-300 kHz ±1.0 dB ±12.0%
	0.01-300 kHz ±1.5 dB ±19.0%
	Amplitude Display ±0.25 dB/dB ±2.8%
	but not more than ±1.5 dB of full 8 div. deflection
	over full 70 dB display range
Calibrator Output:	
Amplitude: -30 dBm ± 0.3 dB; +77 dBμV (H04)	
Standard/H04-8552B: 7.07 mV into 50 ohms	
H01/H02-8552B: 8.66 mV into 75 ohms	
GENERAL	
Scan Time: 16 internal scan rates from 0.1 ms/div to 10 sec/div in a 1, 2, 5 sequence, or Manual Scan.	Power Requirements: 115 or 230 volts ±10%, 50 to 60 Hz, normally less than 225 watts for complete analyzer (varies with plug-in units used).
Scan Time Accuracy: 0.1 ms/div to 20 ms/div: +10% 50 ms/div to 10 sec/div: ±20%	Weight: Model 8552B IF Section: Net 9 lb., 11 oz., (4.4 kg.)
Scan Characteristics	
Scan Mode:	Scan Trigger: For Internal scan mode, select between:
Internal: Analyzer repetitively scanned by internally generated ramp; synchronization selected by Scan Trigger.	Auto: Scan free runs.
Single: Single scan actuated by front panel push. button.	Line: Scan synchronized with power line frequency.
External: Scan determined by 0 to +8 volt external signal; scan input impedance >10 kΩ.	External: Scan synchronized with >2 volt (20V max) trigger signal. Polarity selected by internal switch (on assembly A6) of 8552B IF Section. Scan triggers with negative impulse when switch in NORMAL position.
Blanking: -1.5V external blanking signal required.	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).
Manual: Scan controlled by position of Manual Scan knob.	
Penlift Characteristics	
Penlift output: 0 to +14 volts (0V pen down). Available in Internal and Single Scan modes and Auto, Line and Video Scan Trigger.	

1-27. EQUIPMENT AVAILABLE

1-28. The following equipment is recommended for maintenance purposes:

- a. HP 11592A Service Kit (shown in Figure 1-2).
- b. Six-pin extender board (not included in HP 11592A Service Kit) HP Part Number 5060-5914.

1-29. RECOMMENDED TEST EQUIPMENT

1-30. Table 1-2 lists the test equipment and accessories required to check, adjust and repair the 8552B Spectrum Analyzer IF Section. If substitute equipment is used, it must meet the Minimum Specifications listed in **Table 1-2. Refer to the Maintenance Allocation Chart in the appendix for the required test equipments.**

Table 1-2. Test Equipment and Accessories

Item	Minimum Specifications or Required Features	Suggested Model	Note*
Amplifier	Frequency Range: 3 to 30 MHz Gain: 20 dB Input and Output Impedance: 50 ohms Flatness: ±1 dB	HP 8447A	P, A
Attenuator	Frequency Range: 0 – 30 MHz Flatness: ±0.5 dB Steps: 1 dB from 0 to 12 dB	IIP 355C	A
Attenuator	Frequency Range: 0 – 30 MHz Flatness: ±0.5 dB Steps: 10 dB – 0 to 110 dB	HP 355D	A
Audio Oscillator	Frequency Range: 10 kHz Output Amplitude: 2V rms Frequency Accuracy: ±2% Output Impedance: 600 ohms	HP 200CD	P, A
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	P, A, T
Crystal Detector	Frequency: 1 – 50 MHz Sensitivity: >0.04 mV/μW Frequency Response: ±0.2 dB Polarity: Negative	HP 423A Crystal Detector	A
Frequency Counter	Frequency Range: 100 kHz – 50 MHz Accuracy: ±0.001% Sensitivity: 30 mV rms Readout Digits: 7	HP 5245L Frequency Counter with HP 5261A Plug-in	P, A
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
<p>Note* Performance = P; Adjustment = A; Troubleshooting = T</p>			

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

Item	Minimum Specifications or Required Features	Suggested Model	Note*
Ohmmeter	Resistance Range: 1 ohm to 100 megohms Accuracy: ± 10 of Reading	HP 412A	T
Power Supply	Output Voltage: Variable, 0 – 30 Vdc Output Current: 0 – 400 mA Meter Resolution: <5 mV	HP 6217A Power supply	A
Signal Generator	Frequency Range: 1 – 30 MHz Output Amplitude: >0 dBm Amplitude Accuracy: $\pm 1\%$ Frequency Accuracy: $\pm 1\%$ Output Impedance: 50 ohms Modulation: External to 100%	HP 606B HF Signal Generator	A
Signal Generator	Frequency Range: 30 to 50 MHz Output Amplitude: >-20 dBm Amplitude Accuracy: $\pm 1\%$ Output Impedance: 50 ohms Modulation: External Pulse or CW to 100%	HP 608F VHF Signal Generator	P, A, T
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 – 500 mV rms into 50 ohms. Frequency Reference Stability: Short term, 5 x 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
Sweep Oscillator	Frequency Range: 1 – 60 MHz Output Flatness: ± 0.25 dB over full band Output Impedance: 50 ohms Sweep Width: Up to 10 MHz Output Amplitude: At least 0 dBm.	HP 8601A Generator/Sweeper	A
Pulse Generator	Rep Rate: 10 kHz to 100 kHz Pulse Width: 0.5 to 5 msec Pulse Amplitude: 2V	HP 222A	A
RF Voltmeter	Frequency Range: 3 MHz to 50 MHz Amplitude Range: 0 to -40 dBm Accuracy: $\pm 5\%$	HP 3406A	T
Tunable RF Voltmeter	Bandwidth: 1 kHz Frequency Range: 1 – 50 MHz Sensitivity: 10 mV – 1V rms Input Impedance: ≥ 0.1 megohms	HP 8405A Vector Voltmeter	P, A, T
Extender Board	6-Pin	HP 5060-0050	A, 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
Note* Performance = P; Adjustment = A; Troubleshooting = T			

General Information

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

Item	Minimum Specifications or Required Features	Suggested Model	Note*
50-ohm Termination	Frequency Range: Dc -310 MHz VSWR: 1.1 Power Rating: 0.5 Watt 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 (2)	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 (3)	BNC Female to Type N Male	UG-201A/U HP 1250-0780	P, A
Voltage Probe	Dust Banana Plug-to-Probe Tip and Clip (Ground) Lead	HP 10025A Straight-thru Voltage Probe	A, T
Cable Assy (6)	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	A, T
Cable Assy	Dual Banana Plug to Dual Banana Plug, 44 inches long	HP 11000A	A, T
Cable Assy	BNC Male to one end only; 44 inches. (Attach Teat Clips to Shield and Center Conductor.)	HP 10501A	A, T
Tuning Tool, Slot	Nonmetallic, 6-inch shaft	Gowanda PC9668	A, T
Screwdrivers	Pozidrive No. 1 (small) Stanley No. 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	A, T
Adapter	Type N Female to BNC Female Adapter	FXR 21850	A, T
Adapter	Type NBC Plug-to-Plug Adapter	UG-491B/U HP 1250-0216	A, T
Tuning Tool	Fluted Tip, Siemens Halske B63399-B004-X000	HP 8710-0957	A

Note

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
Service Kit	<p>Contents:</p> <p>140/141 Display Section to Spectrum Analyzer Plug-in Extender Assembly (IIP 11592-60015)</p> <p>IF to RF Unit Interconnection Extender Cable Assembly (HP 11592-60016)</p> <p>Selectro Female to BNC Male Test Cable, Three each, 36 inches long (HP 11592-60001)</p> <p>Selectro Male to Selectro Female Test Cable, Two each, 8 inches long (HP 11592-60003)</p> <p>Selectro Female to Selectro Female Cable, One each, 8 inches long (HP 11592-60002)</p> <p>Extender Board Assembly, 15 pins, 30 conductors, for Plug-in Circuit Boards (HP 11592-60011)</p> <p>Fastener Assembly, 8553 Circuit Board Extender, Two each (IIP 11592-20001 and IIP 1390-0170)</p> <p>Selectro Jack-to-Jack Adapter (HP 1250-0827)</p> <p>Wrench, open end, 15/64 inch (HP 8710-0946)</p> <p>BNC Jack-to-OSM Plug Adapter (HP 1250-1200)</p> <p>OSM Plug-to-Plug Adapter (HP 1250-1158)</p> <p>Cable Assembly, R and P Connector (HP 11592-60013)</p>	HP 11592A Service Kit	Adjustment, Troubleshooting

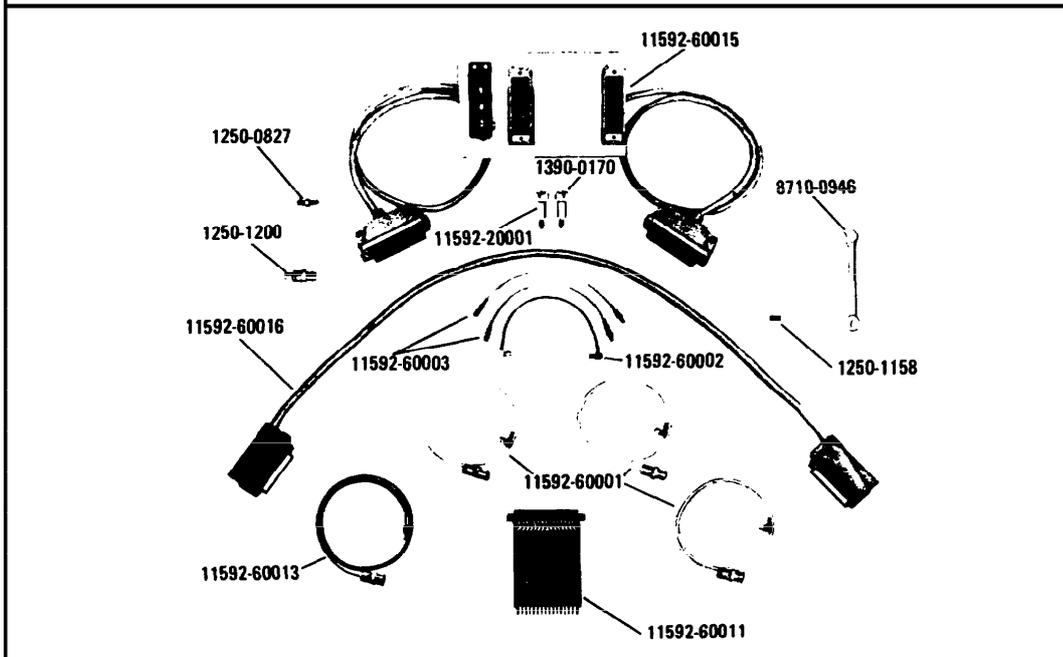


Figure 1-2. HP 11592A Service Kit Required for Maintenance

TM 11-6625-2781-14-1

Installation

Model 8552B

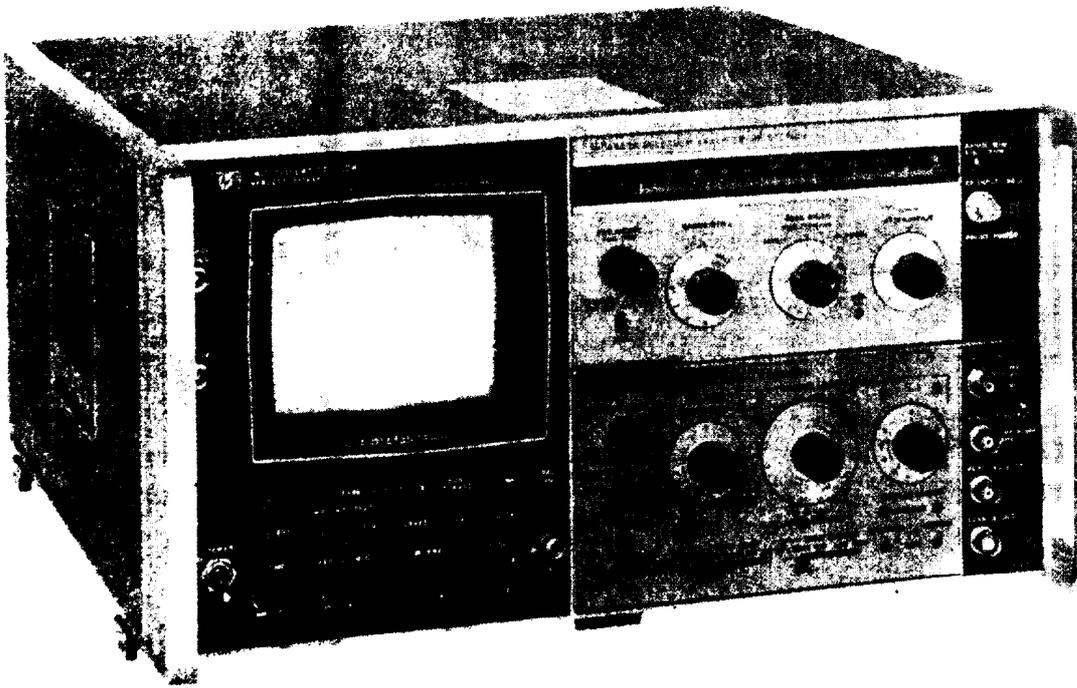


Figure 2-1. Model 8552B Spectrum Analyzer IF Section with 8553B RF Section and 141T Display Section

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 received separately, the plug-ins must be mechanically fitted together, electrically connected, and inserted in a Display Section.

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 Check

2-7. As soon as possible after receipt, the instrument should be checked in accordance with the Performance Tests in 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, **refer to paragraph 0-3 and complete the proper form. Retain**

shipping carton and padding material for inspection by the carrier.

2-10. POWER REQUIREMENTS

2-11. The IF Section receives its power from the Display Section. Before connecting the analyzer to a line power source, perform the installation procedures given in the Display Section manual.

2-12. CONNECTIONS

2-13. Since the RF and IF Sections are 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.

2-14. INSTALLATION CHECK

2-15. 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.

2-16. STORAGE AND SHIPMENT

2-17. Original Packaging

2-18. The same containers and materials used in factory packaging can be obtained through any Hewlett-Packard Sales and Service office.

2-19. If the instrument is being returned to Hewlett-Packard for servicing attach a tag indicating the type of service required, return address, model number and full serial number. Also mark the container FRAGILE to assure careful handling.

2-20. In any correspondence refer to the instrument by model number and full serial number.

2-21. Other Packaging Materials

2-22. The following general instructions should be used for repackaging with commercially available materials.

- a. Wrap the instrument in heavy paper or plastic. (If shipping to a Hewlett-Packard Service office or center, attach a tag indicating the type of service required, return address, model number and full serial number.)
- b. Use a strong shipping container. A double-wall carton made of 350 pound test material is adequate.
- c. Use enough shock-absorbing material (three to four inch layer) around all sides of the instrument to provide firm cushion and prevent movement inside the container. Protect the control panel with cardboard.
- d. Seal the shipping container securely.
- e. Mark the shipping container FRAGILE to assure careful handling.

SECTION III OPERATION

3-1. INTRODUCTION

3-2. This section provides operating instructions for the HP 8552B IF Section. The panel features are described in Figure 3-1, Operator's checks are outlined in Figure 3-2, and Operating Instructions are provided in the appropriate RF Section manual. Operator's Maintenance provides instructions for maintenance that can be done by the operator.

3-3. PANEL FEATURES

3-4. The panel features of the 8552B are shown and explained in Figure 3-1, 8552B Spectrum Analyzer IF Section Controls, Connectors and Indicators.

3-5. OPERATOR'S CHECKS

3-6. The Operator's Checks are designed to familiarize the operator with the 8552B and give him an understanding of the instrument capabilities.

3-7. The FRONT PANEL CHECK PROCEDURE and Table 4-1, (in Section 4), provide the Operator's Checks for the 8552B.

NOTE

When the 8552B-H04 is being used, the adjustment of paragraph 3-14 should be substituted for those in Section IV.

3-8. OPERATIONAL ADJUSTMENTS

3-9. During checkout at the factory, the IF Section is adjusted for proper operation. Upon receipt of the instrument the operator must perform the front panel adjustments as shown in the RF Section manual.

3-10. H01/H02 Instruments

3-11. For H01/H02 instruments it should be recalled that at -30 dBm, the equivalent voltage is 8.66 mV (75 ohms). Perform the tests and adjustments as shown in the RF Section Manual.

3-12. H04 Instruments

3-13. The -30 dBm CAL OUTPUT signal is used to calibrate the analyzer. However, since 0 dB μ V (across 50 ohms) = -107 dBm, the -30 dBm signal corresponds to +77 dB μ V. To achieve correct log calibration, LOG REF LEVEL is set to 80 dB μ V

and AMPL CAL is set so that the signal peaks 3 dB below the LOG REF graticule line. And since -30 dBm = 7.07 mV (across 50 ohms), AMPL CAL is fine-adjusted for 7.1 mV (\approx 7.07 mV) on the CRT display.

Use the following procedure as a supplement to the procedures specified in Section IV and the RF Section manuals for AMPL CAL adjustment.

NOTE

When the 8556A RF Section is used, the correct adjustment procedure is located in the RF Section manual.

1. Make VERTICAL GAIN and POSITION adjustments as specified in the manuals.
2. Set LOG REF LEVEL to 80 dB μ V (check that LOG/LINEAR is set to 10 dB LOG, LOG REF LEVEL Vernier is set to 0, and CAL OUTPUT is connected to RF INPUT).
3. Adjust AMPL CAL to set the 30 MHz calibrator signal 3 dB below the top (0 dB) graticule line on the CRT.
4. Step INPUT ATTENUATION and LOG REF LEVEL through their ranges. The signal should increase or decrease 10 dB per step.
5. Set LOG/LINEAR to LINEAR and LINEAR SENSITIVITY to 1 mV/div. Adjust AMPL CAL to set the 30 MHz Calibrate; signal for 7.1 divisions on the CRT.

3-14. OPERATING INSTRUCTIONS

3-15. Refer to the RF Section manuals for specific operating instructions.

3-16. OPERATING TIPS

3-17. When using the 10 Hz Bandwidth, use a scan time of 1 second or slower, Special provision is made in the 8552B IF Section to increase the stability of the 50 MHz Converter during the slow scans.

3-18. When using MANUAL SCAN or EXTERNAL SCAN, the DISPLAY UNCAL lamp warns if the combination of control settings being used degrades the calibration. Do not sweep the analyzer any faster than it would be swept by an internal scan with the control settings selected.

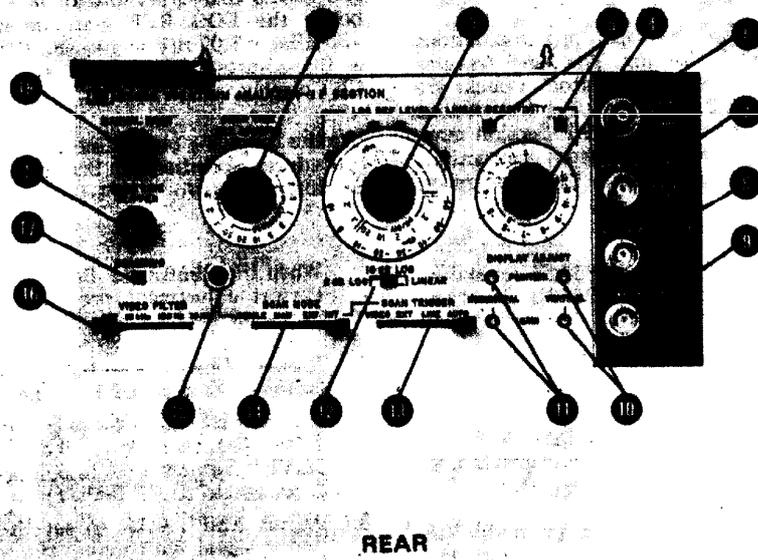


Figure 3-1. 8662B Spectrum Analyzer IF Section Controls and Connectors Indicators

FRONT AND REAR PANEL CONTROLS AND CONNECTORS

- 1 **BASE LINE CLIPPER.** Blanks lower part of trace to blank baseline noise. Blanking function also prevents blooming with a variable-persistence storage display section.
- 2 **SCAN TIME PER DIVISION.** Controls scan time.
- 3 **LOG REF LEVEL · LINEAR SENSITIVITY Ranges.** When the Log-Linear Mode Switch is in either of the Log positions and the vernier dial to the right is set at *black* zero, the *black* number under any illuminated index lamp indicates the power level at the display's LOG REF LEVEL. With the Log-Linear Mode Switch in the LINEAR position, the *blue* number under any illuminated index lamp indicates the per division multiplier for calibrated voltage amplitude, provided the vernier is set to *blue* 1. If the LOG REF LEVEL switch carries a third red scale, these numbers apply only when an 8556 RF Section is used.
- 4 **LOG REF LEVEL · LINEAR SENSITIVITY Vernier.** Indicates 1-dB increments for logarithmic amplification; indicates multiplication factors up to unity for linear amplification.
- 9 **LOG REF LEVEL LINEAR SENSITIVITY Mode Indicators.**
 "+" indicates the amplitude is to be read in dB-Log mode (the Range, Vernier and Display levels are to be added algebraically).
 "x" indicates the amplitude is to be read in volts-linear mode (the Range, Vernier and Display levels are to be multiplied together).
- 6 **CAL OUTPUT.** Provides a 30-MHz signal at -30 dBm for amplitude calibration of spectrum analyzer.
- 7 Provides penlift output 0 to 14 Vdc (0 Vdc while scanning) to compatible TTL HP recorders (HP 7005, 7035, 7004 and 7034). Blanking input when SCAN MODE is set to EXT (-15 Vdc required). Trigger Input of > 2 Vpk maximum) when SCAN MODE is set to INT and SCAN TRIG is set to EXT. (Polarity depends on position of internal switch A6S1, NORM-negative and REV-positive; factory set in the NORM (normal) position.
- 8 **VERTICAL OUTPUT.** Detected video output proportional to vertical deflection on CRT.
- 9 **SCAN IN/OUT.** Scan Output of -5 to +5 Vdc for 10-divisions of horizontal deflection on CRT (1k ohm output impedance). Scan Input 0 to +8 Vdc for 10-divisions of horizontal deflection on CRT (10k ohm input impedance).
- 10 **VERTICAL.** Adjusts vertical position and gain of deflection amplifier.
- 11 **HORIZONTAL.** Adjusts horizontal position and gain of deflection amplifier.
- 12 **Log-Linear Mode Switch.** Selects log (2 or 10 dB) or linear display modes.
- 13 **SCAN TRIGGER.** Selects scan trigger mode. Operable only when SCAN MODE is in the INT position.
- 14 **SCAN MODE.** Selects an internally generated ramp scan voltage in SINGLE or INT. The manual scan voltage is set by the MANUAL SCAN control. The EXT. scan voltage must be provided by an external generator.
- 15 **SINGLE.** Press to initiate or stop scan with SCAN MODE switch set to SINGLE.
- 16 **VIDEO FILTER.** May select 10 Hz, 100 Hz, 10 kHz or OFF sections of low-pass filter for detected video.
- 17 **SCANNING.** Lights for duration of each scan.
- 18 **MANUAL SCAN.** Controls scan in MAN position of SCAN MODE (14).
- 19 **P1.** Connects to display section.

NOTE

Do NOT make any VERTICAL GAIN or POSITION adjustments in the 2 dB LOG mode as the front panel calibration will become invalid.

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

3-19. OPERATOR'S MAINTENANCE

3-20. Operator's maintenance involves changing the -12.6 and -10 Vdc fuses, which are located on the rear panel of the 8552B.

3-21. Both fuses (F1 and F2), may be ordered under HP part number 2110-0001.

3-22. If the fuse is replaced and it immediately burns out again, a competent technician should be called to troubleshoot the instrument.

SECTION IV
PERFORMANCE TESTS

4-1. INTRODUCTION

4-2. Perform tests in procedural order 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 1-2.

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. The analyzer must be allowed to warm up at least one-half hour before being tested or adjusted.

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 4-13. After the instrument is set up, proceed with the checks. The instrument should perform as called out in the procedure (paragraphs 4-12 through 4-21) before going on to the performance tests.

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 and a 141T Display Section unless otherwise noted. If another RF Section is used the procedure must be adjusted accordingly: the frequencies used may change and some bandwidths will not be available for checking. If another Display Section is used, the tests that require variable persistence can be performed using an X-Y Recorder.

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

Para.	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 1. If substitute test equipment is to be used, it must meet the specifications listed in order to check 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:

- 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 5 MILLISECONDS
- LOG REF LEVEL -10 dBm
- LOG REF LEVEL Vernier 0
- LOG LINEAR 10 dB 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.

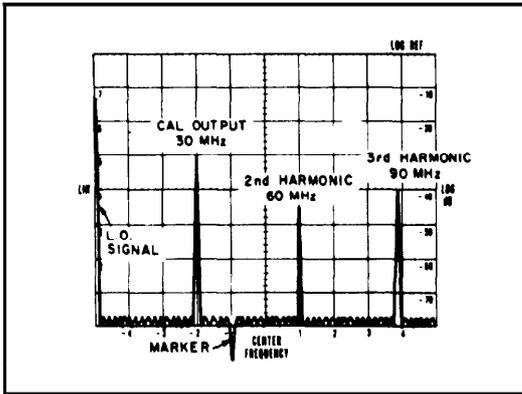


Figure 4-1. 30 MHz Calibrator Signal & Harmonics

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 5 MILLISECONDS. 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.

4-2

NOTE

The other signals on the display are the "zero frequency" First LO feed through and the 60 MHz and 90 MHz harmonics of the calibrator signal.

- d. Set the SCAN WIDTH PER DIVISION control to .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 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 the -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),

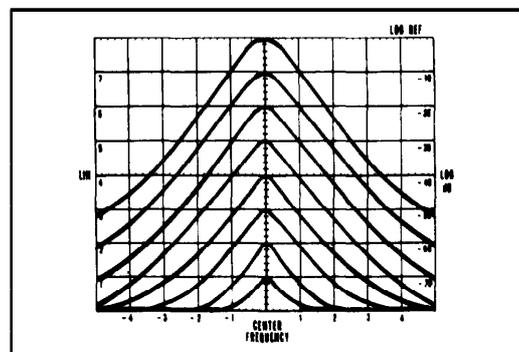


Figure 4-2. Vertical Gain Adjustment

4-18. Ampl. Cal Adjustment Resection

- 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 \cong mV (across 50 ohms), the CRT deflection should be \cong 7.1 divisions.

NOTE

For standard options H01/H02 the CRT deflection should be \approx 8.7 mV across 75 ohms.

- b. Adjust AMPL CAL on RF Section for a \cong 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 10 dB LOG
- LOG REF LEVEL -10 dBm
- TUNING STABILIZER On

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

NOTE

Make NO Front Panel adjustments with LOG- LINEAR set to 2 dB LOG.

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 blank.
Scan	3. Tune SCAN TIME across its range. 4. Return to 5 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. With TUNING STABILIZER on, slowly turn the FREQUENCY control. 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 tune continuously. 10. Signal should not jump 100 kHz.
Bandwidth and Display Uncal Light	11. Reduce BANDWIDTH, SCAN TIME PER DIVISION, and SCAN WIDTH PER DIVISION, using FINE TUNE to center display. 12. Return BANDWIDTH to 10 kHz, SCAN WIDTH PER DIVISION to 20 kHz and SCAN TIME PER DIVISION to 5 MILLISECONDS.	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 -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.

PERFORMANCE TESTS

4-23. Calibrator Output

SPECIFICATION:

Amplitude: .30 dBm \pm 0.3 dB
Frequency: 30 MHz \pm 3 kHz

DESCRIPTION: The Calibrator's amplitude accuracy is checked by comparing the 30 MHz fundamental signal with a source of known accuracy. The frequency is checked by amplifying the signal and measuring it with a frequency counter.

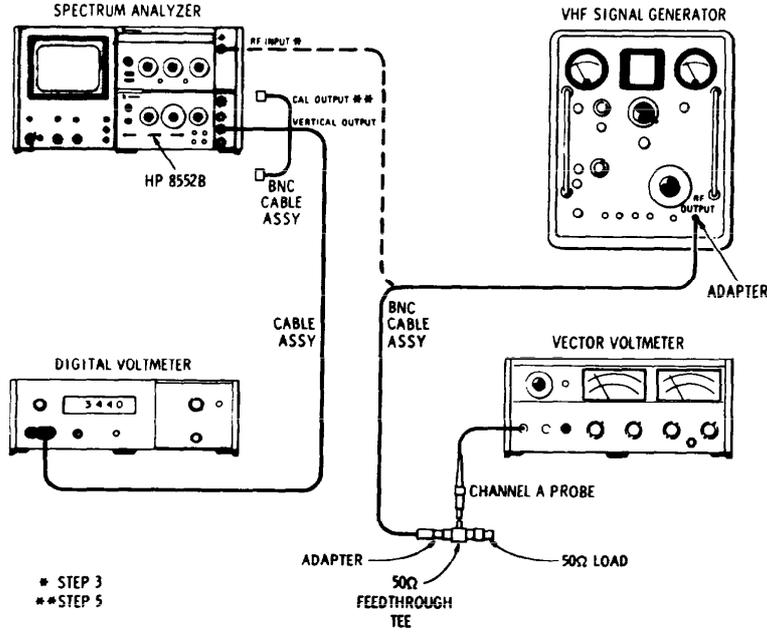


Figure 4-3. Calibrator Amplitude Test Setup

EQUIPMENT:

SIGNAL GENERATOR	HP608F
CABLE ASSEMBLY (2)	HP10503A
CABLE ASSEMBLY	HP11001A
50-OHM TEE	HP11536A
ADAPTER (2)	UG-201A/U
50-OHM TERMINATION	HP 908A
AMPLIFIER	HP 8447A
FREQUENCY COUNTER	HP 5245 L
VECTOR VOLTMETER	HP 8405A
DIGITAL VOLTMETER	HP 3440A/3443A

PERFORMANCE TESTS

4-23. Calibrator Output (cont'd)

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

ANALYZER:

RANGE MHz	0-110
FREQUENCY	30 MHz
BANDWIDTH	300 kHz
SCAN WIDTH	PER DIVISION
SCAN WIDTH PER DIVISION	1 MHz
INPUT ATTENUATION	10 dB
SCAN TIME PER DIVISION	5 MilliSeCOnds
LOG-LINEAR	LINEAR
LINEAR Sensitivity	1 mV/DIV
VIDEO FILTER	OFF
SCAN MODE	INT
SCAN TRIGGER	AUTO

8405A:

FREQ. RANGE -MC	20-40
CHANNEL	
AMPLITUDE RANGE dB	-30

608F:

FREQUENCY RANGE	
MEGACYCLES	30
MODULATION	Cw
ATTENUATION	-30 dBm

3440A:

RANGE	AUTO
-------	------

2. Use signal generator ATTENUATOR VERNIER to set generator amplitude to exactly -30 dBm (7.22 mV for Options H01/H02) as read on vector voltmeter.
3. Disconnect the signal generator from the vector voltmeter; connect signal generator to analyzer RF INPUT, Center the signal on the CRT display with analyzer FREQUENCY control.
4. Set SCAN WIDTH to ZERO and peak the trace with analyzer FREQUENCY control. Use analyzer LINEAR SENSITIVITY vernier to set signal level (as read on digital voltmeter) to 700 ± 0.4 mV. Do not change LINEAR SENSITIVITY vernier during remainder of check.
5. Disconnect the signal generator from RF INPUT and connect CAL OUTPUT to RF INPUT. Peak trace with FREQUENCY control. Signal level (as read on digital voltmeter) should be between 670 and 731 mV (± 0.3 dB):

670 _____ 731 mV

PERFORMANCE TESTS

4-23. Calibrator Output (cont'd)

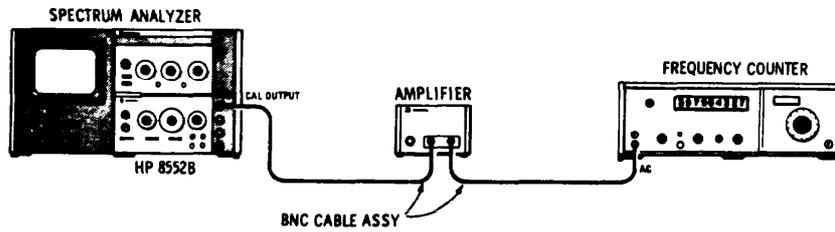


Figure 4-1. Calibrator Frequency Check Test Setup

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

- HP 5245L:
 SAMPLE RATE 9 o'clock
 TIME BASE.
 FUNCTION. FREQUENCY

7. Read CAL OUTPUT on the frequency counter, 30 MHz ± 3 kHz. 29.997 _____ 30.003 MHz

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, all bandwidths except 10 kHz 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.

- 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:
 RANGE-MHz
 FREQUENCY 30 MHz
 BANDWIDTH 300 kHz
 SCAN WIDTH PER DIVISION
 SCAN WIDTH PER DIVISION05 MHz
 INPUT ATTENUATION 10 dB
 SCAN TIME PER DIVISION 6 MILLISECONDS
 TUNING STABILIZER On
 BASE LINE CLIPPER Max ccw
 LOG-LINEAR LINEAR

PERFORMANCE TESTS

4-24. Bandwidth Accuracy (cont'd)

Analyzer control settings (cont'd)

LINEAR SENSITIVITY2mV/Div
VIDEO FILTER10 kHz
SCAN MODEINT
SCAN TRIGGERAUTO

2. Connect CAL OUTPUT to RF INPUT.
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 300 ± 60 kHz (4.8 to 7.2 divisions).

NOTE

4.8 _____ 7.2 div

The bandwidth checks (Table 4-2), assume the use of the 8553B RF Section and 141 T Display Section. With other RF Sections, some bandwidths aren't used; on bandwidths that are used it may be impossible to achieve the resolution needed to take the reading.

5. Repeat steps 3 and 4 to measure the bandwidths listed in Table 4-2, and set the controls as indicated in the table. (When checking .03 and .01 kHz bandwidths: set SCAN MODE to SINGLE, PERSISTENCE to MAX and push single scan button. When finished, set SCAN MODE to INT, PERSISTENCE to MIN.)

Table 4-2. Bandwidth Checks

BANDWIDTH	SCAN WIDTH PER DIVISION	SCAN TIME PER DIVISION	3 dB Bandwidth
100 kHz	20 kHz	5 MILLISECONDS	4.0 _____ 6.0 div
30 kHz	5 kHz	5 MILLISECONDS	4.8 _____ 7.2 div
3 kHz	0.5 kHz	10 MILLISECONDS	4.8 _____ 7.2 div
1 kHz	0.2 kHz	10 MILLISECONDS	4.0 _____ 6.0 div
0.3 kHz	.05 kHz	10 MILLISECONDS	4.8 _____ 7.2 div
0.1 kHz	.02 kHz	0.2 SECONDS	4.0 _____ 6.0 div
.03 kHz	.02 kHz	1 SECONDS	1.2 _____ 1.8 div
.01 kHz	.02 kHz	1 SECONDS	0.4 _____ 0.6 div

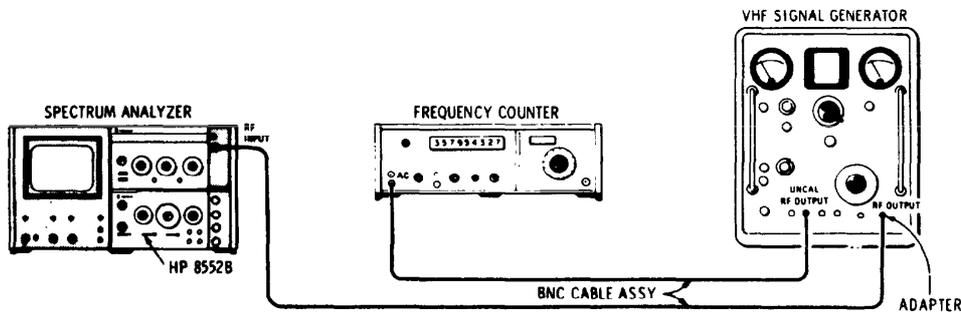


Figure 4-5. 10 kHz Bandwidth Accuracy Test Setup

PERFORMANCE TESTS

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:

```

RANGE - MHz.. . . . . 0-110
FREQUENCY . . . . . 30 MHz
FINE TUNE . . . . . Centered
BANDWIDTH . . . . . 100kHz
SCAN WIDTH . . . . . PER DIVISION
SCAN WIDTH PER DIVISION" : : : : : 0.5 MHz
INPUT ATTENUATION
SCAN TIME PER DIVISION " : : : : : 5MILLISECONDS
BASE LINE CLIPPER . . . . . Maxccw
LOG-LINEAR . . . . . 10 dB LOG
L O G   R E F   L E V E L ; : : : : : - 2 0 d B m
VIDEO FILTER . . . . . OFF
SCAN MODE . . . . . INT
S C A N   T R I G G E R . : : : : : "   A U T O
    
```

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

4-28. Scan Time Accuracy

SPECIFICATION:

0.1 ms/div up to 20 ms/div $\pm 10\%$.
50 ms/div to 10s/div $\pm 20\%$.

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.

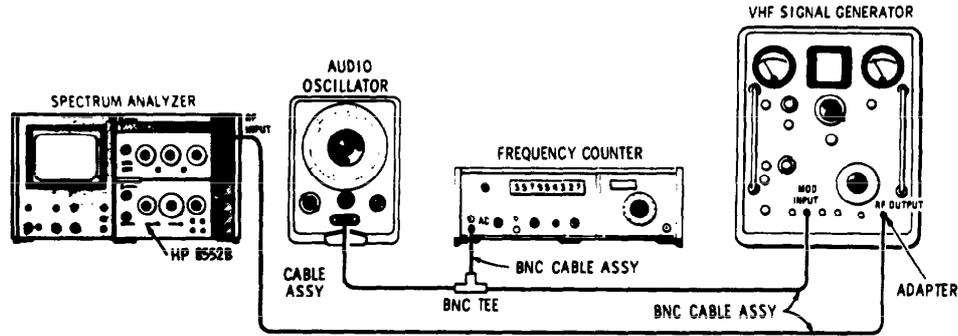


Figure 4-6. Scan Time Accuracy Test Setup

EQUIPMENT:

FREQUENCY COUNTER #	HP 5245L
AUDIO OSCILLATOR	HP 200CD
SIGNAL GENERATOR	HP 608F
CABLE ASSEMBLY (3)	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:

RANGE - MHz	0-110
FREQUENCY	30 MHz
FINE-TUNE	Centered
BANDWIDTH	300 kHz
SCAN WIDTH	ZERO
INPUT ATTENUATION	10 dB
SCAN TIME PER DIVISION	2 MILLISECONDS
BASE LINE CLIPPER 0 , , , 0	Max CCW
LOG LINEAR	LINEAR
LINEAR SENSITIVITY " :	1 mV/DIV
VIDEO FILTER	10 kHz
SCAN MODE	INT
SCAN TRIGGER " : : ; :	VIDEO

PERFORMANCE TESTS

4-28. Scan Time Accuracy(cont'd)

- 608F:
 MEGACYCLES30
 ATTENUATION-40dBm
 MODULATIONEXTAM
 FREQUENCY RANGEB
- 5245L:
 SENSITIVITY (VOLTS RMS)0.1
 FUNCTIONPERIOD AVERAGE -(10)
 TIME BASE10μs
- 200CD :
 RANGEX100
 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 PFR DIVISION positions as listed in Table +4, The approximate HP 200CD frequency settings and HP 5245L PERIOD AVERAGE tolerances are also contained in Table 4-4.

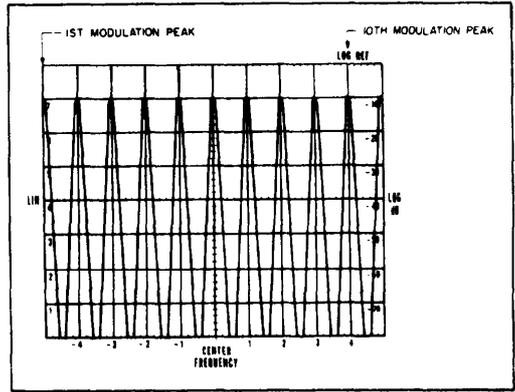


Figure 4-7. Scan Time Modulation Peaks

Table 4-4. Modulation Frequencies for Checking Scan Time

SCAN TIME PER DIVISION	HP 200CD Frequency	Scan Time
0.1 MILLISECONDS	10 kHz	90 _____ 110 μs
0.2 MILLISECONDS	5 kHz	180 _____ 220 μs
0,5 MILLISECONDS	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 _____ 6.5 ms
10 MILLISECONDS	100 Hz	9.0 _____ 11.0 ms
20 MILLISECONDS	50 Hz	18.0 _____ 22.0 ms
60 MILLISECONDS	20 Hz	40.0 _____ 60.0 ms
0.1 SECONDS	10 Hz	80.0 _____ 120.0 ms
0.2 SECONDS	5 Hz	160 _____ 240.0 ms

Table 4-5. Performance Check Test Record

Hewlett-Packard Model 8552B Spectrum Analyzer IF Section Serial No. _____		Test Performed by: _____ Date: _____			
Para. No.	Test Description	Measurement Unit	Min	Actual	Max
4-23	Calibrator Output Amplitude: -30 dBm ±0.3 dB Frequency: 30 MHz, ± 3 kHz	millivolts MHz	676 29.997	_____	724 30.003
4-24	Bandwidth Accuracy Bandwidths: ± 20% 10 kHz Bandwidth: ± 5%				
	300 kHz Bandwidth	divisions		_____	7.2
	100 kHz Bandwidth	divisions		_____	6.0
	30 kHz Bandwidth	divisions		_____	7.2
	10 kHz Bandwidth	kHz		_____	10.5
	3 kHz Bandwidth	divisions		_____	7.2
	1 kHz Bandwidth	divisions		_____	6.0
	.3 kHz Bandwidth	divisions		_____	7.2
	.1 kHz Bandwidth	divisions		_____	6.0
	.03 kHz Bandwidth	divisions		_____	1.8
	.01 kHz Bandwidth	divisions		_____	0.6
4-25	Bandwidth Selectivity Bandwidths				
	300 kHz	ratio		_____	20:1
	100 kHz	ratio		_____	20:1
	30 kHz	ratio		_____	20:1
	10 kHz	ratio		_____	20:1
	1 kHz	ratio		_____	11:1
	0.3 kHz	ratio		_____	11:1
	0.1 kHz	ratio		_____	11:1
	0.03 kHz	ratio		_____	11:1
	0.01 kHz	ratio		_____	11:1
	0.01 kHz	Hz		_____	— 100
4-26	Switching Between Bandwidths				
	±0.5 dB 100 Hz to 300 kHz	divisions		_____	0.8
	±1.0 dB 30 Hz to 300 kHz	divisions		_____	1.6
	±1.6 dB 10 Hz to 300 kHz	divisions		—	2.6
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	4.86	_____	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 Check Test Record (cont'd)

Para. No.	Test Description	Measurement Unit	Min	Actual	Max
4-28	Scan Time				
	Accuracy at 0.1 MILLISECONDS	μ s	90	_____	110
	0.2 MILLISECONDS	μ s	180	_____	220
	0.5 MILLISECONDS	μ s	450	_____	550
	1 MILLISECONDS	ms	0.9	_____	1,1
	2 MILLISECONDS	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 SECONDS	ms	160	_____	240	

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, procedure, 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. The analyzer must warm up one hour before any adjustments are attempted.

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 Screwdrivers

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 Posidriv 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. Use HP 8710-1010 and HP 8710-0957 tuning tools for tuning the slugs in the ferrite inductors in the IF Section. No other tools 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 capacitor.

5-11. HP 11692A 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.

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 11S92-60015 Extender Assembly is especially critical and fabrication should not be attempted. Other items in the kit may be built 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/A12, A13 and A8 assemblies in the IF Section until those assemblies are to be adjusted.

WARNING

“Some of the maintenance and servicing operations described herein are performed with power supplied to the instrument while protective covers are removed. Be careful when performing these operations. Line voltage is always present on terminals including the power input connector, fuse holder, power switch, etc. In addition, when the in-

strument is on, energy available at many points may result in personal injury or death when contacted."

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 11592-60016 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 re-

lated 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. 300 kHz Bandpass Filter Adjustment (para. 5-32).
2. LC Filter Adjustments (para. 5-33).
3. Crystal Filter Fine Adjustment (para. 5-34).
4. 3 MHz IF Gain Adjustment (para. 5-36).

Converter Circuits

1. 47 MHz Local Oscillator Automatic Phase Lock 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).

ADJUSTMENTS

5-26. CHECKS AND ADJUSTMENTS

5-27. Power Supply Check and Adjustment

REFERENCE: Schematic 19.

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.

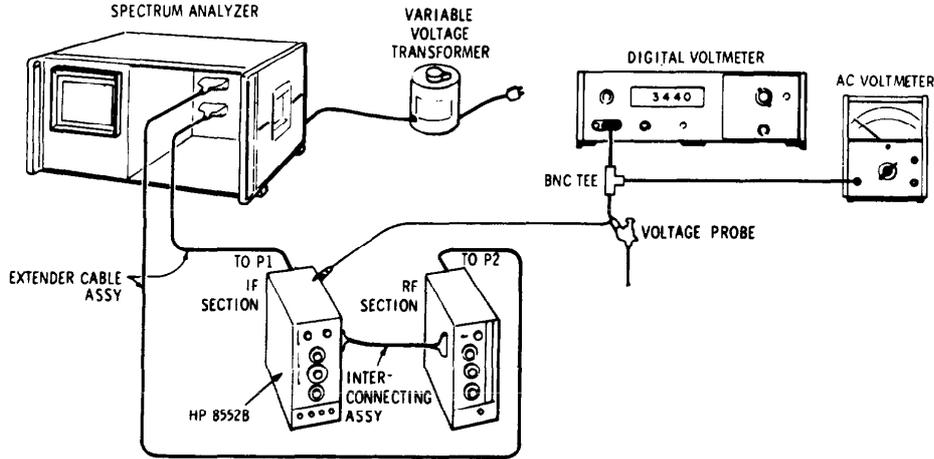


Figure 5-1. Power Supply Check and Adjustment Test Setup

EQUIPMENT:

EXTENDER ASSEMBLY	HP 11592-60015
DIGITAL VOLTMETER	HP 3440A/3443A
INTERCONNECTION ASSEMBLY" : : : : : " : : : :	HP 11592-60016
STRAIGHT-THROUGH VOLTAGE PROBE	HP 10025A
VARIABLE VOLTAGE TRANSFORMER , . . . ; : : : : : : : :	W5MT3A
AC VOLTMETER	HP 400E
BNC TEE . . . . .	.UG-274 B/U

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 ± Vdc
P1-6, P2-6	vio	-100 ± Vdc
F1, F2	wht /vio	-12.6 ± Vdc

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

ADJUSTMENTS

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

3. Connect the digital voltmeter to the IF Section XA5-11 (wht/blk/red lead, Figure 8-8) and measure $+20 \pm 0.10$ Vdc. Ripple should be < 0.5 mV rms. 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 ASR16 +20V ADJ on the power supply assembly for $+20V \pm 0.1$ Vdc.
5. Connect the digital and ac voltmeters to the IF Section XA6-8 (wht/blk/vie) and measure -10 ± 0.01 Vdc. Ripple should be < 0.5 mV rms. These tolerances should be maintained as the line voltage is varied between 103.5 Vac and 126.5 Vac using the variable voltage transformer.
-8.99 _____ -10.01 Vdc
6. If the -10 Vdc supply is out of tolerance, adjust ASR82 -10V ADJ on the power supply assembly for $-10V \pm 0.01$ Vdc.

5-28. Horizontal Scan Check and Adjustment

REFERENCE: Schematic 15,16.

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

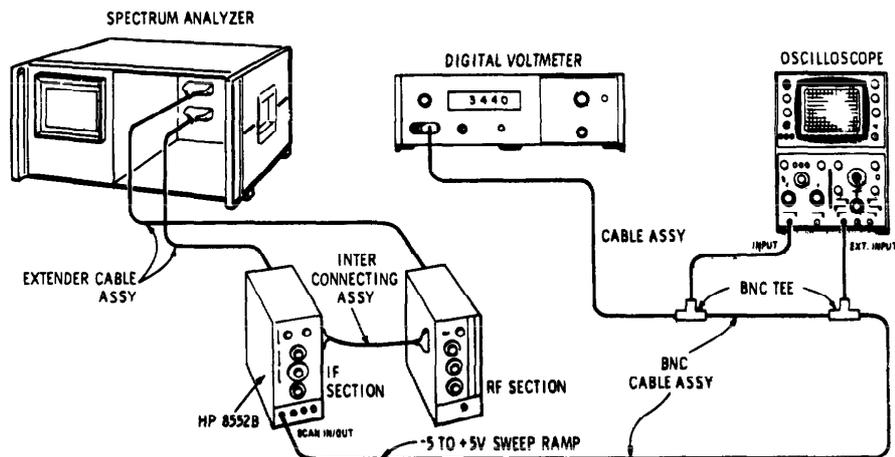


Figure 5-2. Scan Generator Check and Adjustment Test Setup

ADJUSTMENTS

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

EQUIPMENT:

OSCILLOSCOPE	HP 180A/1801A/1821A
DIGITAL VOLTMETER	HP 3440/3443A
EXTENDER ASSEMBLY	HP 11592-60015
INTERCONNECTION ASSEMBLY	HP 11592-60016
BNC Tee (2)	UG-274B/U
CABLE ASSEMBLY (4)	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	0 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 A6R12 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 -5.5 ± 0.02 Vdc.
-4.98 _____ -5.02 Vdc

6. If the voltage is out of tolerance, adjust A6R50 -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. (Note: This requires 100 seconds to reach peak.)

8. Observe the SCAN IN/OUT voltage as the scan reaches the right-hand edge of the graticule. The highest reading should be $+5.0 \pm 0.1$ 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 A6R46 SCAN AMPL control on the scan generator assembly and repeat steps 5 through 8 until both readings are correct.

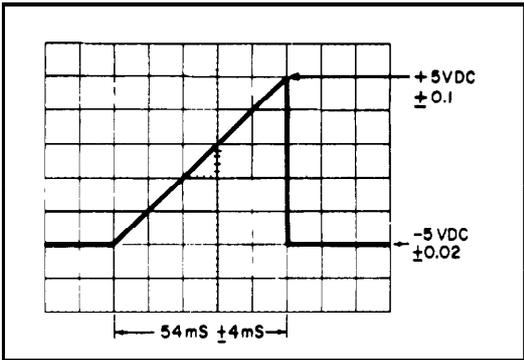


Figure 5-3. Scan Voltage Waveform Measurement

ADJUSTMENTS

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

ANALYZER Control settings (cont'd)

VIDEO FILTER 10 kHz
 SCAN MODE INT
 SCAN TRIGGER : : : : : VIDEO

606B:

FREQUENCY 30 MHz
 ATTENUATOR (dBm) : : : : : -40
 MODULATION SELECTOR EXT DC
 RANGE 6

5245L:

SENSITIVITY 0.1
 FUNCTION PERIOD AVERAGE (10)
 TIME BASE 10 μ s

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	\approx 1 kHz	1.0 \pm 1 ms
5 MILLISECONDS	\approx 200 Hz	5.0 \pm 0.5 ms
10 MILLISECONDS	\approx 100 Hz	10.0 \pm 1 ms
50 MILLISECONDS	\approx 20 Hz	50.0 \pm 10 ms
0.1 SECOND	\approx 10 Hz	100.0 \pm 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 A6R12 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 +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. If they are not, readjust A6R12 SCAN TIME for the best compromise at all SCAN TIME PER DIVISION settings.
8. To check scan time linearity, set the controls as follows:
 SCAN TIME PER DIVISION 2 MILLISECONDS
 Modulation Frequency (HP 200CD) : : : : : \approx 500 Hz

ADJUSTMENTS

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

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 modulated 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 _____
13. To check MAN position of the SCAN MODE switch, rotate MANUAL SCAN from full ccw to full cw. The trace should sweep across the CRT display from left to right (at least 10 full divisions)
MANUAL SCAN: 10 divisions _____

5-30. Vertical Deflection Amplifier Check

REFERENCE: Schematic 14.

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 and 2 dB LOG mode 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.

ADJUSTMENTS

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

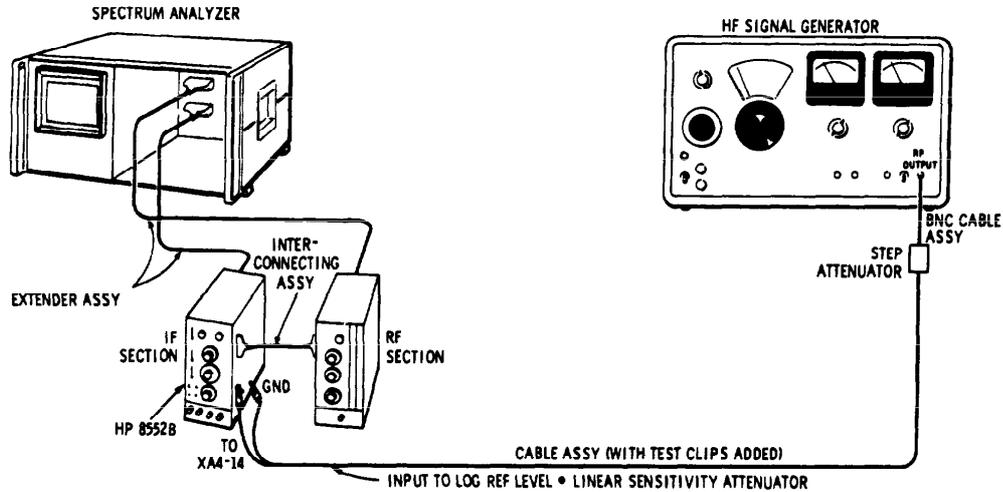


Figure 5-5. Vertical Deflection Amplifier Test Setup

EQUIPMENT:

SIGNAL GENERATOR	HP 606B
CABLE ASSEMBLY (with test clip installed)	HP 10601A
INTERCONNECTION ASSEMBLY	HP 11692-60016
EXTENDER ASSEMBLY	0 : HP 11592-60015
ATTENUATOR	HP 355D
CABLE ASSEMBLY	HP 10603A

1. With the analyzer power off, remove the A4 Crystal Filter board from the 8562B.
2. Connect the the setup shown in Figure 6-5, turn analyzer power ON, and set controls as follows:

ANALYZER:

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

606B:

FREQUENCY	3 MHz
ATTENUATOR (dBm)	0
MODULATION SELECTOR	CW
RANGE	4

ADJUSTMENTS

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

355D:

ATTENUATION100 dB

3. With an input signal at -100 dBm, adjust the front-panel VERTICAL POSITION control. The trace should move ± 2 vertical divisions as the control is moved through its range. -2 _____ +2 div
4. Reset the trace to the bottom vertical graticule line. Then increase the signal level to -50 dBm at XA4-14.
5. 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 _____
6. Set LOG-LINEAR to 10 dB LOG; set 606B to -100 dB. Set trace to bottom graticule line with VERTICAL POSITION.
7. Set 355D to 70 dB; using 606B VERNIER and ATTENUATOR, adjust trace to -70 dB graticule on CRT.
8. Set 355D to 0 dB. Set trace to LOG REF graticule with VERTICAL GAIN. Check trace alignment and adjust if necessary.
9. Repeat steps 6 through 8 until trace is split by graticule in each step.
10. Set 355 D to 0 dB. Switch LOG-LINEAR to 2 dB LOG and adjust A7R35 2 dB OFFSET (see Figure 8-8) to set trace to LOG REF graticule.
11. Set 355D to 10 dB. Note the difference between the trace and the -50 dB graticule; adjust A7R35 2 dB GAIN to move the trace to the -50 dB graticule.
12. Repeat steps 10 and 11 until the trace is at LOG REF graticule at 0 dB and a -50 dB graticule at -10 dB.

LOG REF at 0 dB: _____ (✓)
 -50 dB at -10 dB. _____ (✓)
13. Make the following control settings:
 ANALYZER:
 LOG- LINEAR10 dB LOG
 VIDEO FILTER OFF
 606B:
 MODULATION SELECTOR, ..., INT 100Hz
 MODULATION AMPLITUDE,....90%
 355D:
 ATTENUATION110
14. Turn the BASE LINE CLIPPER until the signal is blanked, The control arrow should indicate between 8 and 12 o'clock,
15. Increase the 356D to 50 dB. Set the SCAN TRIGGER to VIDEO.
16. The scan should trigger on the video signal. Turn the BASE LINE CLIPPER fully clockwise and check signal clipping.
17. 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. _____ 8 div

ADJUSTMENTS

5-31. Log Linear Amplifier Check and Adjustment

REFERENCE: Schematics 12, 13.

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.

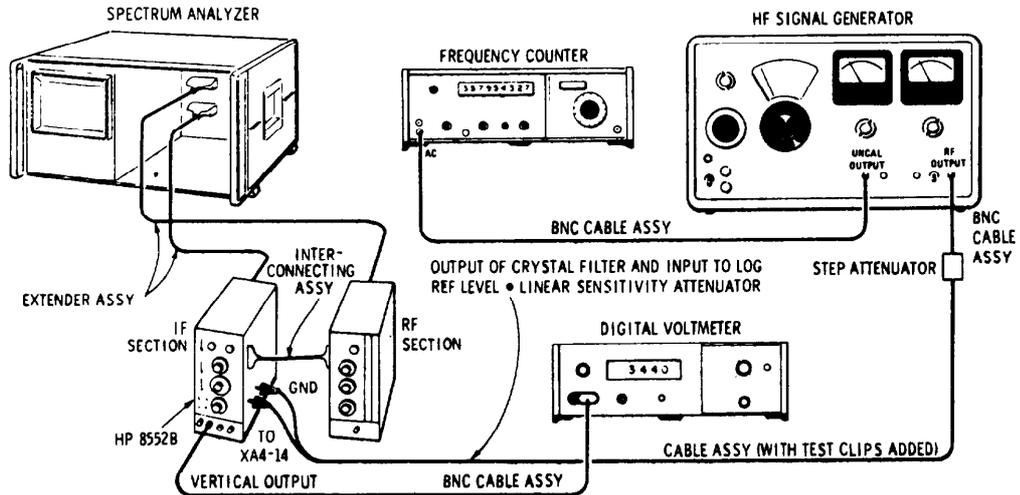


Figure 5-6. Log Linear Amplifier Check and Adjustment Test Setup

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 11592-60016
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.
2. Make the following control settings and then connect the test setup shown in Figure 5-6.

ANALYZER:

LOG LINEAR	10 dB LOG
LOG REF LEVEL ' : : : : :	20 dBm
INPUT ATTENUATION , , , , , . . . . .	...0 dB

ADJUSTMENTS

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

11. Set the HP 355C to 0 dB; set the HP 606B Signal Generator 3 MHz level to -110 dBm, and set LOG LINEAR to 10 dB 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 m Vdc.
_____ -6 m Vdc
13. Increase the signal generator level to +10 dBm. The signal level at XA8-14 should be -800 ±40 m Vdc.
-840_____ -760 m V
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 change by 100 ±40 m Vdc.

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 XA14-14	CRT Display: Deflection in Divisions
Reference: -30 dBm (approx.)	8.0
Add: 6 dB attenuation	4.0 ±0.2
Add: 6 dB attenuation	2.0 ±0.2
Add: 8 dB attenuation	0.8 ±0.2
Add: 10 dB attenuation	0.25 ±0.2
Add: 40 dB attenuation	0 ±0.2

19. Reinstall A4 Crystal Filter Assembly.

ADJUSTMENTS

5-32. 300 k Hz Band pass Filter Adjustment

REFERENCE: Schematics 6, 7.

DESCRIPTION: The 300 kHz bandpass filter is adjusted for symmetry and center frequency. Then the 300 kHz bandwidth is checked.

EQUIPMENT:

CABLE ASSEMBLY	HP 10503A
INTERCONNECTING ASSEMBLY	HP 11592-60016
EXTENDER ASSEMBLY	HP 11592-60015
TUNING TOOL	HP 8710-0095

1. Install the analyzer plug-ins on the two extender cable assemblies, connect CAL OUTPUT to RF INPUT and make the following control settings:

ANALYZER:

INPUT ATTENUATION	20 dB
BANDWIDTH	3kHz
SCAN WIDTH	PER DIVISION
SCAN WIDTH PER DIVISION	5 kHz
FREQUENCY	30 MHz
FINE TUNE	Centered
SCAN TIME PER DIVISION . . . . .	.10 MILLISECONDS
VIDEO FILTER	10 kHz
TUNING STABILIZER	On
SCAN MODE	INT
SCAN TRIGGER	LINE
LOG-LINEAR	LINEAR
LINEAR Sensitivity	1m V/DIV
BASE LINE CLIPPER	Max ccw

2. Place the A2 3 MHz Amplifier assembly on an extender and install it in the analyzer. Center the signal on the CRT display with the FINE TUNE control.
3. Set BANDWIDTH to 300 kHz and SCAN WIDTH PER DIVISION to .05 MHz.
4. Adjust A2A1L2, A2A1L4 and A2R1 for a smooth, symmetrical wave shape centered on the CRT display.
5. Set SCAN WIDTH PER DIVISION to 5 kHz and BANDWIDTH to 3 kHz. The display should remain centered, Return these controls to .05 MHz and 300 kHz, respectively.
6. Install the circuit board without the extender. Readjust A2R1 IMP if necessary.
7. Check 300 kHz bandwidth, paragraph 4-24: 300 kHz \pm 60 kHz

240_____360 kHz
8. If necessary, repeat adjustment procedure.
9. Switch BANDWIDTH to 10 kHz. The peak amplitude should remain the same \pm 0.4 division. If not, perform the LC Filter Adjustment, paragraph 5-33.

ADJUSTMENTS

5-33. LC Filter Adjustment

REFERENCE: Schematic.

DESCRIPTION: The LC Filter circuits (100, 30 and 10 kHz bandwidths) are peaked and centered. The 10 kHz gain control is set so that the 10 kHz bandwidth has the same gain as the 300 kHz bandwidth. Then the gain and bandwidth of the filters are checked.

EQUIPMENT:

CABLE ASSEMBLY	HP 10503A
TUNING TOOL	HP 8710-0095
.	HP 11592-60016
EXTENDER ASSEMBLY	HP 11592-60015

1. Install the analyzer plug-ins on the two extender cable assemblies; connect CAL OUTPUT to RF INPUT, and make the following control settings:

ANALYZER:

FREQUENCY	30 MHz
BANDWIDTH	3 kHz
SCAN WIDTH	PER DIVISION
SCAN WIDTH PER DIVISION	5kHz
INPUT ATTENUATION	20dB
TUNING STABILIZER	On
SCAN TIME PER DIVISION	10 MILLISECONDS
LOG-LINEAR	LINEAR
LINEAR SENSITIVITY	2 m V/DIV
VIDEO FILTER	10kHz
SCAN MODE	INT
SCAN TRIGGER	AUTO

2. Center the signal as carefully as possible on the CRT display with the FINE TUNE control.
 3. Set BANDWIDTH to 10 kHz and SCAN WIDTH to ZERO. Peak A1C4, A1C10, A1C16 and A1C22 for maximum trace deflection on the display.
 4.
 - a. If one of the PEAK capacitors is at the end of its range (or if an inductor has been replaced) remove the circuit board from the analyzer.
 - b. Free the related inductor core with acetone and center the capacitor.
 - c. Install the circuit board on the extender. Perform steps 1 through 3 except tune the inductor, rather than the capacitors.
 - d. Re-glue the inductor, using Duco cement, and re-install the circuit board without the extender.
 - e. Again perform steps 1 through 3.
 5. Set SCAN WIDTH to PER DIVISION and BANDWIDTH to 300 kHz. Use LINEAR SENSITIVITY to set signal for a 7.0 division display.
 6. Set BANDWIDTH to 10 kHz and adjust A1R35 10 kHz ADJ for a 7.0 division display.
 7. Install the shield cover and check the change in signal amplitude on the display as BANDWIDTH is switched from 300 kHz to 10 kHz. Deflection at these bandwidths should be within ± 0.4 division of 300 kHz.
-

ADJUSTMENTS

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

- 300 kHz: Reference
- 100 kHz: -0.4 _____ +0.4 div
- 30 kHz: -0.4 _____ +0.4 div
- 10 kHz: -0.4 _____ +0.4 div

8. Set BANDWIDTH to 3 kHz. Again the signal amplitude should not change more than ±0.4 divisions; if it does, perform the crystal filter adjustment, paragraph 5-34.

- 300 kHz: Reference
- 3 kHz: -0.4 _____ +0.4 div

9. Check 100, 30 and 10 kHz bandwidths, paragraph 4-24.

100 kHz Bandwidth: 80 _____ 120 kHz

30 kHz Bandwidth: 24 _____ 36 kHz

10 kHz Bandwidth: 9.5 _____ 10.5 kHz

10. If necessary, repeat adjustment procedure.

5-34. Crystal Filter Fine Adjustment

REFERENCE: Schematics 10 and 11.

DESCRIPTION: This procedure fine adjusts the crystal filters for bandwidth and amplitude. If component changes are made, Coarse Adjustment (paragraph 5-35) may be necessary. The center frequency of the last four stages is referenced to the first stage, then all five stages are nulled. Next, the bandwidth amplitudes are set. Finally, the filters are checked for bandwidth and amplitude.

EQUIPMENT:

- SIGNAL GENERATOR HP 606B
- OSCILLATOR SYNCHRONIZER HP 8708A
- FREQUENCY COUNTER HP 5245L
- CABLE ASSEMBLY (6) HP 10503A
- INTERCONNECTING ASSEMBLY HP 11592-60016
- EXTENDER ASSEMBLY HP 1592-60015
- OSCILLOSCOPE HP 180A/1801A/1821A
- CABLE ASSEMBLY HP 10501A

1. Remove A2 3 MHz Amplifier Assembly, connect the test setup in Figure 5-7 and make the following control settings:

ANALYZER:

- FREQUENCY 30 MHz
- TUNING STABILIZER On
- BANDWIDTH 0.1 kHz
- SCAN WIDTH PER DIVISION
- SCANWIDTHPERDIVISION 1 MHz
- INPUT ATTENUATION 20 dB
- BASE LINE CLIPPER Max ccw
- SCAN TIME PER DIVISION MILLISECONDS

Model 8552B

ADJUSTMENTS

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

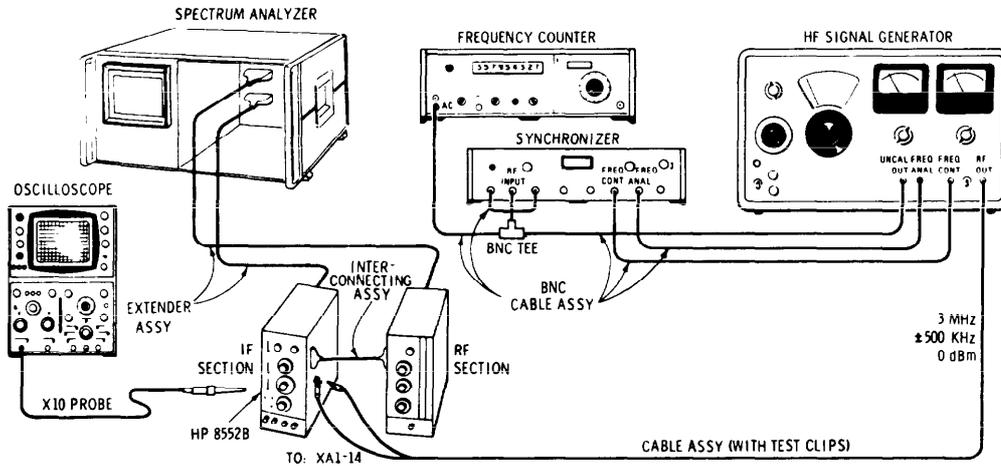


Figure 5-7. Crystal Filter Fine Adjustment Test Setup

ANALYZER control settings (cont'd)

LINEAR SENSITIVITY	20 μ V/DIV
VIDEO FILTER	10 Hz
LOG-LINEAR	LINEAR
SCAN MODE	INT
SCAN TRIGGER	AUTO

606B:

RANGE	4
FREQUENCY	3 MHz
MODULATION SELECTOR	CW
ATTENUATOR (dBm)	-30
VERNIER	Set for 0 on dB meter

8708A:

FREQUENCY RANGE	4
RF INPUT	Under lit lamp
MODULATION	CW
FREQUENCY TUNING	Centered
AC-DC	AC

5245L:

SAMPLE RATE	9 o'clock
TIME BASE	1s

ADJUSTMENTS

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

5245L settings (cont'd)

FUNCTION FREQUENCY
 SENSITIVITY 0.1 (volts rms)

180A:

VOLTS/DIV01
 TIME/DIV 1 MSEC

2. Tune the synchronizer for 3 MHz \pm 10 Hz, connect oscilloscope probe to A4TP6, then tune the synchronizer for a peak on the oscilloscope.
3. Remove the probe from TP6 and reduce LINEAR SENSITIVITY until trace appears on analyzer's CRT display. Adjust A4C30, 43, 57 and 70 for maximum trace deflection.
4. Repeat steps 2 and 3. Then remove the clip leads at XA1-14 and install A2 3 MHz Amplifier Assembly.
5. Connect CAL OUTPUT to RF INPUT and make the following control settings:

ANALYZER:

BANDWIDTH 3 kHz
 SCAN TIME PER DIVISION10 MILLISECONDS
 LINEAR SENSITIVITY1 mV/DIV
 VIDEO FILTER 10 kHz

6. Center signal on display with FREQUENCY control and reduce SCAN WIDTH PER DIVISION to 1 kHz.
7. Adjust A4C19, 34, 47, 61 and 74 to null the signal. Set the signal to the 7 graticule line with LINEAR SENSITIVITY vernier.
8. Set BANDWIDTH to 1 kHz; signal level should not change more than \pm 0.3 division.
9. If signal is out of limits, repeat steps 6 and 7.
10. Set SCAN WIDTH to ZERO and make the BANDWIDTH changes and adjustments indicated below. Re-peak the signal with FINE TUNE every time BANDWIDTH is changed.

BANDWIDTH	Adjust for 7.0 Divisions
0.3 kHz	A4R129 300 Hz
0.1 kHz	A4R126 100 Hz
.03 kHz	A4R122 30 Hz
.01 kHz	A4R115 10 Hz

ADJUSTMENTS

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

11. Repeat steps 8 through 10 until the bandwidth amplitude variations from 3 kHz through 0.1 kHz are as shown below:

3 kHz:	Set for 7 div	
1 kHz:	6.7 _____	7.3 div
0.3 kHz:	6.7 _____	7.3 div
0.1 kHz:	6.7 _____	7.3 div
0.03 kHz:	6.5 _____	7.5 div
0.01 kHz:	6.0 _____	7.0 div

12. Place the A4 Crystal Filter Assembly on an extender. Set BANDWIDTH to 3 kHz, peak the trace with FINE TUNE and set the trace to the 7 graticule with LINEAR SENSITIVITY vernier.
13. Set BANDWIDTH to 300 kHz and adjust A4R133 to set the trace to the 7 graticule line,
14. Install the A4 Crystal Filter Assembly without the extender. Repeat steps 12 through 14 until the bandwidth amplitude variation between 3 kHz to 300 kHz less than ± 0.3 divisions.

6.7 _____ 7.3 div

15. Perform the bandwidth checks for the 3 kHz through .01 kHz bandwidths, paragraphs 4-24, 4-25:

B A N D W I D T H	3 dB Bandwidth	60 dB/3 dB Bandwidth Ratio
3 kHz	4.8 _____ 7.2 div	_____ 11:1 div
1 kHz	4.0 _____ 6.0 div	_____ 11:1 div
0.3 kHz	4.8 _____ 7.2 div	_____ 11:1 div
0.1 kHz	4.0 _____ 6.0 div	_____ 11:1 div
.03 kHz	1.2 _____ 1.8 div	_____ 11:1 div
.01 kHz	0.4 _____ 0.6 div	_____ 11:1 div

16. If necessary, repeat adjustment procedure.

ADJUSTMENTS

5-35. Crystal Filter Coarse Adjustment

REFERENCE: Schematics 10 and 11.

DESCRIPTION: This procedure adjusts A4C18, 32, 45, 59 and 73; it coarse adjusts A4C19, 34, 47, 61 and 74. It should be performed only if component changes that would affect the crystal alignment are made. The crystal filter circuits are adjusted, in turn, by bypassing all but the stage being adjusted; they are adjusted for center frequency, symmetry and null.

NOTE

This procedure can be difficult and time consuming and should not be attempted unless the Fine Adjustment procedure will not align the filters.

EQUIPMENT:

CRYSTAL FILTER BYPASS NETWORK (4)	.....	(See Step 9)
CABLE ASSEMBLY	.....	HP 10503A
INTERCONNECTING ASSEMBLY	.....	HP 11592-60016
EXTENDER ASSEMBLY	.....	HP 11592-60015

1. Install the analyzer plug-ins on the two extender cable assemblies, connect CAL OUTPUT to RF INPUT, and make the following control settings:

ANALYZER:

FREQUENCY	.....	.30 MHz
BANDWIDTH	.....	.3 kHz
SCAN WIDTH	.....	PER DIVISION
SCAN WIDTH PER DIVISION	.....	.05 MHz
INPUT ATTENUATION	.....	10dB
TUNING STABILIZER	.....	On
SCAN TIME PER DIVISION	.....	5 MILLISECONDS
LOG-LINEAR	.....	10 dB LOG
LOG REF LEVEL	.....	-20 dBm
VIDEO FILTER	.....	10 kHz
SCAN MODE	.....	INT
SCAN TRIGGER	.....	AUTO

2. Place the A4 Crystal Filter Assembly on an extender board and install it in the analyzer. Place the four Crystal Filter Bypass Networks across: TP2 to TP7, TP3 to TP8, TP4 to TP9 and TP5 to TP10.
3. Center the signal on the CRT display with the FREQUENCY control. Use the LOG REF LEVEL controls to set signal peak at LOG REF graticule.
4. Tune A4C19 and A4C18 respectively for signal null and symmetrical skirts (60 dB down).

NOTE

Oscillations sometimes occur when the Crystal Filter board is on the Extender board and the Crystal Filter Bypass Networks are being used. Place your fingers across the last Crystal Filter Bandpass Network. This will dampen the oscillations while the adjustment are being made.

5. Perform Step 4 for each of the Filter stages in turn, as indicated:

ADJUSTMENTS

5-35. Crystal Filter Coarse Adjustment (cont'd)

Place Bypass Networks Across Test Points	Tune for null and symmetrical skirts (60 dB down)
1 and 6, 3 and 8 4 and 9, 5 and 10	A4C34 and A4C32
1 and 6, 2 and 7 4 and 9, 5 and 10	A4C47 and A4C45
1 and 6, 2 and 7 3 and 8, 5 and 10	A4C61 and A4C59
1 and 6, 2 and 7 3 and 8, 4 and 9	A4C74 and A4C73

6. Repeat steps 4 and 5.
7. Remove the Bypass Networks and install A4 assembly without an extender.
8. Perform Crystal Filter Fine Adjustment, paragraph 5-34.
9. Assemble four Crystal Filter bypass networks from parts listed below:
 - a. 4 capacitors – .047 microfarad 10% HP 0170-0040
 - b. 4 resistors – 3.3 ohm 5% HP 0683-0335
 - c. 8 receptacles – for .040 inch pin HP 1200-0063

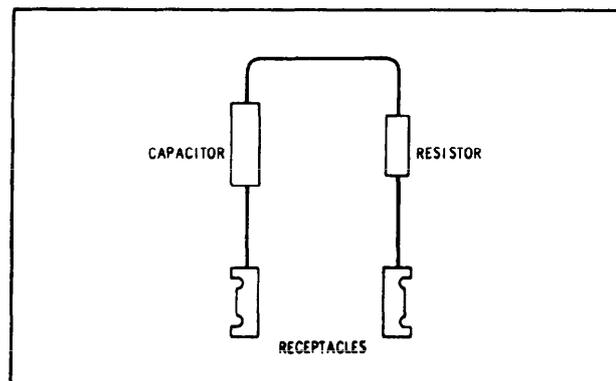


Figure 5-8. Crystal Filter Bypass Network

ADJUSTMENTS

5-36. 3 MHz IF Gain Adjustment

REFERENCE: Schematics 6,7,8.

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.

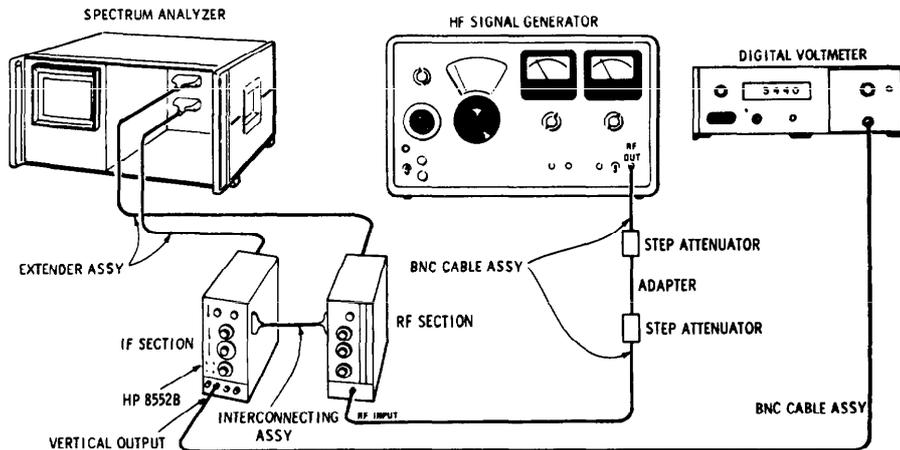


Figure 5-9. 3 MHz IF Gain Adjustment Test Setup

EQUIPMENT:

SIGNAL GENERATOR	HP 606B
DIGITAL VOLTMETER	HP 3440A/3443A
ATTENUATOR	HP 355C
ADAPTER	HP 1258-0216
INTERCONNECTING ASSEMBLY	HP 11592-60016
EXTENDER ASSEMBLY	HP 11592-60015
ATTENUATOR	HP 355D
CABLE ASSEMBLY(3)	HP 10503A

1. Remove the cover shield from the AI LC Filter Assembly, connect the test setup shown in Figure 5-9 and make the following control settings:

ANALYZER:

FREQUENCY	30 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 cew

ADJUSTMENTS

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

ANALYZER control settings (cont'd)

SCAN MODE	INT
SCAN TRIGGER	AUTO
VIDEO FILTER	OFF

606B :

FREQUENCY	30 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
-------------	------

- Adjust FREQUENCY control for maximum trace deflection.
- Adjust signal generator output so that VERTICAL OUTPUT voltage is -1.000 ± 0.005 Vdc.
- Increase test attenuators by 12 dB.
- Turn LOG REF LEVEL vernier to -12 dB.
- Adjust A2R44 12 dB ADJ for -1.000 ± 0.005 Vdc.
- Decrease test attenuators by 12 dB.
- Turn LOG REF LEVEL vernier to 0 dB.
- Adjust A2R51 0 dB ADJ for -1.000 ± 0.005 Vdc.
- Repeat adjustments in steps 4 through 9 to minimize interaction between controls.
- Set test attenuator to 6 dB.
- Turn LOG REF LEVEL vernier to -6. Note error from 1.000 Vdc and adjust HP 606B output for -1.000 Vdc minus error.
- Set test attenuator to 12 dB and repeat steps 5 through 10.

ADJUSTMENTS

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

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.

-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 0 dBm
 LOG-LINEAR 10 dB LOG

606B :

ATTENUATOR (dBm) 0

355D and 355C:

ATTENUATION 10 dB

16. Tune FREQUENCY control for maximum trace deflection.

17. Note reference voltage at VERTICAL OUTPUT.

Reference Voltage <-600 mV (more negative) : _____

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	A1R59	-2 _____ +2
20 dB	-20 dBm	A1R58	-2 _____ +2
30 dB	-30 dBm	A2R21	-2 _____ +2
40 dB	-40 dBm	A2R24	-2 _____ +2
50 dB	-50 dBm	A2R27	-2 _____ +2

ADJUSTMENTS

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

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 m V/DIV with INPUT ATTENUATION at 10 dB.
- d. Measure the voltage at the VERTICAL OUTPUT jack.

Reference Voltage: _____

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

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

f. Remove the shorting strap installed in step a on page 5-24.

5-37. 47 MHz LO Automatic Phase Lock Check and Adjustment

REFERENCE: Schematics 3, 4, 5.

DESCRIPTION: The oscillator levels are set and checked and the phase lock loop is checked. The summing and shaping circuits are then adjusted by applying dc offsets and adjusting for a linear 47 MHz Lo sweep.

ADJUSTMENTS

5-37.47 MHz LO Automatic Phase Lock Check and Adjustment (cont'd)

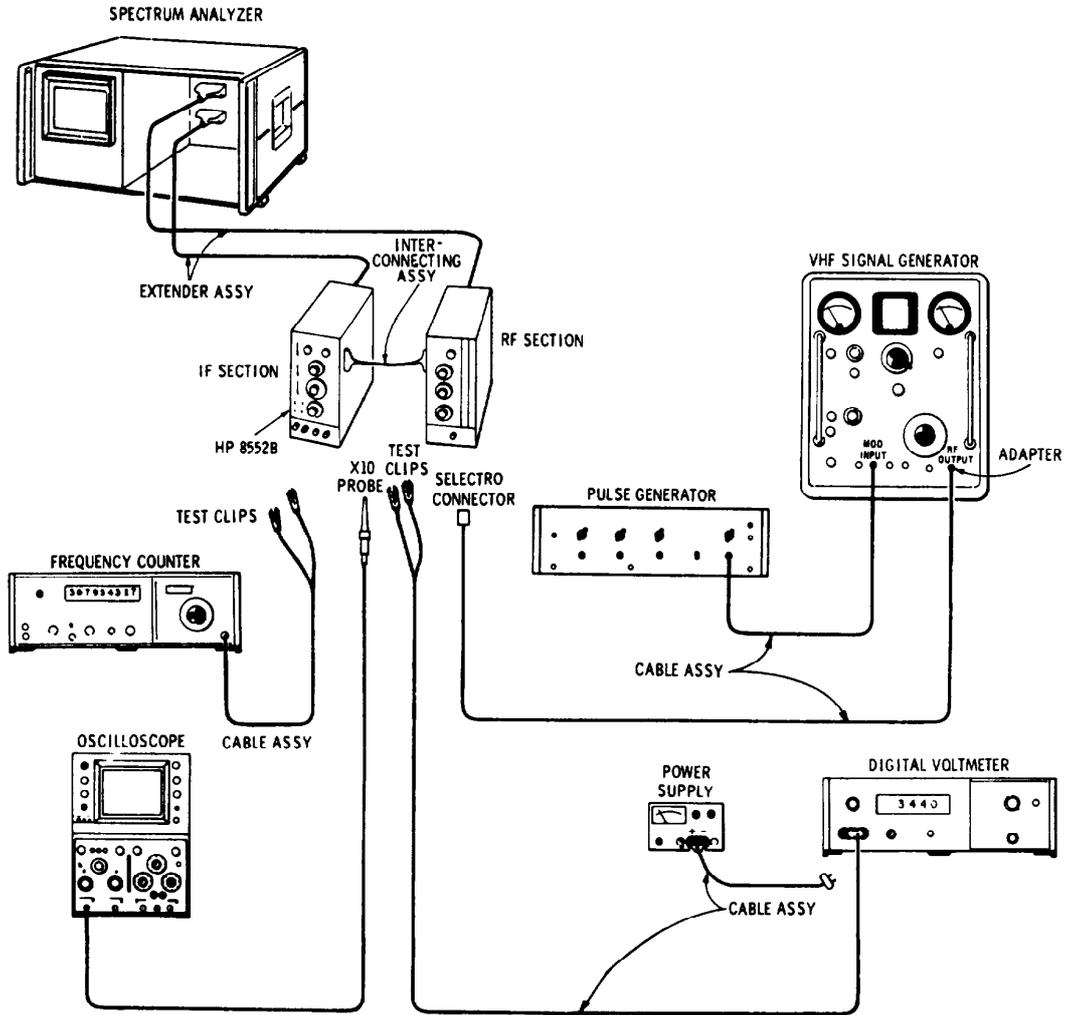


Figure 5-10. 47 MHz LO Automatic Phase Lock Test Setup

EQUIPMENT:

FREQUENCY COUNTER	HP 5245L/5261A
OSCILLOSCOPE	HP 180A/1801A/1820A
SIGNAL GENERATOR	HP 608F
PULSE GENERATOR	HP 222A
POWER SUPPLY	HP 6217A
6-PIN EXTENDER BOARD	HP 5060-5914

ADJUSTMENTS

5-37. 47 MHz LO Automatic Phase Lock Check and Adjustment (cont'd)

EQUIPMENT (cont'd)

EXTENDER ASSEMBLY	HP 11592-60015
INTERCONNECTING ASSEMBLY	HP 11592-60016
CABLE ASSEMBLY	HP 11592-60001
CABLE ASSEMBLY	IIP 10503A
CABLE ASSEMBLY (w/test clips)	HP 10501A
DIGITAL VOLTMETER	HP 3440A/3443A
ADAPTER	UG-201A/U
CABLE ASSEMBLY	HP 11000A
CABLE ASSEMBLY (w/test clips)	HP 11002A
ALIGNMENT TOOL	HP 8710-0957

1. Connect the test setup in Figure 5-10. Remove the A1/A12 Assemblies cover shield and the A13 2 MHz VTO Assembly, and make the following control settings:

ANALYZER:

FINE TUNE	
SCAN TIME PER DIVISION	50 MILLISECONDS
BANDWIDTH	1 kHz
TUNING STABILIZER	OFF
SCAN WIDTH	PER DIVISION
SCAN WIDTH PER DIVISION	20 kHz
VIDEO FILTER	OFF
SCAN MODE	INT
SCAN TRIGGER	AUTO
LOG-LINEAR	10 dB LOG
LOG REF LEVEL	-40 dBm

180A/1801/1820:

VOLTS/DIV . . . . .	.02
TIME/DIV	0.5 MSEC
Probe	X10

5245L/5261A:

SENSITIVITY	PLUG IN
SAMPLE RATE	ccw
TIME BASE	1 s
FUNCTION	FREQUENCY
SENSITIVITY (PLUG-IN)	30 mV RMS

608F:

MODULATION	EXT PULSE
ATTENUATION	-20 dBm
MEGACYCLES	50

222A:

REF RATE	10K - 100K
PULSE WIDTH	0.5 - 5 (vernier ccw)
PULSE AMPLITUDE	2V
PULSE POLARITY	+

2. Attach oscilloscope probe to A12TP2. Adjust A12T1 for maximum; signal level should be 650 ±200 mV p-p.

450 _____ 850 mV p-p

ADJUSTMENTS

5-37. 47 MHz LO Automatic Phase Lock Check and Adjustment (cont'd)

3. Remove oscilloscope probe and attach frequency counter to A12TP2. 45 MHz Crystal Oscillator frequency should be 45 MHz \pm 10 kHz.

44.990 _____ 45.010 MHz

4. Attach oscilloscope probe to feedthrough capacitor C8 (see Figure 8-8) and set oscilloscope VOLTS/DIV to 0.2 and TIME/DIV to 5 msec. Search waveform should be as shown in Figure 5-11 with amplitude from 8.5 to 11.5 V p-p.

8.5 _____ 11.5 v p-p

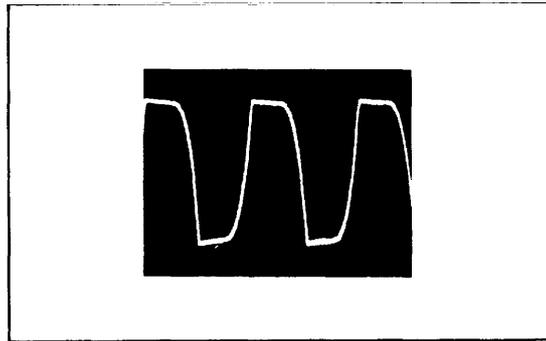


Figure 5-11. Search Waveform

5. Remove oscilloscope probe from C8 and attach to J8 (see Figure 8-8); set oscilloscope VOLTS/DIV to .05 and TIME/DIV to 5 msec. The 47 MHz LO level should be 2.0V \pm 0.5.

1.5V _____ 2.5 V p-p

6. Remove oscilloscope probe from J8 and re-attach to feedthrough C8. Insert A13 2 MHz VTO Assembly into 8552B on 6-pin extender board. 47 MHz LO phase lock will be indicated by the 50 Hz square wave becoming steady dc.

NOTE

If square wave does not become steady dc, adjust 47 MHz LO (A3A2L1) as specified in step 16. Then repeat steps 4 through 6.

7. Remove oscilloscope probe from C8 and attach to A13TP1. Set oscilloscope VOLTS/DIV to .02 and TIME/DIV to 5 msec. Adjust A13R5 VTO LEVEL ADJ for 900 \pm 250 mV p-p.

660 _____ 1150 mV p-p

8. Disconnect oscilloscope probe and attach frequency counter to A13TP1. Switch analyzer SCAN WIDTH to ZERO. With alignment tool, adjust A13T1 for 2 MHz \pm 2 kHz. (FINE TUNE must be centered and TUNING STABILIZER must be off.)

1998 _____ 2002 kHz

ADJUSTMENTS

5-37. 47 MHz LO Automtic Phase Lock Check and Adjustment(cont'd)

9. Remove A13 2 MHz VTO and re-install in 8552B without extender.

NOTE

The following steps of this paragraph should be omitted if the RF Section being used is an 8554 or 8555.

Turn analyzer POWER off. Unsolder yellow wire at 8552B XA5 pin 3 and connect power supply positive lead to XA5 pin 3 (connect negative lead to chassis ground.) Adjust power supply for +7.50 V with digital voltmeter.

10. Connect pulse generator to frequency counter. Adjust REP RATE VERNIER for 20.000 kHz, then connect pulse generator to signal generator. Disconnect W7-50 MHz, white coax at J6 (see Figure 8-8). Connect the signal generator output to J6. Set analyzer SCAN WIDTH to PER DIVISION (SCAN WIDTH PER DIVISION should be 20 kHz).
11. Turn analyzer POWER on and observe signal on Display Section CRT.
12. Adjust A5R45 SHAPING ADJ for optimum linearity, aligning the pulses of the modulated signal or the vertical graticule lines. Adjust frequency of signal generator to keep pulses aligned on graticule lines as adjustment is made. Pulses should not deviate more than ± 0.75 minor divisions from graticule lines across entire display.
- Max. deviation: 0.75 _____ 0.75 minor div
13. Change power supply to put -7.50V at XA5 pin 3. Adjust A5R71 OFFSET ADJ for optimum linearity, aligning pulses on vertical graticule lines and adjusting signal generator frequency as necessary to keep pulses on graticule lines. Pulses should not deviate more than ± 0.75 minor divisions horn graticule lines across entire display.
- Max. deviation 0.75 _____ 0.75 minor div
14. Set the power supply to 0V and check to see that the pulses do not deviate more than ± 0.75 minor divisions from vertical graticule lines across entire display.
- Max. deviation 0.75 _____ 0.75 minor div
15. Repeat steps 8 through 14 until no further adjustments are necessary to meet the specifications in each step. (Yellow wire at XA5 pin 3 can remain unsoldered until adjustments are completed.)
16. Set analyzer SCAN WIDTH to ZERO and attach DVM to feedthrough C8. Phase lock error signal should be $+4 \pm 0.4V$, If not, adjust A3A2L1 (accessible through hole in A3A2 cover).
- +3.6 _____ +4.4V
17. Turn the analyzer POWER off, reconnect W6 to J6 and resolder yellow wire to XA6 pin 3. Remove test W equipment connections from analyzer and reinstall the cover shields to the A13 and A1/A12 Assemblies,

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 band pass filter is adjusted for frequency, amplitude, width and flatness.

ADJUSTMENTS

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

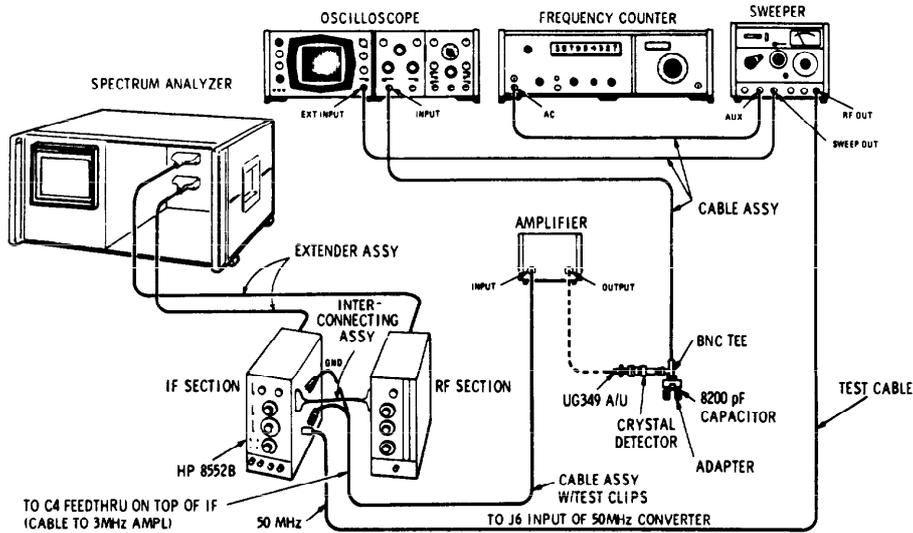


Figure 5-12. 50 MHz IF Bandpass Adjustment Test Setup

EQUIPMENT:

GENERATOR/SWEEPER	HP 8601A
OSCILLOSCOPE with 1801A/1821A PLUG-INS	HP 180A
FREQUENCY COUNTER	HP 5245L
AMPLIFIER	HP 8447A
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 11592-60016
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 5-12. 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

ADJUSTMENTS

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

180A/1801A:

MAGNIFIER X5
 POSITION (see Figure 5-13)
 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 5-13.)
3. If the bandpass is not flat (± 2 mV) at least 0.3 MHz on either side of 50 MHz, adjust A3A1C5, 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 5-13. 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.

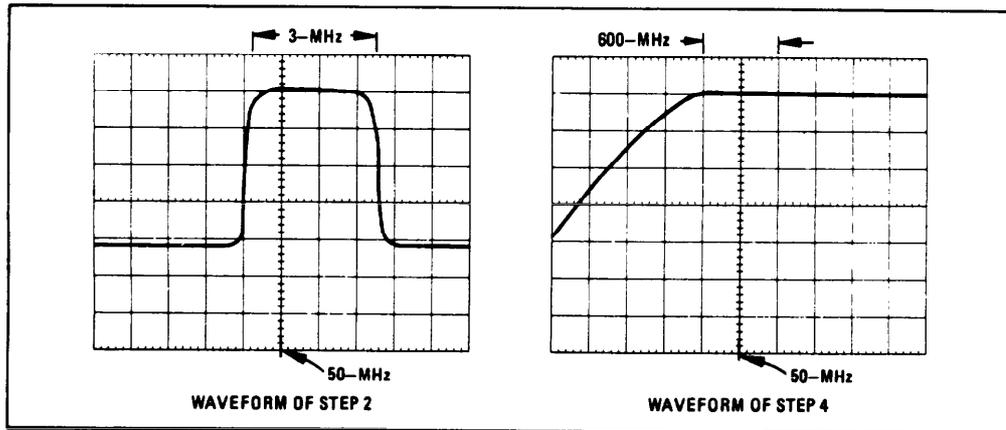


Figure 5-13. 50 MHz Bandpass Display for 10 MHz and 3 MHz Sweeps

ADJUSTMENTS

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

- 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 dB
 TUNING STABILIZER OFF
 BANDWIDTH 10 kHz
 SCAN WIDTH PER DIVISION
 SCAN WIDTH PER DIVISION 100 kHz
 BASE LINE CLIPPER Max cew
 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

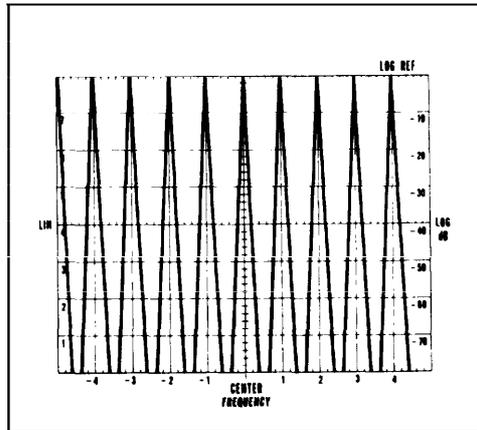


Figure 5-14. 50 MHz Bandpass Flatness Display

- Tune FREQUENCY for display indicated in Figure 5-14 when FINE TUNE is rotated in 100 kHz steps.
- 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 rejected controls are adjusted.

ADJUSTMENTS

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

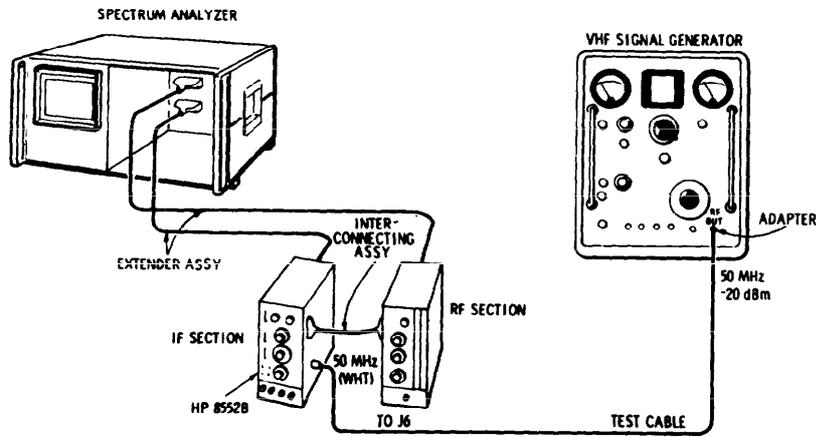


Figure 5-15. 44 MHz Rejection Adjustment Test Setup

EQUIPMENT:

SIGNAL GENERATOR	HP 608F
TEST CABLE	11592-60001
INTERCONNECTING ASSEMBLY	HP 11592-60016
EXTENDER ASSEMBLY	HP 11592-60015
ADAPTER	UG-201A/U

1. Connect the test setup shown in Figure 5-15 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	10 dB LOG

608F:

MODULATION	CW
ATTENUATION	-20 dBm

ADJUSTMENTS

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

608F control settings (cont'd)

MEGACYCLES	50
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.

5-40. 30 MHz Calibration Oscillator Check and Adjustment

REFERENCE: Schematic 18.

DESCRIPTION: The CAL OUTPUT at the front panel is measured and adjusted for 30 MHz at -30 dBm. The amplitude is measured on the analyzer CRT by comparing it to a calibrated signal. The frequency is amplified and measured with a counter.

ADJUSTMENTS

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

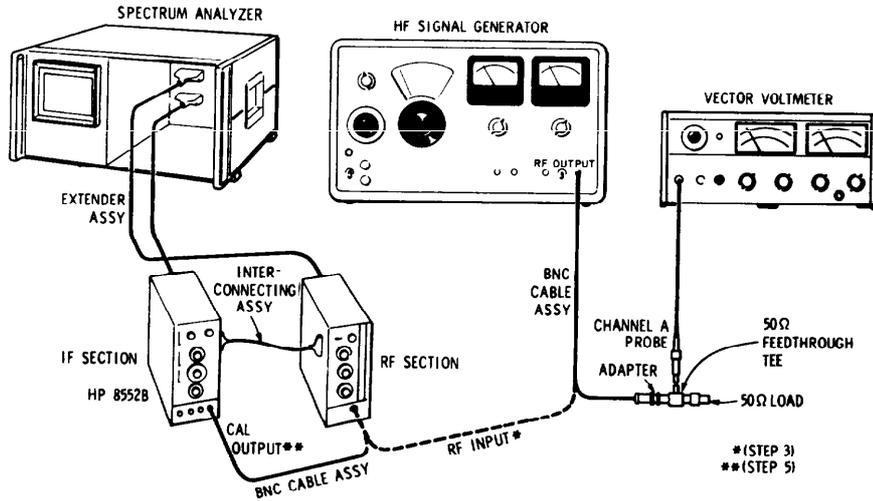


Figure 5-16. 30 MHz Calibration Amplitude Adjustment Setup

EQUIPMENT:

VECTOR VOLTMETER	HP 8405A
CABLE ASSEMBLY (2)	HP 10503A
EXTENDER ASSEMBLY	HP 11592-60015
INTERCONNECTING ASSEMBLY	HP 11592-60016
50-OHM LOAD	HP 908A
50-OHM TEE	HP 11536A
ADAPTER	UG-201A/U
SIGNAL GENERATOR	HP 606B

1. Connect the equipment shown in Figure 5-16 and make the following control settings:

ANALYZER:

FREQUENCY	30 MHz
BANDWIDTH	30 kHz
SCAN WIDTH	PER DIVISION
SCAN WIDTH PER DIVISION	20 kHz
TUNING STABILIZER	On
INPUT ATTENUATOR	10 dB
SCAN TIME PER DIVISION	5 MILLISECONDS

ADJUSTMENTS

5-40. 30 MHz Calibration Oscillator Check and Adjustment (con't.)

ANALYZER control settings (cont'd)

LOG-LINEAR LINEAR
 LINEAR SENSITIVITY 1 mV/DIV
 SCAN MODE INT
 SCAN TRIGGER AUTO

8405A:

FREQUENCY RANGE - MHZ. 20-40
 CHANNEL A
 AMPLITUDE RANGE - dB -30

606B:

RANGE 6
 FREQUENCY 30 MHz
 MODULATION CW
 ATTENUATOR 30 dB
 VERNIER 0 dB

2. Set amplitude of signal generator (as read on vector voltmeter) to exactly -30 dBm with ATTENUATOR VERNIER.
3. Disconnect signal generator from vector voltmeter and connect to analyzer RF INPUT. Adjust analyzer FINE TUNE control to center signal.
4. Adjust signal with LINEAR SENSITIVITY vernier for a 7.0 division reference on CRT display.
5. Disconnect signal generator from RF INPUT. Connect CAL OUTPUT to RF INPUT.
6. Signal Amplitude should be 7.0 division ± 0.2 divisions.
 6.8 _____ 7.2 div
7. If it is out of limits, peak signal with A6C15 and set signal level to 7.0 division with A6R54 CAL LEVEL.

NOTE

A6 must not be operated on extender board for this adjustment.

8. Measure the Calibrator frequency (see paragraph 4-23). Frequency limits:
 29.997 _____ 30.003 MHz
9. If frequency is out of limits, replace A6Y1 and repeat steps 1 through 8.

ADJUSTMENTS

5-41. Analogic Check and Adjustment

REFERENCE: Schematic 17.

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 DIVISION1 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

CHECKS AND ADJUSTMENTS

541. Analogic Test and Adjustment (cont'd)

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.

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. Factory Selected Components

Component	Service Sheet	Basis of Selection
A1R16	8	Adjusts 10 kHz Bandwidth amplitude: 750 to 1200 ohms.
A1R38	8	Adjusts 300 kHz Bandwidth amplitude: 10 to 50 ohms.
A3R3	3	Adjusts 47 MHz LO level: 1.5K to 2.15K ohms.
A3R9	3	Adjusts 50 MHz Converter Gain: 18 to 52 ohms (4 ohm/dB change).
A4R125	11	Adjusts overall gain of 8552B for full deflection to Log Ref graticule with -13 dBm input at J6 (LOG REF LEVEL at -10 dBm): 200 to 700 ohms.
A6C13	15	Adjusts scan time at 0.2 to 10 sec/div: 0 to 15 microfarads.
A8R3	12	Optimizes 10 dB gain step: 1.47K to 2.37K.
A10R8 A10R9	11	Insures 10 dB/step attenuation: R8, 6.81K to 16.2K; R9, 21.5K to 51.1K.
A4R25 A4R26	11	Adjusts crystal filter skirt width. If out of specifications, change both resistors. Possible value ranges: R25, 19.6K to 23.7K; R26, 42.2K to 51.1K.
A4R44 A4R45	11	Adjusts crystal filter skirt width. If out of specifications, change both resistors. Possible value ranges: R44, 23.7K to 26.1K; R45, 51.1K to 56.2K.
A4R70 A4R71	11	Adjusts crystal filter skirt width. If out of specifications change both resistors. Possible value ranges: R70, 23.7K to 26.1K; R71, 51.1K to 56.2K.
A4R81 A4R82	11	Adjusts crystal filter skirt width, If out of specifications change both resistors. Possible value ranges: R81, 23.7K to 26.1K; R82, 51.1K to 56.2K.
A12R14	4	Adjusts search loop gain: 0 to 1K ohm.

Table 5-5. 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				
	109.5 - 126.5 Line Voltage:	Vdc	+19.90	_____	+20.10
	+20 Vdc supply	mVrms		_____	0.5
	Ripple	Vdc	9.99	_____	-10.01
5-28	Horizontal Scan Checks & Adjustments				
	SCAN IN/OUT voltage:				
	Rise Time	ms	5 0	_____	58
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	Vp-p	2	_____	20	
EXT SCAN MODE: voltage required for trace	Vp-p	8	_____		
VIDEO TRIGGER: voltage required for trace	divisions	1.5	_____		
MANUAL SCAN	divisions	10	_____		
5-30	Vertical Deflection Amplifier Checks				
	VERTICAL POSITION control check	divisions	2	_____	+ 2
	VERTICAL GAIN control check	divisions	2	_____	
	2 dB LOG: at 0 dB	LOG REF		_____	(✓)
	at -10 dB	-50 dB		_____	(✓)
BASE LINE CLIPPER Check: full CW	divisions	2	_____	8	

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

Para. No.	Test Description	Measurement Unit	Measurement			
			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	300 kHz Bandpass Filter Adjustment Bandwidth	kHz	240	_____	360	
5-33	LC Filter Adjustment 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
	3 kHz	±0.4 div	divisions	-0.4	_____	+0.4
	Bandwidth Check:					
100 kHz		kHz	80		120	
30 kHz		kHz	24		36	
10 kHz		kHz	9.5		10.5	
5-34	Crystal Filter Fine Adjustment Gain Check:					
	3 kHz : set for 7 div		divisions	6.7	_____	7.3
	1 kHz		divisions	6.7	_____	7.3
	0.3 kHz		divisions	6.7	_____	7.3
	0.1 kHz		divisions	6.7	_____	7.3
	0.03 kHz		divisions	6.5	_____	7.5
	0.01 kHz		divisions	6.0	_____	7.0

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

Para. No.	Test Description	Measurement Unit	Min	Actual	Max
5-34 (cont)	Between 3 kHz and 300 kHz Bandwidth Check:				
	3 kHz	divisions	4.8	_____	7.2
	1 kHz	divisions	4.0	_____	6.0
	0.3 kHz	divisions	4.8	_____	7.2
	0.1 kHz	divisions	4.0	_____	6.0
	.03 kHz	divisions	1.2	_____	1.8
	.01 kHz	divisions	0.4	_____	0.6
	60 dB/3 dB Bandwidth Ratio				
	3 kHz	Ratio		_____	11:1
	1 kHz	Ratio		_____	11:1
	0.3 kHz	Ratio		_____	11:1
	0.1 kHz	Ratio		_____	11:1
	.03 kHz	Ratio		_____	11:1
	.01 kHz	Ratio		_____	11:1
5-35	Crystal Filter Come Adjustment If necessary	(✓)		_____	
5-36	3 MHz If Gain Log Adjustments				
	LOG REF LEVEL vernier: -0	Vdc	-0.96	_____	+1.04
	-1	Vdc	-0.96	_____	+1.04
	-2	Vdc	-0.96	_____	+1.04
	-3	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
	-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		_____		

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

Para. No.	Test Description	Measurement Unit	Min	Actual	Max
5-36 (cont)	Test Atten. LOG REF Error Limit LEVEL				
	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
	Test Atten. LINEAR Error Limit SENSIVITY				
	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 LO Automatic Phase Lock Check and Adjustment Level at A12TP2 Frequency at A12TP2 Level at C8 Level at J8 Level at A13TP1 Frequency at A13TP1 Frequency Linearity: Positive Offset Negative Offset No Offset APC Error at C8	mV p-p MHz V p-p V p-p mV p-p kHz divisions divisions divisions V d c	450 44.990 8.5 1.5 650 1998 0.75 0.75 0.75 +3.6	_____	8 5 0 45.010 11.5 2.5 1150 2002 0.75 0.75 0.75 +4.4
5-36	50 MHz IF Band pass 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	7 0	_____	
5-40	30 MHz Calibration Oscillator Check & Adjustment Amplitude Frequency	divisions MHz	6.8 29.997	_____	7.2 3 0 . 0 0 3

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

Para. No.	Test Description	Measurement Unit	Min	Actual	Max
5-41	Analogic Check and Adjustment				
	<u>SCAN TIME</u>	<u>SCAN WIDTH</u>	<u>BAND-WIDTH</u>	<u>DISPLAY UNCAL</u>	
	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	(✓)	

**SECTION VII
MANUAL CHANGES**

7-1. INTRODUCTION

7-1. This section contains information for adapting this manual to instruments for which the content does not apply directly.

7-3. To adapt this manual to your instrument, refer to Table 7-1 and make all of the manual changes listed opposite your instrument serial number. Per-

form these changes in the sequence listed.

7-4. Refer to paragraph 7-6 for manual changes pertaining to later serial numbered instruments.

NOTE

Changes M, N, and R in Table 7-1 below are deleted.

Table 7-1. Manual Changes by Serial Number

Serial Prefix or No.	Make Manual Changes
1345A	A
1335A04961 to 05360	A, B
1335 A04861 to 04960	A, B, C
1311A	A through D
1250A	A through E
1234A02983 to 03210	A through F
1217A	A through G
1210A	A through H
1209A	A through I
1144A01311 to 01810	A through J
1144A01211 to 01310	A through K
1137A	A through L

Serial Prefix or No.	Make Manual Changes
1131A	A through M
1121A00811 to 00960	A through N
1121A00761 to 00810	A through O
1107A00561 to 00760	A through P
1107A00436 to 00560	A through Q
1050A00386 to 00435	A through R
1050A00311 to 00385	A through S
977-00261 to 00310	A through T
977-00186 to 00260	A through U
977-00161 to 00185	A through V
974	A through W
971	A through X

Table 7-2. Summary of Changes by Component (1 of 2)

Changes	A	B	c	D	E	G	H	I	J	K
A1	L7	R4, R7, R12, R21, R25, R26, R30, R44, R45, R70, R71, R81, R82			R60					
A2			Z1							
A3										
A3A2										
A4								R36 R55 R96 R112		R122
AS				C20 R18						
A6					RS7					
A7							Note 2			
A8									R98	
A10										
A11										
A12										
A13										
W13									W13	
CHASSIS PARTS										

Table 7-2. Summary of Changes by Component (2 of 2)

Changes	L	O	P	S	T	V	W	X	Y
A1							R38		
A2									
A3								Note1	
A3A2							C15, R3 R7, R8, R13, R14		
A4			CR48 CR49			R115 R122	R10, R44, R45, R70 R71, R81, R82, R102, R115, R117 R122, R126 R132		
A5			Z1			U1 U2			C14,15 C19
A6						C13			
A7	C4, R7	Q2,Q9 R7,R20 R21,R24 R25, CR23 R12			Q10 Q19	R23 R24			
A8									
A10				R10					
A11					R1				
A12									L4, L5 L6 R14 R16
A13								L2	
W13									
CHASSIS PARTS				R13	XF1 XF2				
<p>NOTES</p> <p>1. Extensive changes in A3 assembly. New parts list and schematic for instruments with serial prefix 974- and lower.</p> <p>2. The instrument contains a new A7 board assembly. Section 7 of this manual contains the information contained on Service Sheet 14 for instruments with aerial number prefixes 1217A and lower.</p>									

TM 11-6625-2781-14-1

Manual Changes

Model 8552B

7-5. MANUAL CHANGE INSTRUCTIONS**CHANGE A**

Page 8-27, Figure 8-19 (Service Sheet 4):

Delete L7 on lead from "+20" to "TO C10" on right-hand side of A12 assembly.

Page 8-21 (Service Sheet 4):

Add A12L7 between "+20 V" on A12 Assembly and C10 feedthrough capacitor.

CHANGE B

Page 8-35, Figure 6-29 (Semite Sheet 8):

Change A1R4, A1R12, A1R21, and A1R30 to 3.65K ohms.

Page 8-39, Figure 8-32 (Semite Sheet 10):

Change A4R25* to A4R25 19.6K ohms.

Change A4R26* to A4R26 42.2K ohms.

Change A4R44†* to A4R44 † 23.7K ohms.

Change A4R45†* to A4R45 † 51.1K ohms.

Page 8-41, Figure 8-34 (Service Sheet 11):

Change A4R70†* to A4R70 † 23.7K ohms.

Change A4R71†* to A4R71 † 51.1K ohms.

Change A4R81†* to A4R81 † 23.7K ohms.

Change A4R82†* to A4R82 † 51.1K ohms.

CHANGE C

Page 8-31, Figure 8-25 (Service Sheet 6):

Delete shielding bead A2Z1 adjacent to A2C10.

Page 8-57, Figure 8-51 (Service Sheet 19):

Delete A5Z2 at base lead of A5Q23 (top left-hand side of schematic).

Model 8552B

CHANGE D

Page 8-57, Figure 8-50, (Service Sheet 19):

Change C20 to R18 on A5 Power Supply.

Page 8-57, Figure 8-51 (Service Sheet 19):

Delete A5C20 .01 μF (lower left-hand portion of schematic).

Add A5R18 511 ohms in place of A5C20 (from gate to cathode of A5CR10).

CHANGE E

Page 8-35, Figure 8-29 (Service Sheet 8):

Change the value of R60 to 147 ohms.

CHANGE F

Page 8-23, Table 8-5 (Service Sheet 2):

Delete under connector J3: Pin 22, Wire Color Code, 90; Function, Scan width Ground.

Page 8-29, Figure 8-23 (Service Sheet 5):

Change the diagram as shown in the partial schematic.

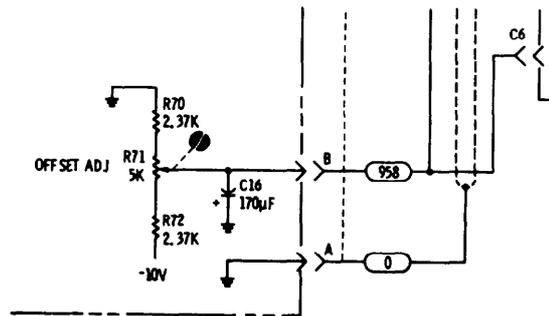


Figure 7-1. Power Supply Partial Schematic (Part of Change F)

CHANGE G

Page 8-55, Figure 8-49 (Service Sheet 18):
Change Note 1 to: R57 is 1.1K ohms for Options H01/H02.

CHANGE H

Service Sheet 14 Component Locations:
Change to Figure 7-10.
Service Sheet 14 Schematic:
Change the figure as shown by Figure 7-11.
Service Sheet 14 Text:
Redate the text material with the information contained under the heading SERVICE SHEET 14 TEXT.

SERVICE SHEET 14 TEXT (Part of Change H)

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 2 MHz
LOG REF LEVEL 30 dBm
VIDEO FILTER OFF
SCAN TRIGGER LINE
INPUT ATTENUATION 0 dB
LOG-LINEAR10 dB LOG
SCAN MODE INT
SCAN TIME PER DIVISION . 1 MILLISECOND
CAL OUTPUT connected to RF INPUT
FREQUENCY30 MHz

1 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. In the MANUAL mode, blanking is not used.

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 7.

TEST PROCEDURE 1

Connect the HP 180A/1801A/1821A to TP A (Q11-e) and observe the waveforms shown in A and B below.

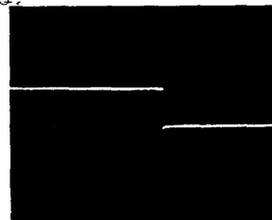
CONTROL SETTINGS:
(Waveform A)

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.



Model 8552B

SERVICE SHEET 14 TEXT (cont'd)
(Part of Change H)

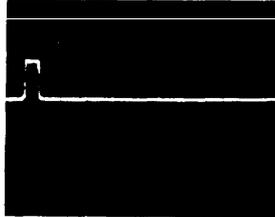
CONTROL SETTINGS:
(Waveform B)

Oscilloscope:
Same as A.

Analyzer: Same as above except rotate BASE LINE CLIPPER full cw.

If waveform A was GOOD and B was BAD, trouble should be in the baseline clipper circuits.

If correct waveforms were obtained, blanking circuits and baseline clipper circuit is functioning properly. Proceed to step 2



2 BASELINE CLIPPER AND CLIPPER CIRCUIT

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 3

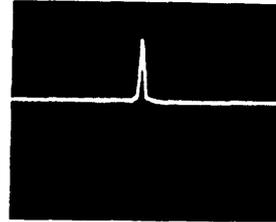
Operation of the BASE LINE CLIPPER is verified by the test procedure in step 3. To verify

operation of the clipper override circuit, connect the HP 180A/1801A/1821A to TP B (Q20-c) and observe the waveform.

CONTROL SETTINGS:

Oscilloscope:
0.1 V/Div
2 msec/Div
10:1 probe

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.)

3 2 dB LOG AND VERTICAL PREAMPLIFIER CIRCUITS

Q15, Q16 and associated circuitry comprise an operational amplifier; when S1 (LOG-LINEAR switch) is in the 10 dB LOG position the amplifier's gain is 1. When S1 is in the 2 dB LOG position, K1 is energized by Q25. This adds a feedback divider and an offset to the amplifier to increase its gain to 5 and re-reference the maximum signal point to the CRT LOG REF graticule. Q24 is used as a dual diode and prevents any signal on the CRT display from going below the base line.

Q5, Q6, Q7 and associated circuitry comprise an operational amplifier with a gain of approximately 10. VERTICAL GAIN control, R11, controls the amplifier's feedback and thus its gain.

TEST PROCEDURE 3

3a. With LOG-LINEAR in 10 dB LOG, switch LOG REF LEVEL to -20 dBm to put the signal peak at the -10 dB graticule on the CRT display. Switch LOG-LINEAR to 2 dB LOG; signal should drop approximately to the -50 dB graticule.

Test GOOD: Proceed to 3b.

Test BAD: Check Q15, Q16, Q24, Q25 and associated circuitry.

3b. Connect HP 180A/1801A/1821A to TP C (Q5-c) and observe the waveform.

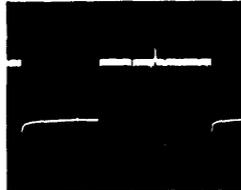
SERVICE SHEET 14 TEXT (cont'd)

(Part of Change H)

CONTROL SETTINGS

Oscilloscope:
0.1 V/Div
2 msec/Div
10:1 probe

Analyzer:
Same as basic except:



SCAN WIDTH 0-100 MHz
SCAN TIME PER DIVISION . 1 MILLISECOND
LOG REF LEVEL -10dBm
FREQUENCY50 MHz

Not a negative-going video and positive-going marker pulses. Rotate vertical gain control to verify proper operation.

Waveform GOOD: Proceed to step
Waveform BAD: Check Q5, Q6, Q7 and associated circuitry.

NOTE

If repairs to the 2 dB LOG and vertical pre-amplifier circuits are required, the adjustments specified in paragraphs 5-30 of Section V should be performed.

VERTICAL DEFLECTION POWER AMPLIFIERS

The vertical deflection signals from the vertical pre-amplifier are dc coupled through VR1 and R34 to output drive 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 a positive-going deflection signal. 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.

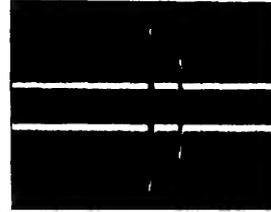
TEST PROCEDURE 4

Connect the HP 180A/1801A/1821A Channel A probe to TP D (Q8-e) and the Channel B probe to TP E (Q18-e), and observe the waveforms.

CONTROL SETTINGS

Oscilloscope:
1 V/Div
2 msec/Div
10:1 probes

Analyzer:
Same as basic except:



SCAN TIME PER DIVISION 0.5 MILLISECOND
LOG REF LEVEL -10dBm

Waveform GOOD: Proceed to step 5

Waveform BAD: Check Q1, VR1, VR2, Q2, Q8, Q9, Q10, Q18, Q19 and associated components.

5 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 horizontal deflection plates of the CRT. Controls are provided to vary the width and position of the CRT trace.

TEST PROCEDURE 5

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

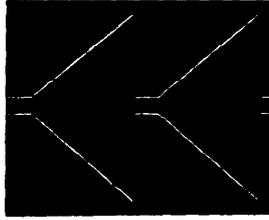
If repairs to the deflection amplifier assembly are required, the Front Panel Check Procedure, paragraph 4-12 of Section IV, should be performed.

Model 8552B

SERVICE SHEET 14 TEXT (cont'd)
(Part of Change H)

CONTROL SETTINGS

Oscilloscope:
2V/Div
5 msec/Div
10:1 probe



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.

CHANGE I

Service Sheet 11 and 12 Schematics:

Change:

A4R36, R55, R96 and R112 to 7500 OHMS.

CHANGE J

Service Sheet 13 Schematic:

Change the figure as shown in the partial schematics of Figures 7-4 and 7-5.

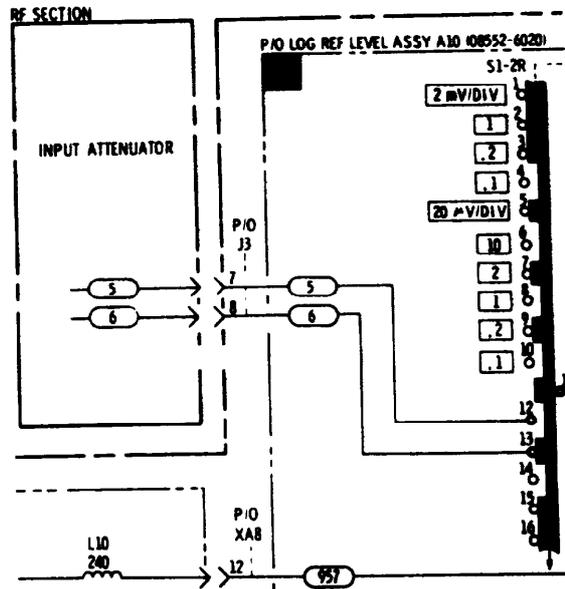


Figure 7-4. Log/Linear Amplifier Partial Schematic (Part of Change J)

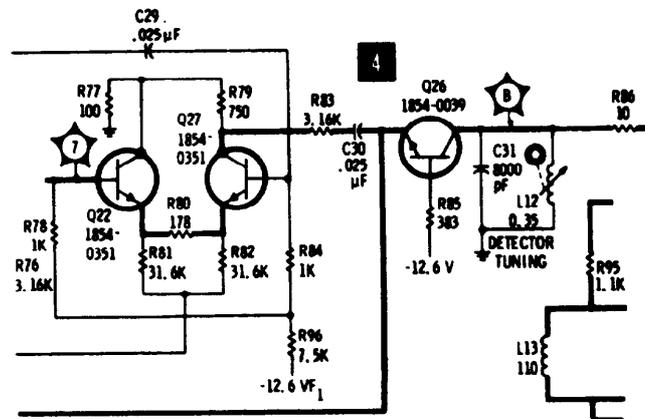


Figure 7-5. Log/Linear Amplifier Partial Schematic (Part of Change J)

Model 8552B

CHANGE K

Service Sheet 11 Schematic:

Change the value of A4R122 to 511.

CHANGE L

Semite Sheet 14:

Change the value of A7R7 to 680 and A7C4 to 0.22.

CHANGE M

Deleted.

CHANGE N

Deleted.

CHANGE O

Service Sheet 14 Component Locations:

Change the figure to the one shown in Figure 7-5.

Service Sheet 14 Schematic:

change:

The HP Part number for the Deflection Amplifier Assy A7 (upper left-hand corner of the schematic) to 08552-60108.

A7Q2 and Q9 HP part numbers to 1853-0050 of Figures 7-6 and 7-7.

The diagram as shown in the partial schematics.

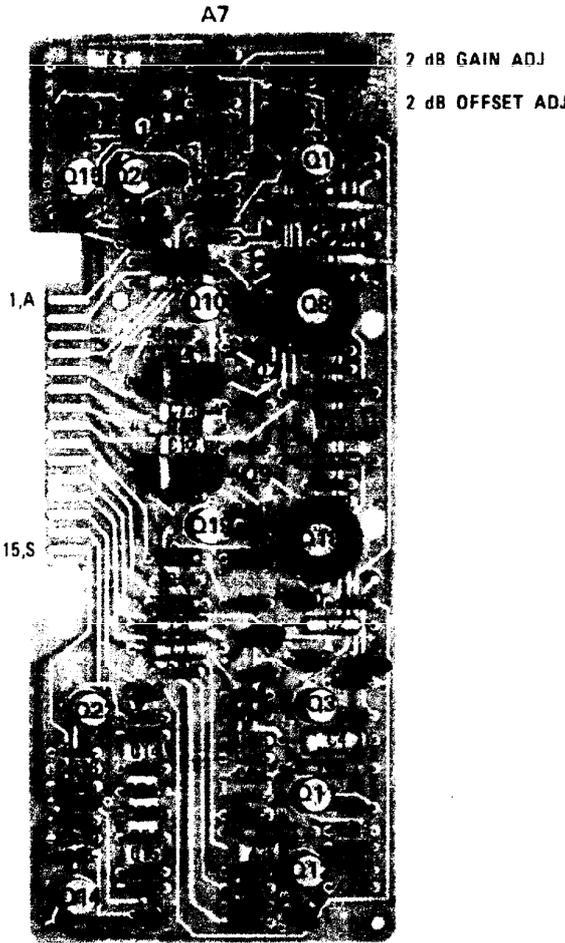


Figure 7-6. Deflection Amplifier A7 Component Identification (Part of Change O)

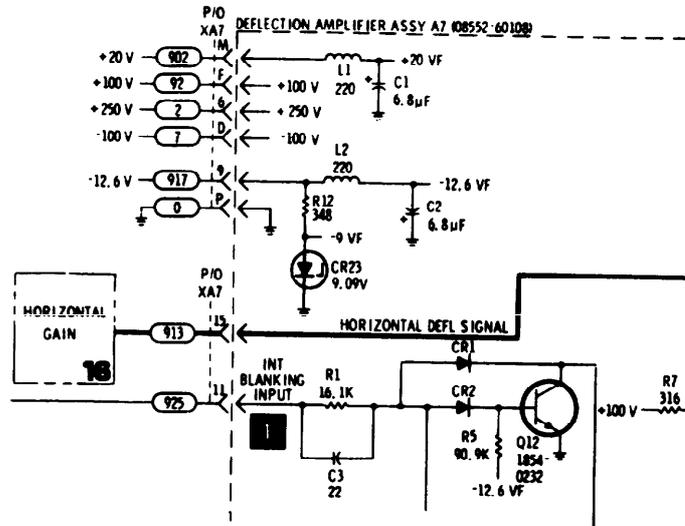


Figure 7-7. Deflection Amplifier Partial Schematic (Part of Change O)

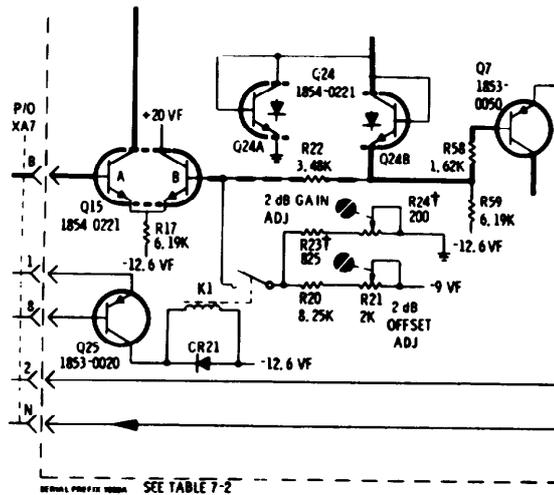


Figure 7-8. Deflection Amplifier Partial Schematic (Part of Change O)

CHANGE P

Service Sheet 19 Schematic:
Delete A5Z1.
Semite Sheet 10 Schematic:
Delete A4CR48 and CR49.

CHANGE Q

Table 1-1:
Change the AMPLITUDE SPECIFICATIONS:
Amplitude Accuracy:
Switching between bandwidths (at 20°C)

	LOG	LINEAR
0.03 – 300 kHz	±0.05 dB	±5.8%
0.01 – 300 kHz	±1.0dB	± 19.0%

CHANGE R

Delated.

CHANGE S

Service Sheet 13 Schematic:
Change: R13 value to 147.
Delete: A10R10 and show the -12.6 Vdc supply voltage connected directly to the switch contact.

CHANGE T

Service Sheet 14:
Change: A7Q10 and Q19 to 1864-0232.

Service Sheet 17:
Change: A11R1 to 34.8K.

CHANGE V

Service Sheet 4 Schematic:

Change: A12U1 HP Part number to 1820-0216.

Service Sheet 5 Schematic:

Change: A5U1 and U2 HP part numbers to 1820-0216.

Service Sheet 11 Schematic:

Change the value of

A4R115 to 147.

A4R122 to 1000.

Service Sheet 14 Schematic:

change:

The value of A7R23 to 909.

A7R24 to 100 ohm potentiometer.

Service Sheet 15 Schematic:

Change:

The value of A6C13 to 12.

A6U1 and U2 HP part numbers to 1820-0216.

CHANGE W

Service Sheet 3 Schematic:

Change the value of:

- A3A2C15 to 39
- A3A2R3 to 2150
- A3A2R7 to 147
- A3A2R8 to 61.9
- A3A2R13 to 21.5
- A3A2R14 to 90.9.

Service Sheet 4 Schematic:

Change the value of A4R10 to 2.15K.

Service Sheet 8 Schematic:

Change the value of A1R38 to 51.1.

Service Sheet 10 Schematic:

Change the value of:

- A4R44 to 19.6K
- A4R45 to 42.2K.

Service Sheet 11 Schematic:

Change the value of:

- A4R70 and A4R81 to 19.6K
- A4R71 and A4R82 to 42.2K
- A4R102 to 12.1K
- A4R115 to 51.1
- A4R122 to 511
- A4R126 and R128 to 1K
- A4R132 to 10K.

CHANGE X

Service Sheet 3 Schematic Diagram:

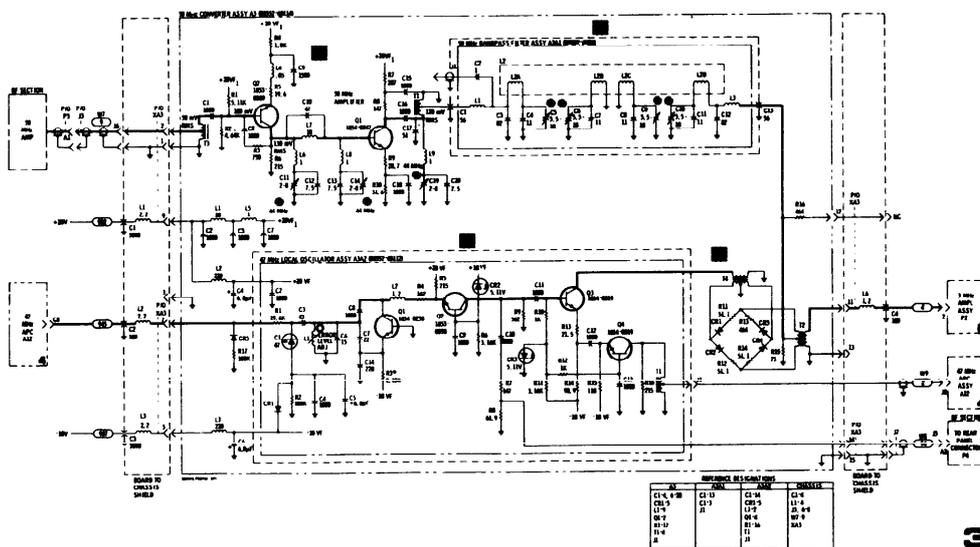
Change the schematic to the one shown in Figure 7-11.

Service Sheet 4 Schematic Diagram:

Change the value of:

- A12L4 and A12L5 to 8.2.
- A12R14 to a 1000 ohm variable resistor.
- A12R16 to 26.1
- A13L2 to 33.0

Delete: A12L2.



Model 8552B

CHANGE Y

Service Sheet 5 Schematic Diagram:

Change the Schematic as shown in Figure 7-12.

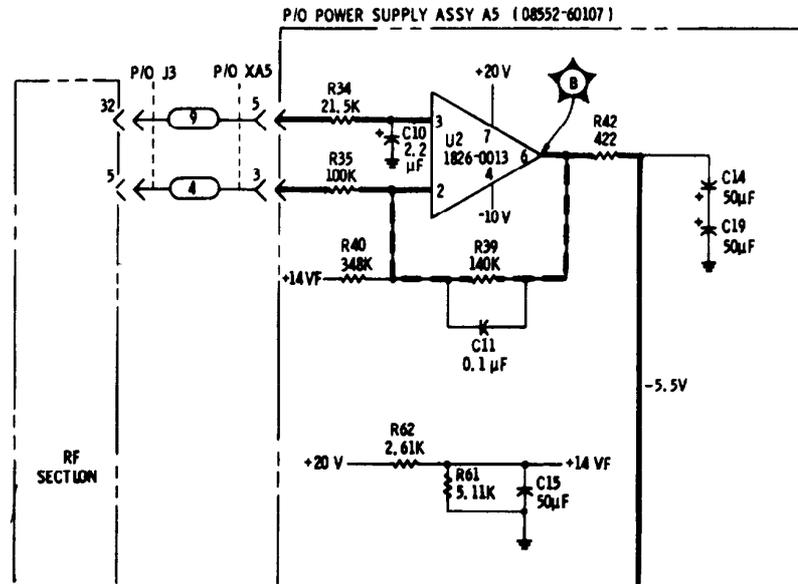


Figure 7-12. Power Supply Partial Schematic Diagram (Part of Change Y)

7-6. The manual changes given below are for correcting errors and for adapting the manual to instruments containing improvements made after the printing of the manual. Make all ERRATA corrections first and then make all appropriate serial number related changes indicated in the table.

<u>Serial Prefix or Number</u>	<u>Make Manual Changes</u>
1431A	1
1437A thru 1437A07660, 1505A thru 1505A prefix, 1613A	1,2
1616A	1,2,3
1650A	1,2,3,4

ERRATA

Page 8-27, Figure 8-19, SERVICE SHEET 4:
Change C10 (far left) to C11.

Page 8-31, Figure 8-25, SERVICE SHEET 6:
Delete pF from value of L12.

CHANGE 1

Page 8-41, Figure 8-34, SERVICE SHEET 11:
Change R122 to R122*.

Page 8-49, Figure 8-43, SERVICE SHEET 15:
Change A6R29 to 1.96K.
Change A6R39 to 19.6K.

CHANGE 2

Page 8-39, Figure 8-32, SERVICE SHEET 10:
Change A4R33 to A4R33* 1.33K.
Change A4R52 to A4R52* 1.33K.
Change A4R66 to A4R66* 1.33K.
Change A4R36† to A4R36†* 6.19K.
Change A4R55† to A4R55†* 6.19K.
Change A4R68† to A4R68†* 6.19K.

Model 8552B**Manual Changes****CHANGE 2 (Cont'd)**

Page 8-41, Figure 8-34, SERVICE SHEET 11.

Change A4R92 to A4R92* 1.33K.

Change A4R96† to A4R96†* 6.19K.

Change A4R108 to A4R108* 1.33K.

Change A4R112† to A4R112†* 6.19K.

CHANGE 3

Page 8-45, Figure 8-39, SERVICE SHEET 13:

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 12.

CHANGE 4

Page 1-6, Table 1-2:

Change Tuning Tool. Slot, Nonmettalic, 2.5-inch shaft HP Part Number to 8710-0772.

Page 5-14, Paragraph 5-32:

Under EQUIPMENT, change TUNING TOOL HP Part Number to 8710-0772.

Page 5-15, Paragraph 5-33:

Under EQUIPMENT, change TUNING TOOL HP Part Number to 8710-0772.

SECTION VIII

SERVICE

8-1. INTRODUCTION

8-2. This section provides instructions for troubleshooting and repair of the HP 8552B 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 $\pm 10\%$. 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%.

WARNING

"Some of the maintenance and servicing operations described herein are performed with power supplied to the instrument while protective covers are removed. Be careful when performing these operations. Line voltage is always present on terminals including the power input connec-

tor, fuse holder, power switch, etc. In addition, when the instrument is on, energy available at many points may result in personal injury or death when contacted."

8-5. MAINTENANCE AIDS

8-6. 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 **Maintenance Allocation Chart in the appendix.**

Test instruments other than those listed may be used if their performance equals or exceeds that of the equipment listed (**refer to Table 1-2**).

8-9. Two circuit board extenders are required to service the 8552B IF Section. A 15-pin extender is supplied with the HP 11592A Service Kit. It may be used to extend the A1 through A8 Assemblies. In addition, a 6-pin extender (HP 5060-5914) is required to extend the A13 Assembly.

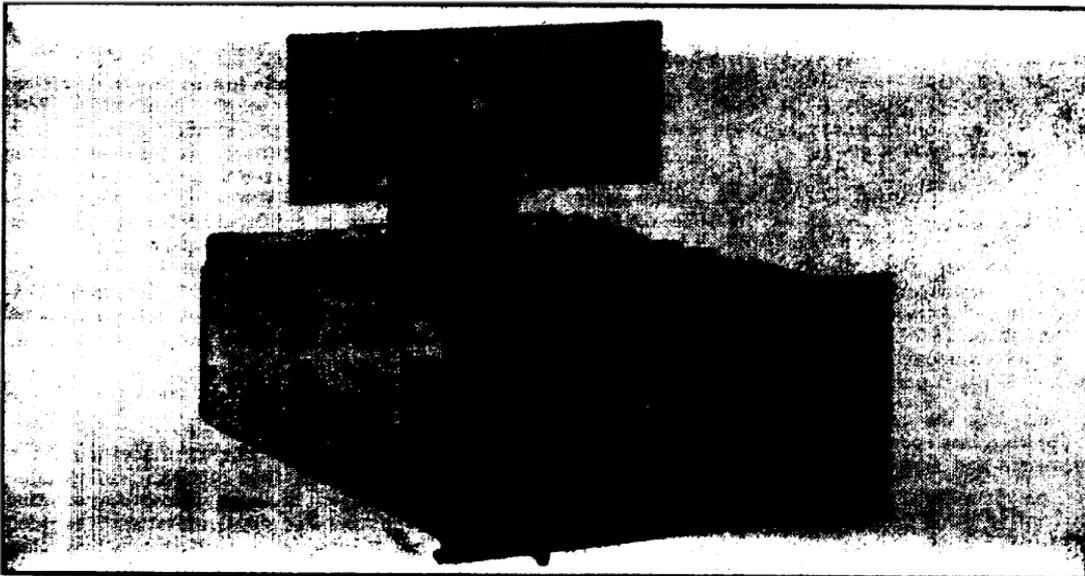


Figure 8-1. 8552B IF Section with Circuit Board Extended for Maintenance

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 8-8. 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 **TM 11-6625-2781-24P-1**.

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. Modular Exchange Program. Circuit boards for the 8552B 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 exchange modules (circuit boards) received by an HP Field Sales office will be shipped the same day — either from the sales office itself or from service center.

8-19. An exchange module should be ordered by the "Exchange Assembly" part number listed under the assembly designation.

Upon receiving the exchange module, the faulty module should be returned in the same special carton in which the exchange module was received. A flow diagram of the Modular Exchange Program is shown in Figure 8-2.

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. This procedure should be used in conjunction with the block diagrams and text located on Service Sheet 1. The test equipment required follows:

RF Voltmeter	HP 3406A
Oscilloscope	HP 180A/1801A/1821A
Signal Generator	HP 608F
Service Kit	HP 11592A
Adapter	UG-201 A/U
Cable Assembly	HP 10503A

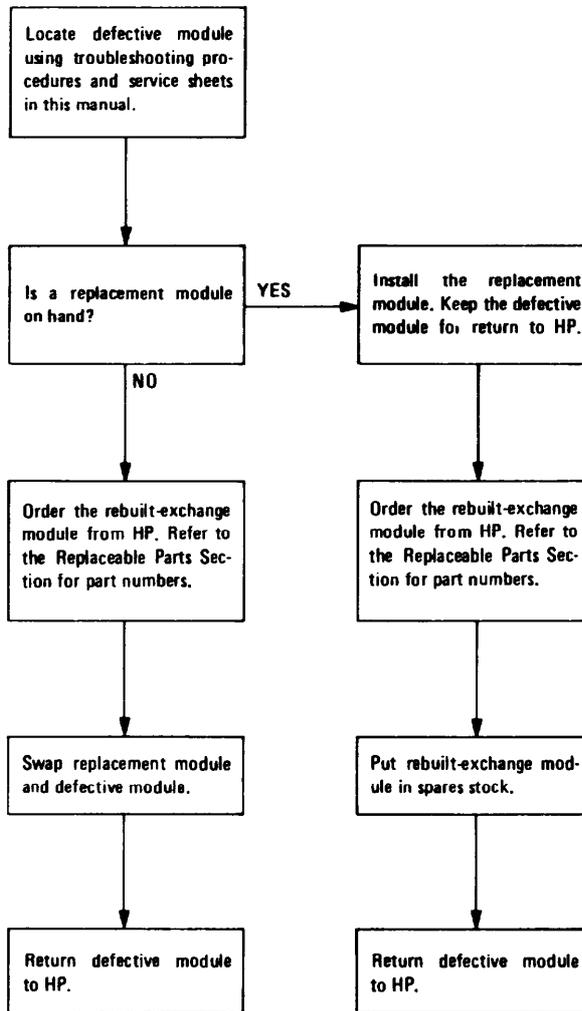
8-21. No attempt is made in this procedure to isolate causes of trouble to the component level. Reference is made to the specific Service Sheet which describes the circuits and test procedures for the portion of the analyzer to which the malfunction has been isolated. Where RF or Display Section maintenance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

8-22. Diagram Notes. Table 8-3, Schematic Diagram Notes, provides information relative to symbols and measurement units shown in schematic diagrams.

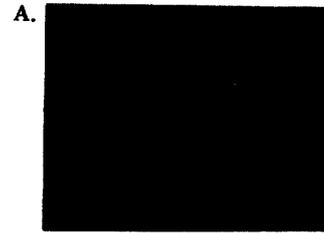
8-23. ETCHED CIRCUITS

8-24. The etched circuit boards in the 8552B 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 recommendations and precautions pertinent to

The module exchange program described here is a fast, efficient, economical method of keeping your Hewlett-Packard instrument in service.



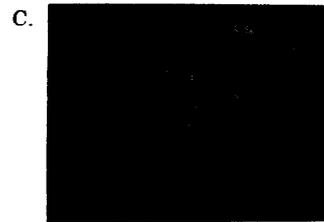
*HP pays postage on boxes mailed in U.S.A.



Rebuilt-exchange modules are shipped individually in boxes like this. In addition to the circuit module, the box contains:
 Module repair report
 Return Address label
 Tape for resealing box



Open box carefully - it will be used to return defective module to HP. Complete repair report. Place it and defective module in box. Be sure to remove enclosed return address label.



Seal box with tape provided. Inside U.S.A., stick preprinted return address label over label already on box, and return box to HP. Outside U.S.A., do not use address label: instead, address box to the nearest HP office.

Figure 8-2. Diagram of Modular Exchange Program

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 component 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.

S-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.

Table 8-1. Etched Circuit Soldering Equipment

Item	Use	Specification	Item Recommended
Soldering tool	Soldering Unsoldering	Wattage rating: 47½ – 56¼ 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	Soldapullit by Edeyn 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
Solder	Component replacement Circuit board repair Wiring	Resin (flux) core, high tin content (60/40 tin/lead), 18 gauge (SWG) preferred	
Protective Coating	Contamination, corrosion protection	Good electrical insulation, corrosion-prevention properties	Silicone Resin such as GE DRI-FILM**88
<p>*For working on 8552B Boards: for general purpose work, use Ungar No. 1237 Heating Unit (37.5W, tip temperature of 750–800 degrees) and Ungar No. PL111 1/8" chisel tip.</p> <p>**General Electric Co., Silicone Products Dept., Waterford, New York, U.S.A.</p>			

Model 8552B

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, and which is the base. Figures 8-3 and 8-4 show epoxy and metal case transistors and integrated circuits and the means of identifying the leads.

8-29. To replace a 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.

d. Integrated circuit replacement instructions are the same as those for transistors.

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 No. 6 silicone compound or equivalent before fastening the transistor to the chassis, Dow Corning No. 5 compound is available in 8-oz. tubes from Hewlett Packard; order HP Part No. 8500-0059.

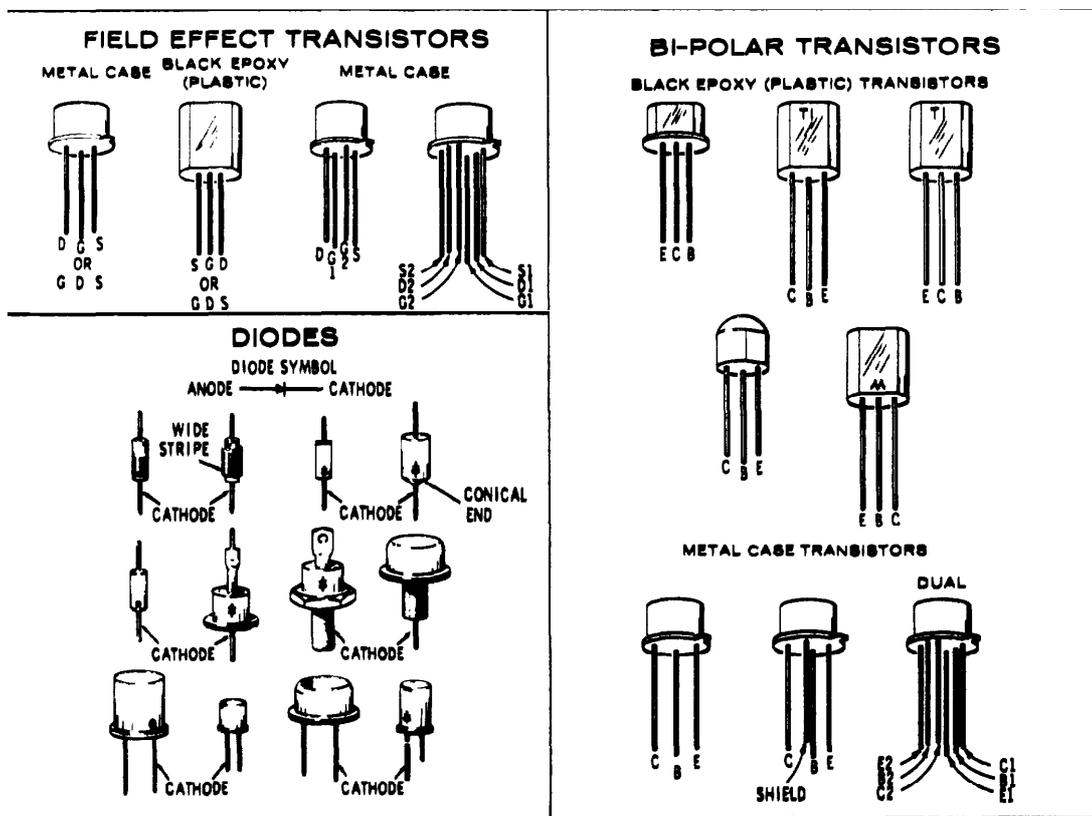


Figure 8-3. Examples of Diode and Transistor Marking Methods

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 8-3 shows examples of some diode 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 dif-

ferent from that used in previous Hewlett-Packard manuals. 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 8-5 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.

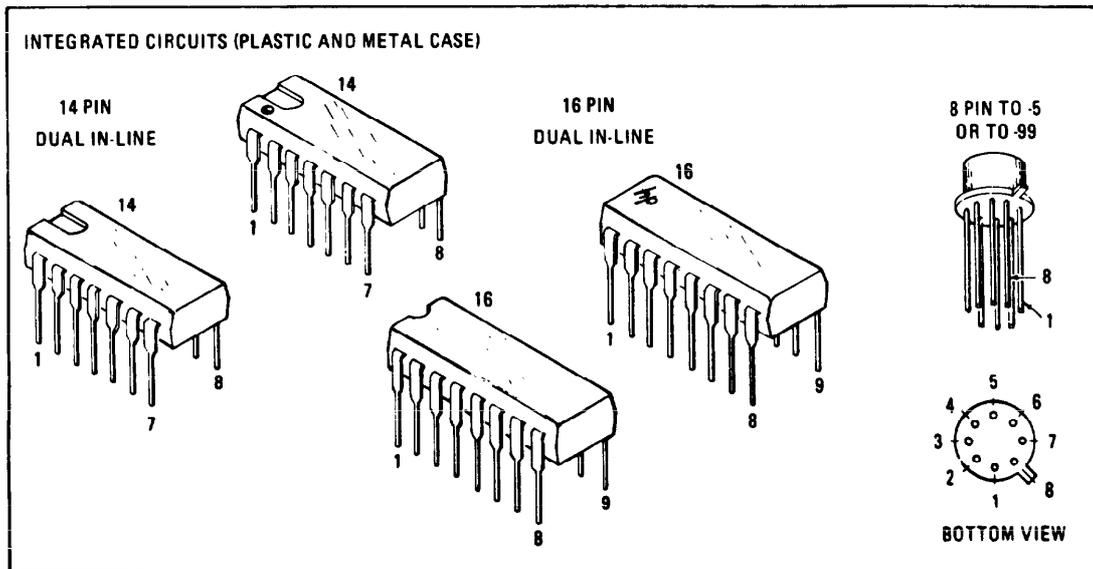


Figure 8-4. Integrated Circuit Packaging

Model 8552B

8-37. In all schematics in this manual, the switches are shown in the maximum ccw position, unless otherwise noted. The physical layout of the switches are shown as well as a straight-line presentation of switch action. In Figure 8-6 note that the straight

line rotor contact moves from the bottom to the top when the switch moves one step in a cw direction, Figure 8-7 illustrates the difference between the old method of switch presentation and the straight line presentation.

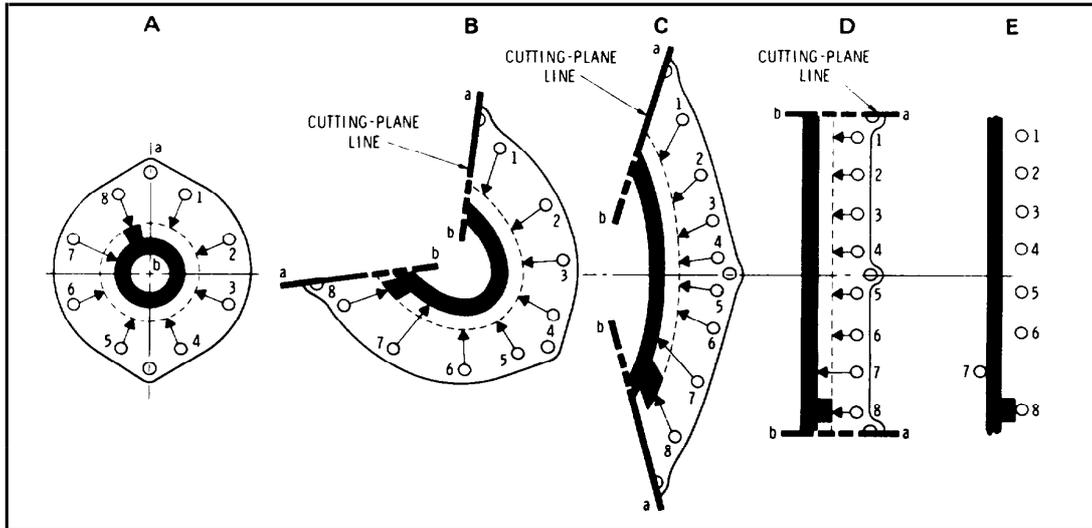


Figure 8-5. Evolution of Straight-Line Switch Presentation

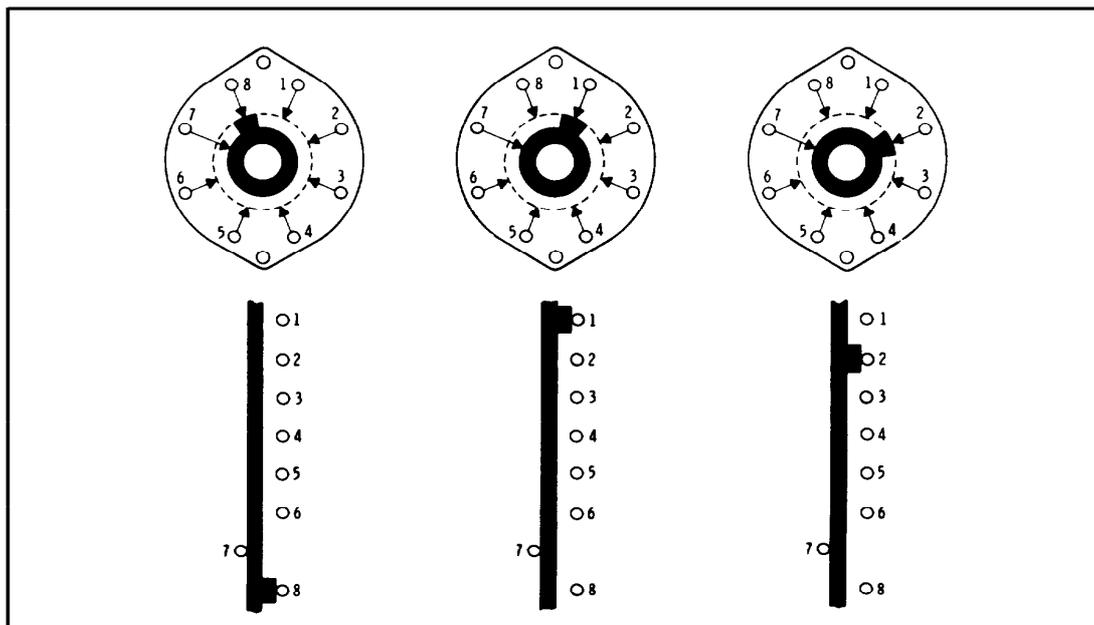


Figure 8-6. Three Positions of Typical Switch Wafers

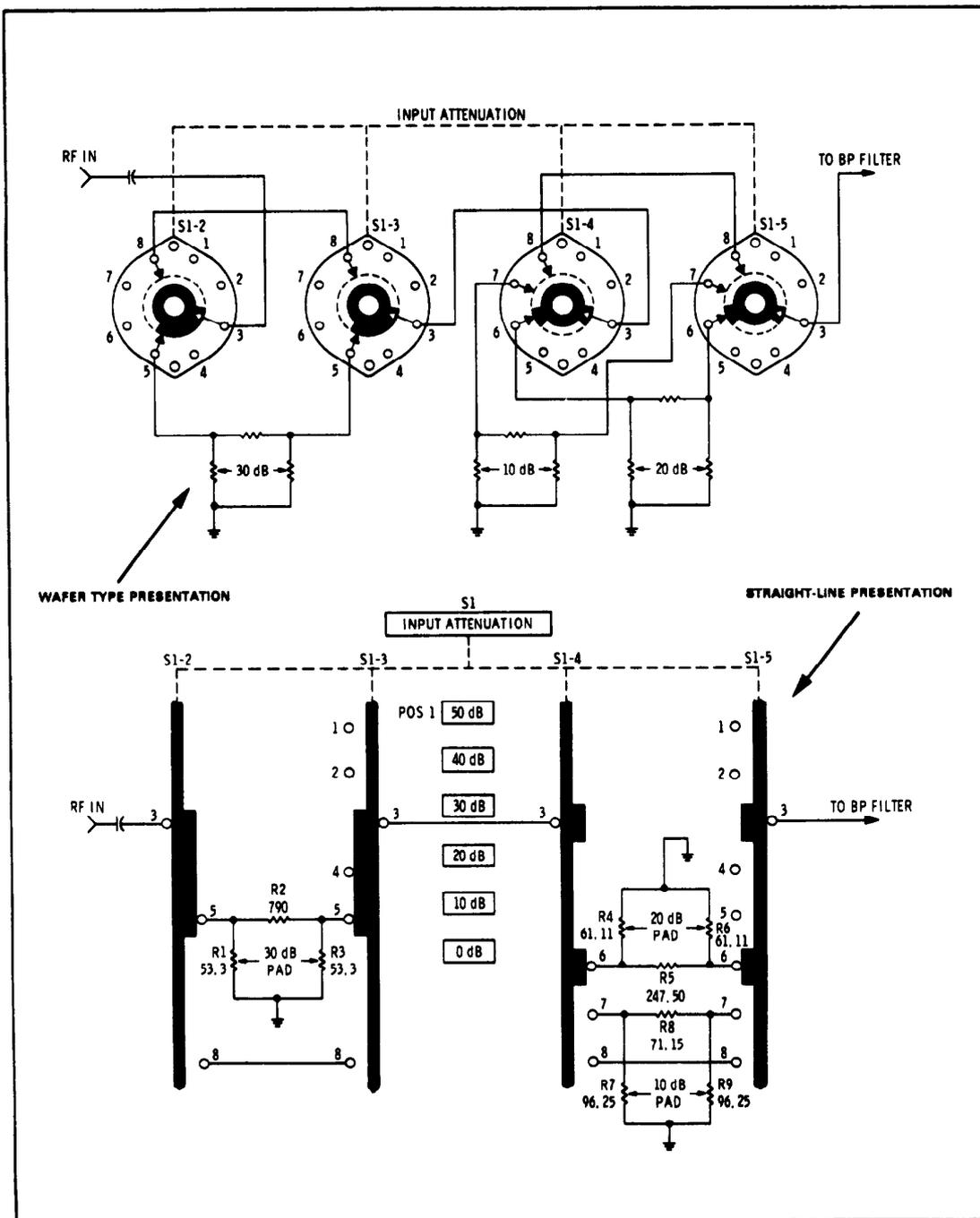


Figure 8-7. Wafer Switch Presentation Versus Straight-Line Presentation

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

TEST	FAULT	PROCEDURE
<p>5. Set analyzer controls as follows: FREQUENCY30 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 10 dB 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.</p>	<p>Signal does not appear on Dis- play Section CRT</p> <p>Signal appears but sweeps back and forth about ± 1 Div on CRT.</p>	<p>Connect the RF voltmeter to CAL OUT- PUT jack. The voltmeter should indicate approximately -30 dBm. If the signal is not present refer to Service Sheet 17. Repair the calibration oscillator and repeat the test. If CAL OUTPUT is pre- sent proceed to test 6.</p> <p>Refer to Service Sheet 4 and check the 47 MHz APC and the 2 MHz VTO cir- cuits.</p>
<p>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 LOG-LINEAR 10dB LOG VIDEO FILTER OFF SCAN TIME PER DIVISION 2 MILLISECONDS</p> <p>Connect a 50 MHz -33 dBm signal from the signal generator to J6 on the top of the 8552B using the 11592-60001 cable. Tune the signal generator slightly around 50 MHz un- til the signal is centered. With AMPL CAL centered the signal should read -30 dBm ± 2 dBm.</p>	<p>If signal is correct</p> <p>Signal is missing</p>	<p>IF Section operating correctly. Trouble in RF Section. See Systems Test and Troubleshooting Procedure in RF Sec- tion Manual.</p> <p>Proceed to test 7</p>
<p style="text-align: center;">NOTE</p> <p>For steps 7a through 7g connect CAL OUTPUT to RF INPUT and set the analyzer controls as specified in step 6.</p>		

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 the RF voltmeter to terminal labeled 3 MHz (C4) on the top of the 8552B. Tune frequency for maximum signal around 30 MHz. Signal should be about 8 mV rms. If signal is correct, proceed to test 7b.	Signal is missing or incorrect	Refer to Service Sheet 3 and repair the 50 MHz Converter.
7b. Connect the RF voltmeter to the 3 MHz terminal (C4), peak FREQUENCY, then set SCAN TIME PER DIVISION to 1 SECOND. Meter should fluctuate with peaks at about 8 mV rms. If signal is correct set SCAN TIME PER DIVISION to 2 MILLISECONDS and proceed to test 7c.	Meter does not fluctuate	Refer to Service Sheet 4 and check the 47 MHz APC and the 2 MHz VTO circuits. If trouble persists, check the 2 MHz Shaping circuits (Service Sheet 5).
7c. Set SCAN WIDTH to ZERO, connect the RF voltmeter to XA2 pin 14 and tune FREQUENCY for maximum. Signal level should be about 38 mV rms. Rotate AMPL CAL and LOG REF vernier cw; signal should increase. If signal is correct, re-center AMPL CAL, set vernier ccw and proceed to test 7d.	Signal is missing or incorrect	Refer to Service Sheets 6 and 7 and repair the 3 MHz Amplifier.
7d. Connect the RF voltmeter to XA1 pin 2 and tune FREQUENCY and FINE TUNE for maximum. Signal level should be about 230 mV rms. If signal is correct, proceed to test 7e.	Signal is missing or incorrect	Refer to Service Sheet 8 and repair the LC Filter.
7e. Connect the RF voltmeter to XA4 pin 14 and tune FREQUENCY and FINE TUNE for maximum. Signal should be about 930 mV rms. Set BANDWIDTH to 3 kHz and peak signal with FINE TUNE. Signal should remain about the same. If signal is correct, proceed to test 7f.	Signal is missing or incorrect	Refer to Service Sheets 10 and 11 and repair the Crystal Filter.

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

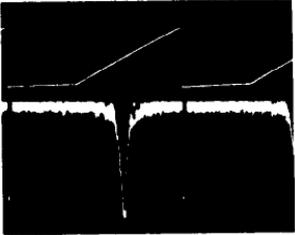
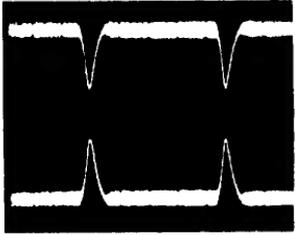
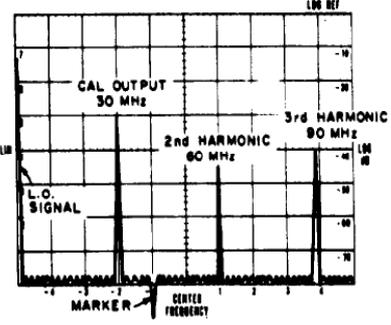
TEST	FAULT	PROCEDURE
<p>7f. Set SCAN WIDTH to PER DIVISION and connect oscilloscope channel A probe to SCAN IN/OUT jack and the channel B probe to XA7, pin B. Oscilloscope control settings: Time/Div0.5 msec/div Channel A 0.5 V/div Channel B02 V/div 10:1 probes If waveform is correct, proceed to test 7g.</p>	<p>Waveform B is missing or incorrect</p>	<p>Refer to Service Sheet 12 and 13 and repair the Log • Linear Amplifier circuits.</p> 
<p>7g. Connect the oscilloscope channel A input to XA7 pin 6 and the channel B input to XA7 pin 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.</p>	<p>Either waveform is missing or incorrect</p>	<p>Refer to Service Sheet 14 and repair the vertical deflection circuit.</p> 
<p>8. Set analyzer controls as follows: FREQUENCY 40 MHz FINE TUNE Centered BANDWIDTH 300 kHz SCAN WIDTH 0-100 MHz SCAN WIDTH PER DIVISION10 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 0 LOG-LINEAR 10 dB 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.</p>	<p>Sweep does not extend to full width of graticule Not all signals present or properly spaced</p>	 <p>30 MHz Calibrator Signal & Harmonics</p> <p>See Service Sheet 14. Check Scan Generator assembly.</p> <p>Same as above. Also refer to System Test and Troubleshooting Procedure in RF Section Manual,</p>

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

TEST	FAULT	PROCEDURE
<p>Test 8 (cont'd)</p> <p>Vary VERTICAL position to center baseline trace on bottom CRT graticule. Signal amplitude is unimportant in this test. Proceed to test 9.</p>	<p>Baseline trace does not vary</p>	<p>See Service Sheet 14, Check vertical deflection circuit</p>
<p>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.</p>	<p>Focus and astigmatism inoperative or trace will not align</p>	<p>Refer to Display Section Manual and repair as required.</p>
<p>10. Turn FREQUENCY control and observe marker. Marker should move as FREQUENCY is tuned. Proceed to test 11.</p>	<p>Marker is missing</p>	<p>See System Test and Troubleshooting Procedure in RF Section Manual.</p>
<p>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.</p>	<p>30 MHz signal does not appear on CRT</p>	<p>Check calibration and alignment of the analyzer.</p>
<p>12. Adjust FREQUENCY to center the 30 MHz signal on CRT, then reduce SCAN WIDTH PER DIVISION to 10 kHz and recenter the display with FINE TUNE control. Signal centers properly. Proceed to test 13.</p>	<p>Signal is unstable, FINE TUNE does not vary signal position</p>	<p>Refer to System Test and Troubleshooting Procedure in RF Section manual, See Service Sheet 5. Check 2 MHz VTO Shaping Circuit,</p>
<p>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.</p>	<p>Each of the first 4 steps: no increase in gain, not 10 dB gain or loss of signal,</p>	<p>See Service Sheet 11.</p>

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

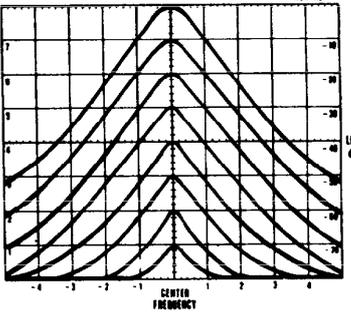
TEST	FAULT	PROCEDURE
<p>13. (cont'd)</p> <p>Set INPUT ATTENUATION to 30 dB and rotate LOG REF LEVEL cw for remaining two steps. Signal amplitude should again reach the top CRT graticule.</p> <p>INPUT ATTENUATION to 10 dB, LOG REF LEVEL to 0 dBm. Rotate LOG REF LEVEL Vernier to full cw. Signal shown should increase by 12 dB. Proceed to test 14.</p>	<p>Steps 5 and 6 same as above</p> <p>Steps 7, 8 and 9 same as above</p> <p>All or most levels incorrect and cannot be corrected by adjustment.</p> <p>No change in signal level or change is incorrect.</p>	 <p>Check 3 MHz step gain amplifier, Service Sheets 8 and 9.</p> <p>Check 3 MHz step gain amplifier, Service Sheets 6 and 9.</p> <p>Check Lin/Log amplifier, Service Sheets 12, 13.</p> <p>Check variable gain amplifier, Service Sheet 7.</p>
<p>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.</p>	<p>AMPL CAL does not vary signal level.</p>	<p>See Service Sheet 6. Check calibration amplifier.</p>
<p>15. Set LOG LINEAR to 2 dB LOG. Signal should remain at LOG REF graticule on CRT. Set LOG REF LEVEL to -20 dBm. Signal should drop to about -50 dB graticule on CRT. Proceed to step 16.</p>	<p>Either level incorrect</p>	<p>See Service Sheet 14. Check 2 dB Log Amplifier.</p>

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

TEST	FAULT	PROCEDURE
16. Set LOG-LINEAR to LINEAR and LINEAR SENSITIVITY to 1 m V/D IV. The CRT deflection should be adjusted by the AMPL CAL control to 7.1 divisions. If display is correct, proceed to test 17.	AMPL CAL cannot be adjusted for 7:1 division display.	See Service Sheets 12 and 13. Probable trouble is in linear amplifier compensation circuit or linear scale factor circuit.
17. Set analyzer controls as follows: SCAN WIDTH 0-100 MHz SCAN WIDTH PER DIVISION 10 MHz BANDWIDTH 10 kHz LOG - LINEAR10 dB LOG LOG REF LEVEL -10 dBm Turn BASE LINE CLIPPER full ccw. Switch SCAN TIME PER DIVISION through its range. Return SCAN TIME PER DIVISION to 2 MILLISECONDS. Set SCAN WIDTH to PER DIVISION. Set SCAN TIME PER DIVISION to 2 SECONDS, SCAN MODE to SINGLE and push the button; a dot should appear on the CRT display moving from left to right. Push the SINGLE scan button again; the dot should disappear. Set SCAN MODE to MAN and rotate the MANUAL SCAN knob. Knob should control the dot on the CRT. Set SCAN MODE to INT and SCAN TRIGGER to LINE, The scan circuits should trigger and sweep normally.	Bottom 2 divisions of CRT not blanked. Scan does not occur in all positions DISPLAY UNCAL does not illuminate Display incorrect Display incorrect No sweep on CRT.	See Service Sheets 14, 15, and 16. Check base line clipper circuit. Check scan generator circuit. Refer to System Test and Troubleshooting Procedure in RF Section Manual and Service Sheet 17. Probable cause of trouble is in the analogic circuit or switching circuits. Refer to Service Sheet 15 and repair the scan control flip-flop or S2. Refer to Service Sheet 16 and check the manual scan circuits. Refer to Service Sheet 15 and check the scan trigger circuits.

SCHEMATIC DIAGRAM NOTES

Resistance in ohms, capacitance in picofarads, and inductance in microhenries unless otherwise noted.

P/O = part of.

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



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 star-on circuit assemblies show locations of test points.



Encloses wire color code. Code used (MIL-STD681) 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.

Table 8-3. Schematic Diagram Notes

Table 8.4. IF Section Assembly and Component Location

Assembly	Service Sheet	Photo
A1 LC Filter	8	Figure 8-28
A2 3 MHz Amplifier	6,7	Figure 8-24,8-26
A3 SO MHz Converts	3	Figure 8-17
A4 Crystal Filter	10,11	Figure 8-31, 8-33
A6 Power Supply	6,17,19	Figure 8-22,8-46,8-50
A6 Scan Generator	15,16,18	Figure 8-42,8-44,8-47
A7 Deflection Amplifier	14	Figure 8-40
A8 Log Amplifier	12, 13	Figure 8-36, 8-38
A9 Scan Time Switch	5, 15, 17	Figure 8-13
A10 Log Ref Level	6,9,11,13,18	Figure 8-12
A11 Video Filter Switch	13,17	Figure 8-11
A12 47 MHz APC	4	Figure 8-19
A13 2 MHz VTO	4	Figure 8-20
Component	Service Sheet	Photo/Location
C1-4	3	Chassis Top
C5	15	Front Panel
C 6 - 10	4	Chassis Bottom
CR1	17	Rear Panel
DS1-6 LOG REF Index Lights	18	Front Panel
DS7 X	13	Front Panel
DS8 +	13	Front Panel
DS 9 SCANNING	15	Front Panel
F1, 2	17	Rear Panel
J1 CAL OUTPUT	18	Front Panel
J2 PEN LIFT OUTPUT	14,15,16	Front Panel
J3 IF Section/RF Section	1, 3, 5, 6, 8, 9, 14, 16 17,18,19	Chassis Top
J4 VERTICAL OUTPUT	14	Front Panel
J5 SCAN IN/OUT	16	Front Panel
J6 50 MHz input	3	Chassis Top
J7 47 MHz output	3	Chassis Top
J8	4	Chassis Bottom
L1-4	3	On XA 3
P1 IF Section/Display Section	2,14,17,19	Rear Panel
Q23, 24	19	Rear Panel
R1 - R3	19	Rear Panel
R4 HORIZONTAL POSITION	14	Front Panel
R5 HORIZONTAL GAIN	16	Front Panel

Table 8-4. IF Section Assembly and Component Location (cont'd)

Component	Service Sheet	Photo/Location
R6	14,16	Front Panel
R7, 8	14	Rear Panel
R9	15	Front Panel
R10 BASE LINE CLIPPER	14	Front Panel
R11 VERTICAL GAIN	14	Front Panel
R12 Vernier	7	Front Panel
R13, 14	13	Front Panel
R15 VERTICAL POSITION	14	Front Panel
R16	13	Front Panel
R17	12	Rear Panel
R18	19	Chassis Top
R19	14,15,16	Front Panel
R20 MANUAL SCAN	16	Front Panel
S1 LOG-LINEAR	13, 14	Front Panel
S2 SINGLE SCAN	15	Front Panel
S3 SCAN MODE	15, 16, 17	Front Panel
S4 SCAN TRIGGER	15,16	Front Panel
W1 Green	11,12	Figure 8-8
W2 Blue, shielded	11	Figure 8-8
W3 Horiz Output	14	Figure 8-8
W4 Cal output	18	Figure 8-8
W5 Orange	13	Figure 8-8
W6 Vert Output	14	Figure 8-8
W7 50 MHz Input	3	Figure 8-8
W8 47 MHz Output	3	Figure 8-8
W9 47 MHz APC	3,4	Figure 8-8
W10 Blue, Twisted Pair	4,5	Figure 8-8
W11 Blue, Shielded Pair	4, 5	Figure 8-8
W12 Red	8,10	Figure 8-8

SERVICE SHEETS

VIBRO-METER ASSEMBLY A11

The control switch may be used to place any one of three hydraulic cylinders under the selected output. When a "STOP" is made the output of other cylinders is controlled in the opposite direction as the cylinder in use.

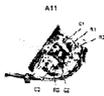


Figure 8-11. Vibro Meter Assembly A11

LINE REFERENCE LEVEL SWITCH ASSEMBLY A10

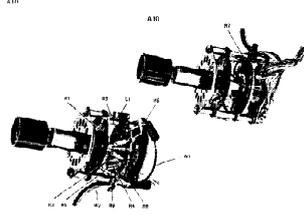


Figure 8-12. Line Reference Level Switch Assembly A10
 A10, A11, A12, A13, A14, A15, A16, A17, A18, A19, A20, A21, A22, A23, A24, A25, A26, A27, A28, A29, A30, A31, A32, A33, A34, A35, A36, A37, A38, A39, A40, A41, A42, A43, A44, A45, A46, A47, A48, A49, A50, A51, A52, A53, A54, A55, A56, A57, A58, A59, A60, A61, A62, A63, A64, A65, A66, A67, A68, A69, A70, A71, A72, A73, A74, A75, A76, A77, A78, A79, A80, A81, A82, A83, A84, A85, A86, A87, A88, A89, A90, A91, A92, A93, A94, A95, A96, A97, A98, A99, A100

YR 11-000000000000

Model 8850D

SERVICE SHEET 2 (cont'd)
 Section A10, A11, A12, A13, A14, A15, A16, A17, A18, A19, A20, A21, A22, A23, A24, A25, A26, A27, A28, A29, A30, A31, A32, A33, A34, A35, A36, A37, A38, A39, A40, A41, A42, A43, A44, A45, A46, A47, A48, A49, A50, A51, A52, A53, A54, A55, A56, A57, A58, A59, A60, A61, A62, A63, A64, A65, A66, A67, A68, A69, A70, A71, A72, A73, A74, A75, A76, A77, A78, A79, A80, A81, A82, A83, A84, A85, A86, A87, A88, A89, A90, A91, A92, A93, A94, A95, A96, A97, A98, A99, A100

WATER SWITCH ASSEMBLY A8
 The various functions of the water level switch assembly are as follows:

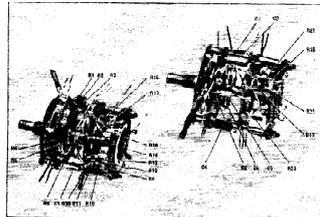


Figure 8-13. Water Level Switch Assembly A8

Model 05525

Table K-6. 1P to 3P Sections Enter connecting Jack Identification			Table K-7. 1P to 3P Sections Display Section Interconnecting Pin Identification		
Pin No.	Min. Core Class	Physical Function	Pin No.	Min. Core Class	Physical Function
Pin 1	912	01 1MΩ Resistor	Pin 1	6	+20V
2	912	0.1 1MΩ Resistor	3	3	-180V
4	914	0.1 1MΩ Resistor	4	4	180V
6	916	1 1MΩ Resistor	6	92	-180V
7	9	Power Lead Compensation	7	7	Power
8	9	Power Lead Voltage	8	7	120V
9	9	Linear Compensation Control Voltage	9	7	Power
10	9	Long Def Level Lamp No. 1	10	8	Horizontal Deflection
11	9	Long Def Level Lamp No. 2	11	9	Vertical Deflection
12	9	Short Def Level Lamp No. 1	12	10	Horizontal Deflection
13	9	Short Def Level Lamp No. 2	13	11	Vertical Deflection
14	925	01 1MΩ Resistor	14	1	5.7Vcc
15	927	01 1MΩ Resistor	15	9	Ground
16	927	01 1MΩ Resistor	16	14	Horizontal Deflection
17	927	01 1MΩ Resistor	17	13	Vertical Deflection
18	927	01 1MΩ Resistor	18	15	Ground
19	927	01 1MΩ Resistor	19	16	Horizontal Deflection
20	927	01 1MΩ Resistor	20	17	Vertical Deflection
21	927	01 1MΩ Resistor	21	18	Ground
22	927	01 1MΩ Resistor	22	19	Horizontal Deflection
23	927	01 1MΩ Resistor	23	20	Vertical Deflection
24	927	01 1MΩ Resistor	24	21	Ground
25	927	01 1MΩ Resistor	25	22	Horizontal Deflection
26	927	01 1MΩ Resistor	26	23	Vertical Deflection
27	927	01 1MΩ Resistor	27	24	Ground
28	927	01 1MΩ Resistor	28	25	Horizontal Deflection
29	927	01 1MΩ Resistor	29	26	Vertical Deflection
30	927	01 1MΩ Resistor	30	27	Ground
31	927	01 1MΩ Resistor	31	28	Horizontal Deflection
32	927	01 1MΩ Resistor	32	29	Vertical Deflection
33	927	01 1MΩ Resistor	33	30	Ground
34	927	01 1MΩ Resistor	34	31	Horizontal Deflection
35	927	01 1MΩ Resistor	35	32	Vertical Deflection
36	927	01 1MΩ Resistor	36	33	Ground
37	927	01 1MΩ Resistor	37	34	Horizontal Deflection
38	927	01 1MΩ Resistor	38	35	Vertical Deflection
39	927	01 1MΩ Resistor	39	36	Ground
40	927	01 1MΩ Resistor	40	37	Horizontal Deflection
41	927	01 1MΩ Resistor	41	38	Vertical Deflection
42	927	01 1MΩ Resistor	42	39	Ground
43	927	01 1MΩ Resistor	43	40	Horizontal Deflection
44	927	01 1MΩ Resistor	44	41	Vertical Deflection
45	927	01 1MΩ Resistor	45	42	Ground
46	927	01 1MΩ Resistor	46	43	Horizontal Deflection
47	927	01 1MΩ Resistor	47	44	Vertical Deflection
48	927	01 1MΩ Resistor	48	45	Ground
49	927	01 1MΩ Resistor	49	46	Horizontal Deflection
50	927	01 1MΩ Resistor	50	47	Vertical Deflection
51	927	01 1MΩ Resistor	51	48	Ground
52	927	01 1MΩ Resistor	52	49	Horizontal Deflection
53	927	01 1MΩ Resistor	53	50	Vertical Deflection
54	927	01 1MΩ Resistor	54	51	Ground
55	927	01 1MΩ Resistor	55	52	Horizontal Deflection
56	927	01 1MΩ Resistor	56	53	Vertical Deflection
57	927	01 1MΩ Resistor	57	54	Ground
58	927	01 1MΩ Resistor	58	55	Horizontal Deflection
59	927	01 1MΩ Resistor	59	56	Vertical Deflection
60	927	01 1MΩ Resistor	60	57	Ground
61	927	01 1MΩ Resistor	61	58	Horizontal Deflection
62	927	01 1MΩ Resistor	62	59	Vertical Deflection
63	927	01 1MΩ Resistor	63	60	Ground
64	927	01 1MΩ Resistor	64	61	Horizontal Deflection
65	927	01 1MΩ Resistor	65	62	Vertical Deflection
66	927	01 1MΩ Resistor	66	63	Ground
67	927	01 1MΩ Resistor	67	64	Horizontal Deflection
68	927	01 1MΩ Resistor	68	65	Vertical Deflection
69	927	01 1MΩ Resistor	69	66	Ground
70	927	01 1MΩ Resistor	70	67	Horizontal Deflection
71	927	01 1MΩ Resistor	71	68	Vertical Deflection
72	927	01 1MΩ Resistor	72	69	Ground
73	927	01 1MΩ Resistor	73	70	Horizontal Deflection
74	927	01 1MΩ Resistor	74	71	Vertical Deflection
75	927	01 1MΩ Resistor	75	72	Ground
76	927	01 1MΩ Resistor	76	73	Horizontal Deflection
77	927	01 1MΩ Resistor	77	74	Vertical Deflection
78	927	01 1MΩ Resistor	78	75	Ground
79	927	01 1MΩ Resistor	79	76	Horizontal Deflection
80	927	01 1MΩ Resistor	80	77	Vertical Deflection
81	927	01 1MΩ Resistor	81	78	Ground
82	927	01 1MΩ Resistor	82	79	Horizontal Deflection
83	927	01 1MΩ Resistor	83	80	Vertical Deflection
84	927	01 1MΩ Resistor	84	81	Ground
85	927	01 1MΩ Resistor	85	82	Horizontal Deflection
86	927	01 1MΩ Resistor	86	83	Vertical Deflection
87	927	01 1MΩ Resistor	87	84	Ground
88	927	01 1MΩ Resistor	88	85	Horizontal Deflection
89	927	01 1MΩ Resistor	89	86	Vertical Deflection
90	927	01 1MΩ Resistor	90	87	Ground
91	927	01 1MΩ Resistor	91	88	Horizontal Deflection
92	927	01 1MΩ Resistor	92	89	Vertical Deflection
93	927	01 1MΩ Resistor	93	90	Ground
94	927	01 1MΩ Resistor	94	91	Horizontal Deflection
95	927	01 1MΩ Resistor	95	92	Vertical Deflection
96	927	01 1MΩ Resistor	96	93	Ground
97	927	01 1MΩ Resistor	97	94	Horizontal Deflection
98	927	01 1MΩ Resistor	98	95	Vertical Deflection
99	927	01 1MΩ Resistor	99	96	Ground
100	927	01 1MΩ Resistor	100	97	Horizontal Deflection

TM 11-6670-2101-201

Series

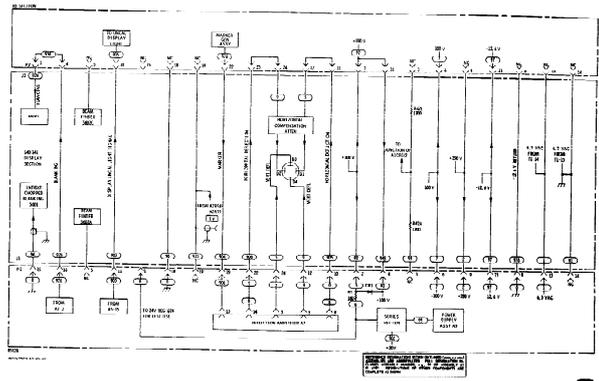


Figure 8-14. R.F. Section of Vacuum Display Section Interconnection

Model 8542B



Figure 8-15. 50 MHz Bandpass Filter AS1A1 Component Identification

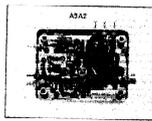


Figure 8-16. 47 MHz LO AS1A2 Component Identification

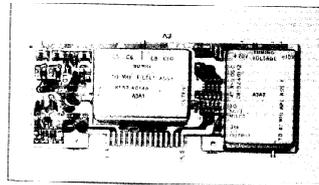
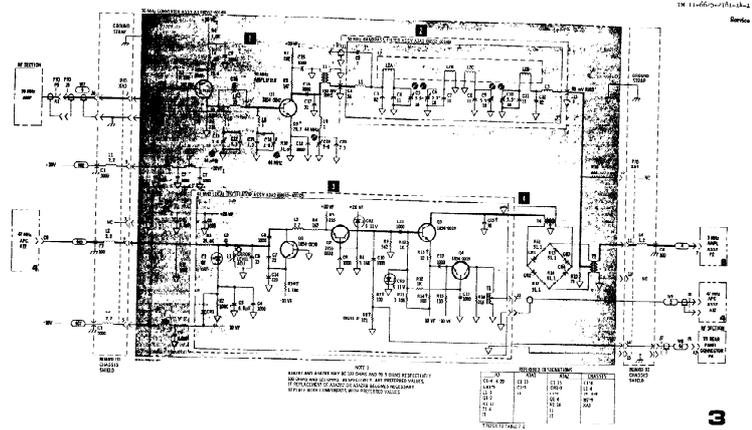


Figure 8-17. 50 MHz Converter AS2 Component Identification



Motor Action

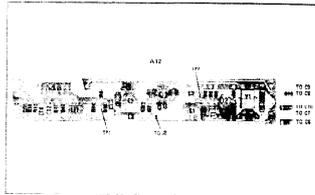


Figure A-79 21 Motor APC A12 Component Identification

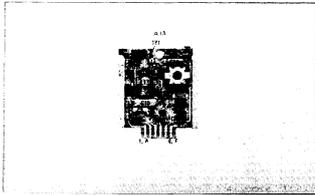


Figure A-80 2 Motor A11 Component Identification

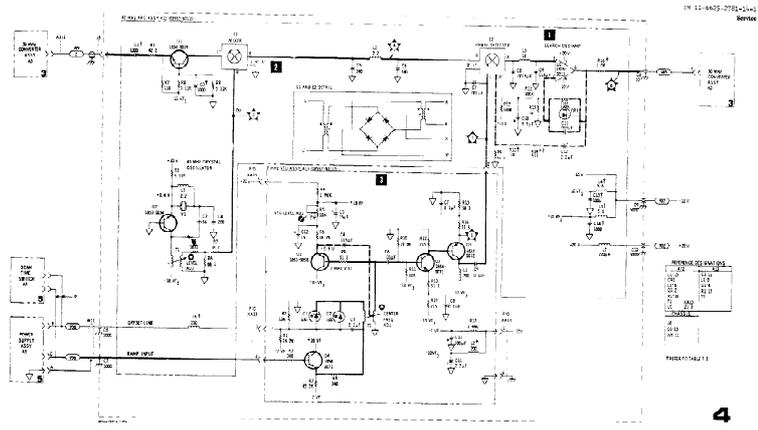


Figure A-11 27 Motor Automatic Phase Control and 2 Motor Voltage Control Generator

Model 8652B

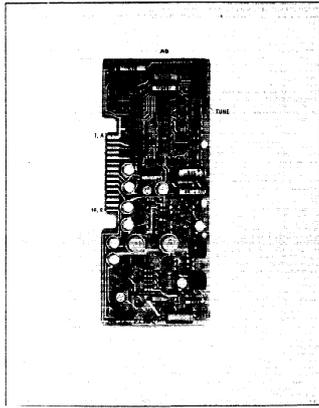


Figure 5-22 P40 Power Supply & 4 Programmed Identifiers

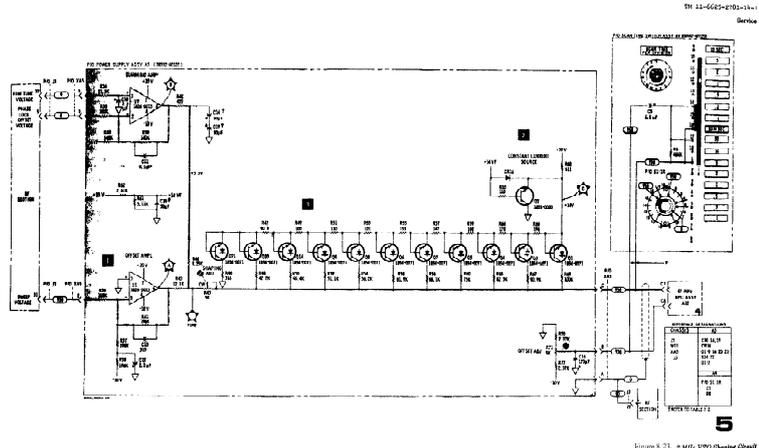


Figure 5-23 2 80V VFD Channel Output

Model 8552B

Part No.		Standard Count Range (500)									
Part No.	Part Name	10	20	30	40	50	60	70	80	90	100
8552B-1	10	10	20	30	40	50	60	70	80	90	100
8552B-2	20	20	40	60	80	100	120	140	160	180	200
8552B-3	30	30	60	90	120	150	180	210	240	270	300
8552B-4	40	40	80	120	160	200	240	280	320	360	400
8552B-5	50	50	100	150	200	250	300	350	400	450	500
8552B-6	60	60	120	180	240	300	360	420	480	540	600
8552B-7	70	70	140	210	280	350	420	490	560	630	700
8552B-8	80	80	160	240	320	400	480	560	640	720	800
8552B-9	90	90	180	270	360	450	540	630	720	810	900
8552B-10	100	100	200	300	400	500	600	700	800	900	1000

TR 11765-2(1)-11-1
Rev. 10

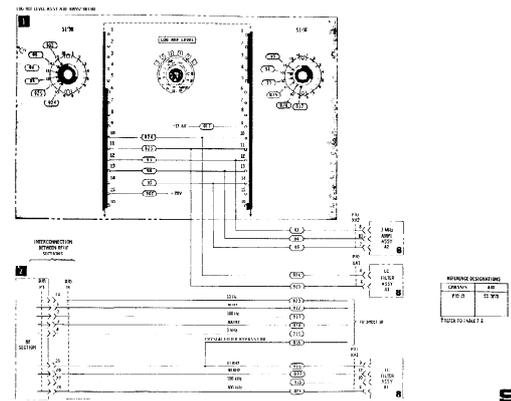


Figure 8-35. Analog/Digital Control Circuit

SERVICE SHEET 10

It is assumed that the 3 MHz IF signal from the 12.4 MHz and the 40 spreading voltages are present and correct and that the 3 MHz output is missing or out of tolerance.

PRELIMINARY CHECKS

When trouble has been traced to the 3 MHz Crystal Filter assembly, the assembly should be removed and inspected using the procedure found in periodic service instructions. Test procedures follow description of component errors.

NOTE

Some of the Signal Filter crystals are shown on Service Sheet 11.

EQUIPMENT REQUIRED

SERVICE KIT HP 11022A
VARIABLE VOLTAGE SUPPLY HP 6000A
HP 700000000A

TEST POINT SYSTEMS

WAVE DIFFERENTIAL 0-40
HANDLED-TO 1-40
TONE-TO-TO 10-40
SCAN FILTER 10-40
FREQUENCY 20-40

CRITICAL MEASUREMENTS TO BE MADE BY THE TECHNICIAN

These measurements are to be made on the 3 MHz output filter assembly. The measurements are: 1) The 3 MHz output filter assembly should be checked for correct operation. 2) The 3 MHz output filter assembly should be checked for correct operation. 3) The 3 MHz output filter assembly should be checked for correct operation.

All the stages are identical to those of the 3 MHz output filter assembly. The 3 MHz output filter assembly is a parallel resonant circuit. The 3 MHz output filter assembly is a parallel resonant circuit. The 3 MHz output filter assembly is a parallel resonant circuit. The 3 MHz output filter assembly is a parallel resonant circuit.

TR 11-000000000000

Service

Wash 80000

SERVICE SHEET 10 (cont'd)

TEST PROCEDURES

1. Check the 3 MHz output filter assembly for correct operation. 2. Check the 3 MHz output filter assembly for correct operation. 3. Check the 3 MHz output filter assembly for correct operation. 4. Check the 3 MHz output filter assembly for correct operation.

NOTE

CRITICAL MEASUREMENTS TO BE MADE BY THE TECHNICIAN. These measurements are to be made on the 3 MHz output filter assembly. The measurements are: 1) The 3 MHz output filter assembly should be checked for correct operation. 2) The 3 MHz output filter assembly should be checked for correct operation.

If the signal were correct at all handwheels, proceed to step 10. If the signal were incorrect at some, but not all handwheels, proceed to step 11.

If the signal were incorrect at all handwheels, under the faulty stage by measuring the signal at the test points Y10 and Y11 on Service Sheet 11. More testing should be about the same as step 10.

CRITICAL MEASUREMENTS TO BE MADE BY THE TECHNICIAN. These measurements are to be made on the 3 MHz output filter assembly. The measurements are: 1) The 3 MHz output filter assembly should be checked for correct operation. 2) The 3 MHz output filter assembly should be checked for correct operation.

Using the signal generator, check the test circuit. The signal should be about 12.4 volts at the level indicated by the 3 MHz output filter assembly.

If the voltage are correct, use step 10 and step 11 to test the faulty stage and measurement.

CRITICAL MEASUREMENTS TO BE MADE BY THE TECHNICIAN. Detailed on Service Sheet 11.

NOTE

After repairing any of the circuits on the Signal Filter Assembly, the assembly should be checked in accordance with Paragraph 5.3 of Section V.

Figure 8-28. 1C Filter A1 Component Identification

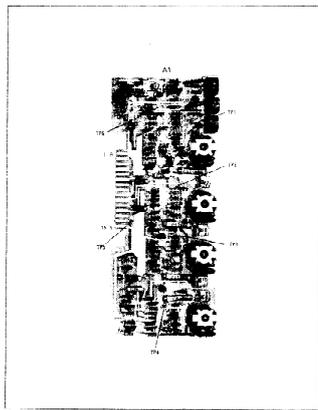


Figure 8-28. 1C Filter A1 Component Identification

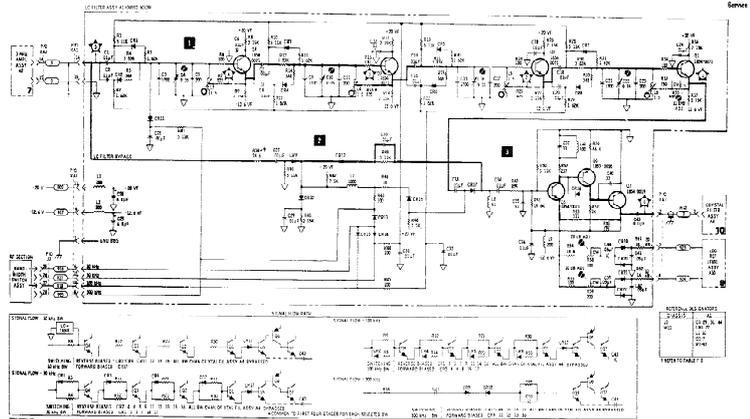


Figure 8-29. 1C Filter A1 Schematic Diagram

701-460-7722 (toll-free)
Service

Model 8554D

SERVICE SHEET 4

Normally, malfunctions which occur in the switching system will be detected and corrected automatically. Certain devices are service items 2 and 3.

TROUBLESHOOTING PROCEDURE

Since these switches function for voltage control, the only all components and wiring can be checked for connecting voltage drops at the range adjustment for the 3 MHz IF amplifier. If false results, see the 3 MHz IF section.

EQUIPMENT REQUIREMENTS

SERVICE KIT HP 33800A
DIGITAL VOLTMETER HP 34400A

CONTROL SETTINGS

See page 10 for control settings.

RF LEAD REPAIR KIT ASSEMBLY

This portion of the log indicates most commonly used "20" value or 1.6 is used on wave or dip side switches on control and pins or pins on the 3 MHz IF amplifier and RF wave assembly.

TEST PROCEDURES

Use the HP 34400A Digital Voltmeter to verify switching voltages on pins of 2, 3 and 4 for the operation of LOW-BEAT LEVEL SWITCH. The voltage shown in the adjacent chart are typical.

If voltages are correct, the switch service is complete.

If voltages are not correct, check voltage inputs to switch, check voltages and wiring.

Pin	20	10	5	2.5	1.25
2	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0	0.0
32	0.0	0.0	0.0	0.0	0.0
33	0.0	0.0	0.0	0.0	0.0
34	0.0	0.0	0.0	0.0	0.0
35	0.0	0.0	0.0	0.0	0.0
36	0.0	0.0	0.0	0.0	0.0
37	0.0	0.0	0.0	0.0	0.0
38	0.0	0.0	0.0	0.0	0.0
39	0.0	0.0	0.0	0.0	0.0
40	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0
44	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0
46	0.0	0.0	0.0	0.0	0.0
47	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0
51	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0
67	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0
73	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0
76	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0
78	0.0	0.0	0.0	0.0	0.0
79	0.0	0.0	0.0	0.0	0.0
80	0.0	0.0	0.0	0.0	0.0
81	0.0	0.0	0.0	0.0	0.0
82	0.0	0.0	0.0	0.0	0.0
83	0.0	0.0	0.0	0.0	0.0
84	0.0	0.0	0.0	0.0	0.0
85	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0
87	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0
89	0.0	0.0	0.0	0.0	0.0
90	0.0	0.0	0.0	0.0	0.0
91	0.0	0.0	0.0	0.0	0.0
92	0.0	0.0	0.0	0.0	0.0
93	0.0	0.0	0.0	0.0	0.0
94	0.0	0.0	0.0	0.0	0.0
95	0.0	0.0	0.0	0.0	0.0
96	0.0	0.0	0.0	0.0	0.0
97	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0
99	0.0	0.0	0.0	0.0	0.0
100	0.0	0.0	0.0	0.0	0.0

HIGH-VOLTAGE CIRCUIT

Pin 1, 14, and 20-25 of all control units with the RF Section. The RF Section BROADCAST switch, provides positive or negative voltage to all, positive or negative depending on the switch position.

TEST PROCEDURES

Use the HP 34400A Digital Voltmeter to verify switching voltages of pins of 1, 14 and 20-25 for the operation of LOW-BEAT LEVEL SWITCH. The voltage shown in the adjacent chart are typical.

If voltages are correct, the switch service is complete.

If voltages are not correct, check voltage inputs to switch, check voltages and wiring.

If response of switch are missing, check the RF Section.

Model 85523

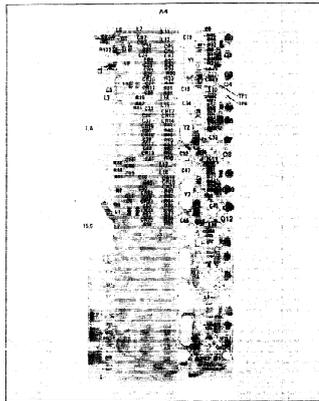


Figure 6-11 Post-Process Photo of Component Identification

TR 11-6609 0703-21-1
Rev. 10

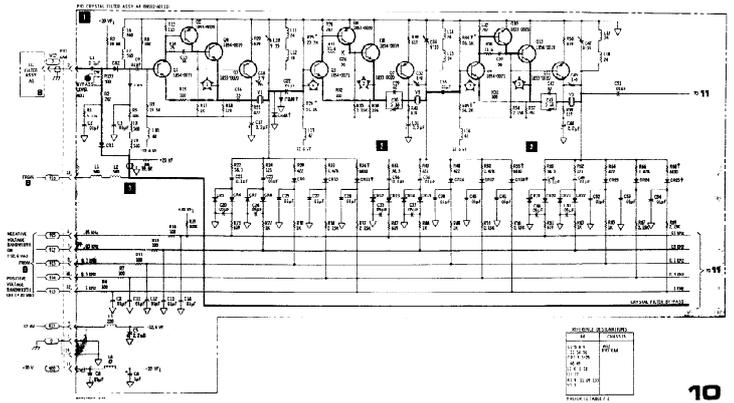


Figure 6-12 Output Transformer
S-19

WARNING SWAP 12
It is assumed that a meter signal from the crystal filter and de-coupling stages are present and correct, see that the output signal is not present or it is out of tolerance.

LINEARIZATION TEST PROCEDURE
When the scope has been connected to the Linear Amplifier assembly, A1, it should be removed from the chassis and reconnected to the calibrator board to provide a known test component. After adjusting the assembly, the procedure outlined in paragraphs 5-20 and 5-21 of Section V should be performed.

NOTE
Some parts of the control signal on Section Board 13, Section Board 15 and 17 should be present only on establishing the assembly.

EQUIPMENT REQUIRED
SERVICES KIT
VARIABLE MULTIMETER
SIGNAL GENERATOR

CONTROL SETTINGS
When electronic assembly is installed into chassis:
SCAN WIDTH 100
MULTI ATTENUATION 100
TRIGGER LEVEL 0.5
SCAN TRIGGER LOG LINEAR

RECEIVER AMPLIFIER AND CONTROL UNIT TEST (CONT'D)
The general procedure is to operate the scope in the linear mode. The general procedure is to operate the scope in the linear mode. The general procedure is to operate the scope in the linear mode.

EMITTER FOLLOWER OUTPUT SIGNAL Q24
Enable collector Q24 presents a high impedance input which provides buffer for output of the emitter follower assembly and also provides isolation between the input and the first LINEAR amplifier.

SERVICE DIRECT 12 (cont'd)

TEST PROCEDURE 1
With a 50 MHz, 20 dBm signal from the HP 6005 connected to the variable LOG LEVEL, connect the HP 8162A or TP 1 (Q21) test point to the variable LOG LEVEL. The maximum signal level on the HP 8162A typical level is 0 dBm.

Typical meter reading is 600 mV rms. If correct reading is obtained, proceed to the next step.
If correct reading is not obtained, check Q21 and associated components. If Q21 and associated components are correct, good and signal is still not present, check Q21 test point.

RECEIVER AMPLIFIERS IN LOG MODE
When the receiver is operated in the LOG mode the Linear Amplifier has seven receiver amplifier stages. The first section amplifier consists of a common emitter amplifier followed by an emitter follower. The output of the common emitter amplifier is applied to the following emitter Q26 (see Q1) on Section Board 15.

Operation of the first seven receiver amplifier stages is checked, in only the LOG mode and in the linear mode. The output of the emitter follower is split and applied to the common collector load of a second emitter stage. The base of the second emitter stage is connected to the common collector load of the first emitter stage. A 100 ohm resistor (R25) from the low level signal path to ground provides a common collector. The emitter follower output of each stage provides the signal level for the following stage and signal current on the common bus.

The logarithmic relationship of the output level to the input level is provided by controlled loading and matching in the LOG mode. The output of the first stage is a relatively low level signal approximately 70 dBm. This signal will saturate the first linear amplifier. Proceeding amplifier stages operate at each 10 dB increase in the input signal. The LOG LEVEL control setting is referenced to the 10 dBm signal level.

TEST PROCEDURE 2
Connect the output of the HP 6005 to the variable LOG LEVEL and adjust the signal generator for a 20 dBm signal. Connect the HP 8162A to TP 1 of the variable LOG LEVEL control on the HP 8162A. Typical level is 0 dBm.

SERVICE DIRECT 13 (cont'd)

TEST PROCEDURE 1
If the signal is not present check Q26, Q27, Q28 and associated components.

If the signal is present, disconnect the HP 8162A and connect it to TP 1 (Q27) test point. The maximum signal level on the HP 8162A typical level is 0 dBm.

If readings are correct, the last section of the LOG mode assembly will be assembled and the receiver assembly is functioning properly.

If the readings are not correct, check the Q26, Q27, Q28 and associated components. If the readings are correct, the last section of the LOG mode assembly will be assembled and the receiver assembly is functioning properly.

RECEIVER AMPLIFIERS IN LOG MODE
Q26 sets the output current from the input driver collector and the output current from the first four stages of the LOG mode amplifier. It also provides isolation between the first four linear amplifier and following circuit.

TEST PROCEDURE 2
Connect the output of the HP 6005 to the variable LOG LEVEL and adjust the signal generator for a 20 dBm signal.

SERVICE DIRECT 14 (cont'd)

TEST PROCEDURE 1
A 50 MHz, 60 dBm signal output. Connect the HP 8162A to TP 1 (Q27) test point. The maximum signal level on the HP 8162A typical level is 0 dBm.

Check the signal level at TP 1 (Q27) test point. The maximum signal level on the HP 8162A typical level is 0 dBm.

If correct readings are obtained, the remaining conditions are functioning properly.

If readings are not correct, check Q26, Q27 and associated components.

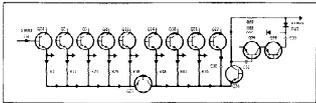


Figure 3-25. Simplified Test Procedure Diagram - Log Mode of Operation



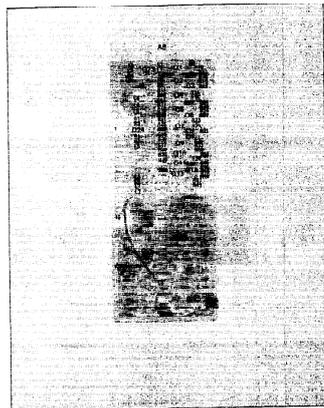


Figure 8-26. P10 Log Linear Amplifier PCB Component Identification

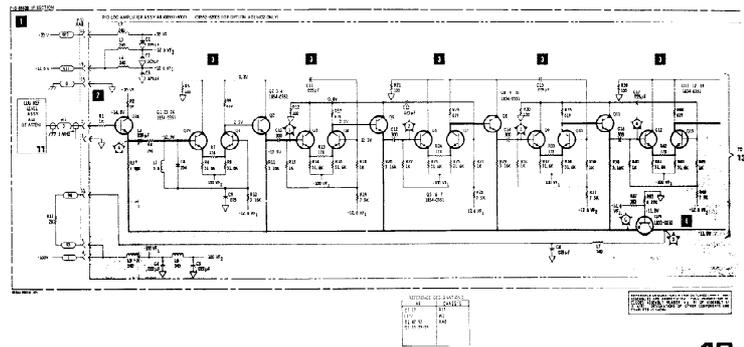


Figure 8-27. Log Linear Amplifier Schematic

Model 80528

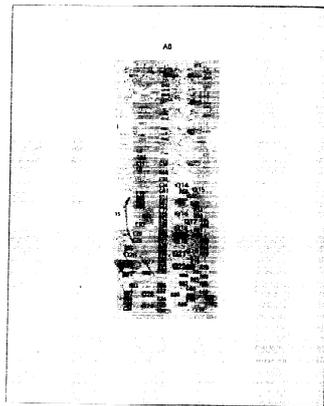


Figure 6-26 P111 Engine - Amplifier - EP Equipment Co., Ltd.

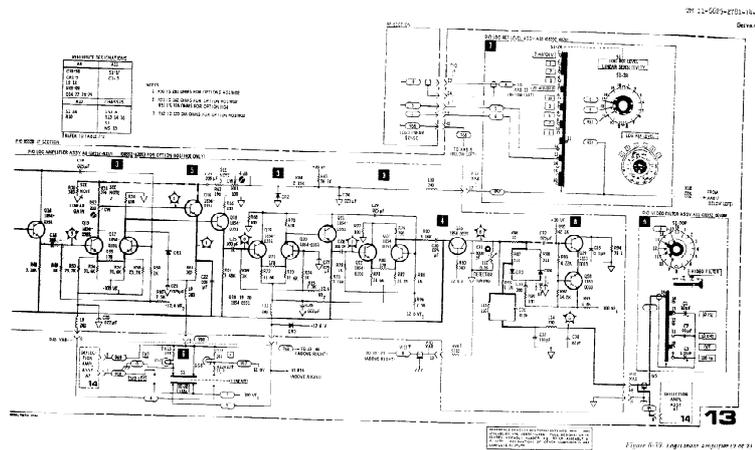


Figure 6-27 P111 Engine - Amplifier - EP Equipment Co., Ltd.

SERVICE SHEET 15

It is assumed that the scan generator is not being triggered properly and that the correct control signals are present.

TRIGGERING PREVIOUS

Check whether the scan generator assembly (AG) is shielded by wires from the chassis and insulation using the extreme board to provide easy access to components. Troubleshooting information follows the technical documents of these components.

NOTE

The Scan Generator is a drop circuit and the failure of other components will prevent it from being generated if this is the case, see SERVICE SHEET 14 to be made out the manual voltage there to check the generator.

REQUIREMENT INFORMATION

CONTRACT NO. HP 180A/180A/18122A
 SERVICE KIT HP 11520A
 MULTIMETER HP 857A
 OSCILLOSCOPE HP 22453B/11511A

CONTROL SETTINGS

Specified in individual tests.

1. TRIGGER GENERATOR

This circuit controls the operation of the Scan Generator (AG) and is located on the Scan Generator Board (AG) at the INT (Internal) position and S1 in the (RHS) (Automatic) position. A drop (12V) is provided from the (RHS) (Automatic) position to the Scan Generator Board (AG). The trigger generator (AG) is present in the Scan Generator Board (AG) and is controlled by the scan generator circuit. When active, it will trigger the Scan Generator Board (AG) to generate a scan signal. The trigger generator (AG) is present in the Scan Generator Board (AG) and is controlled by the scan generator circuit. When active, it will trigger the Scan Generator Board (AG) to generate a scan signal. The trigger generator (AG) is present in the Scan Generator Board (AG) and is controlled by the scan generator circuit. When active, it will trigger the Scan Generator Board (AG) to generate a scan signal.

When the SCAN TRIGGER switch is in the INT position, the Scan Generator Board (AG) will generate a scan signal. When the SCAN TRIGGER switch is in the INT position, the Scan Generator Board (AG) will generate a scan signal. When the SCAN TRIGGER switch is in the INT position, the Scan Generator Board (AG) will generate a scan signal. When the SCAN TRIGGER switch is in the INT position, the Scan Generator Board (AG) will generate a scan signal.

TEST PROCEDURE 1

Connect the HP 180A/180A/18122A Channel A probe to Q1 base and the Channel B probe to Q1 emitter. The waveform of the output signal is present and the output signal is present.

SERVICE SHEET 15 (cont)

CURRENT SETTINGS

Oscilloscope Channel A 10 V/div
 Channel B 10 V/div
 10 MHz
 100 psec



ANALYSIS

Check the Channel A waveform in current and Channel B waveform in time. Check Q1 current. If both waveforms are correct and the scan generator is not being triggered, check scan generator drop time.

Current waveform of Q1 should be verified by measuring the current in the R14 resistor. The waveform should be present at all times. Check current and time and be checked with the test circuit. Observe for maximum wave removal of scan and AG operation.

SCAN CONTROL FLIP FLIP

The scan control flip flop controls the scan control. Whenever Q1 is in the INT position, the scan control flip flop will generate a scan signal. The scan control flip flop will generate a scan signal. The scan control flip flop will generate a scan signal.

TEST PROCEDURE 2

If any signal is in the scan generator board or failure of waveforms will be present in the test circuit. The oscilloscope, an SCAN MODE to SINGLE and check the Scan Generator. The Scan Generator will be present in the test circuit.

When Q1 is in the INT position, the Scan Generator will generate a scan signal. When Q1 is in the INT position, the Scan Generator will generate a scan signal.

When Q1 is in the INT position, the Scan Generator will generate a scan signal. When Q1 is in the INT position, the Scan Generator will generate a scan signal.

When Q1 is in the INT position, the Scan Generator will generate a scan signal. When Q1 is in the INT position, the Scan Generator will generate a scan signal.

When Q1 is in the INT position, the Scan Generator will generate a scan signal. When Q1 is in the INT position, the Scan Generator will generate a scan signal.

When Q1 is in the INT position, the Scan Generator will generate a scan signal. When Q1 is in the INT position, the Scan Generator will generate a scan signal.

SERVICE SHEET 15 (cont)

off and the scan generator begins to charge and provide the ramp signal to the pump amplifier.

TEST PROCEDURE 3

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

CONSTANT CURRENT SOURCE AND RAMP CHANGE NETWORK

The RAMP network is present in the Scan Generator Board (AG) and is controlled by the scan generator circuit. The RAMP network is present in the Scan Generator Board (AG) and is controlled by the scan generator circuit.

TEST PROCEDURE 4

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

RAMP AMPLIFIER AND RAMP LEVEL DETECTOR CIRCUIT

This circuit is a feedback circuit. The feedback impedance of the current source loading of the constant current source, Q1. The output ramp voltage is applied to the SCAN MODE switch. The output ramp from Q1 is also applied to the SCAN MODE switch.

TEST PROCEDURE 5

Check the scan generator output signal. The scan generator output signal is present and the output signal is present. The scan generator output signal is present and the output signal is present.

SCAN RESET CIRCUIT

When the scan generator begins to charge, it will trigger the scan reset circuit which turns off Q1 to stop the scan ramp. When the scan reset circuit is present, the scan reset circuit will be present in the test circuit.

When Q1 is in the INT position, the Scan Generator will generate a scan signal. When Q1 is in the INT position, the Scan Generator will generate a scan signal.

When Q1 is in the INT position, the Scan Generator will generate a scan signal. When Q1 is in the INT position, the Scan Generator will generate a scan signal.

When Q1 is in the INT position, the Scan Generator will generate a scan signal. When Q1 is in the INT position, the Scan Generator will generate a scan signal.

When Q1 is in the INT position, the Scan Generator will generate a scan signal. When Q1 is in the INT position, the Scan Generator will generate a scan signal.

SERVICE SHEET 15 (cont)

off and the scan generator begins to charge and provide the ramp signal to the pump amplifier.

TEST PROCEDURE 6

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

CONTROL SIGNALS

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TRIGGER

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN MODE

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TIME PER DIVISION

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TRIGGER

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN MODE

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TIME PER DIVISION

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TRIGGER

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN MODE

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TIME PER DIVISION

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TRIGGER

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN MODE

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TIME PER DIVISION

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TRIGGER

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN MODE

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TIME PER DIVISION

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TRIGGER

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN MODE

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TIME PER DIVISION

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TRIGGER

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN MODE

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TIME PER DIVISION

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TRIGGER

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN MODE

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TIME PER DIVISION

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TRIGGER

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN MODE

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TIME PER DIVISION

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SERVICE SHEET 15 (cont)

off and the scan generator begins to charge and provide the ramp signal to the pump amplifier.

TEST PROCEDURE 7

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

CONTROL SIGNALS

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TRIGGER

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN MODE

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TIME PER DIVISION

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TRIGGER

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN MODE

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TIME PER DIVISION

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TRIGGER

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN MODE

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TIME PER DIVISION

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TRIGGER

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN MODE

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TIME PER DIVISION

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TRIGGER

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN MODE

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TIME PER DIVISION

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TRIGGER

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN MODE

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TIME PER DIVISION

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TRIGGER

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN MODE

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TIME PER DIVISION

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TRIGGER

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN MODE

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TIME PER DIVISION

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TRIGGER

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN MODE

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

SCAN TIME PER DIVISION

Check the scan generator output signal. The scan generator output signal is present and the output signal is present.

Model 6522

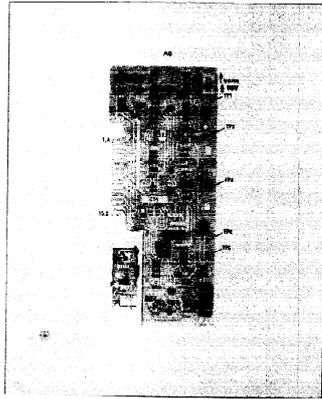


Figure 8-42. PFD Drive Generator PCB Component Identification

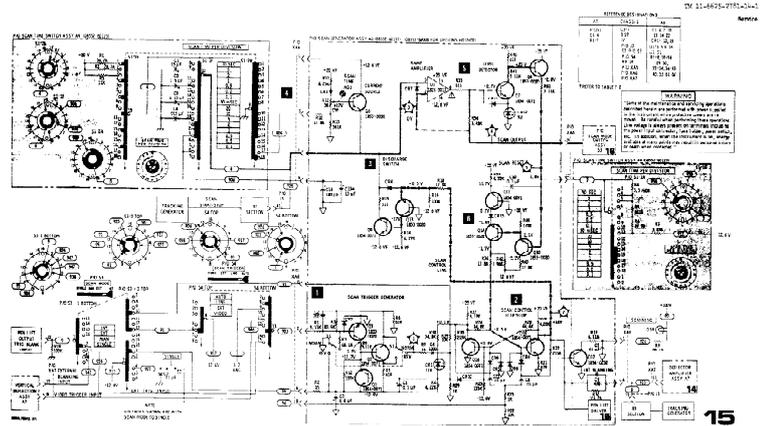


Figure 8-43. Area Generator and Trigger Circuit

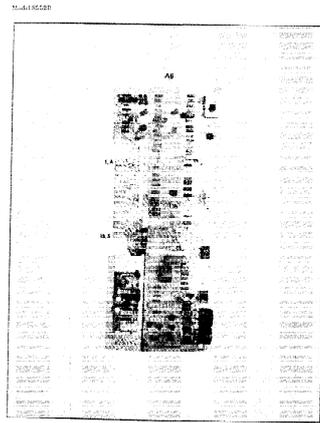


Figure 4-41. PD Scan Controller AS Component Identification

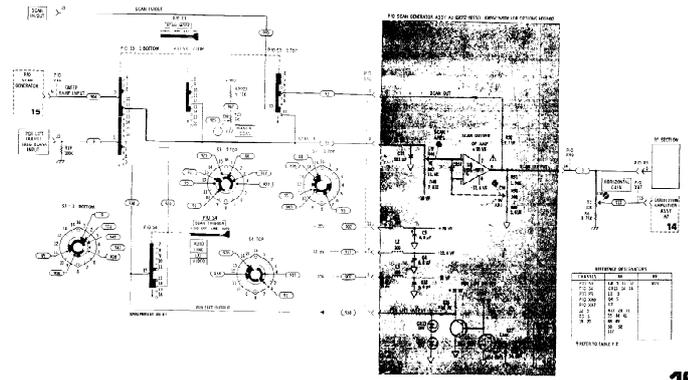


Figure 4-42. Scan Frame and Post-1.0 Circuit

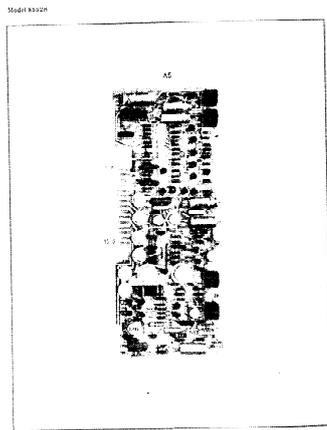
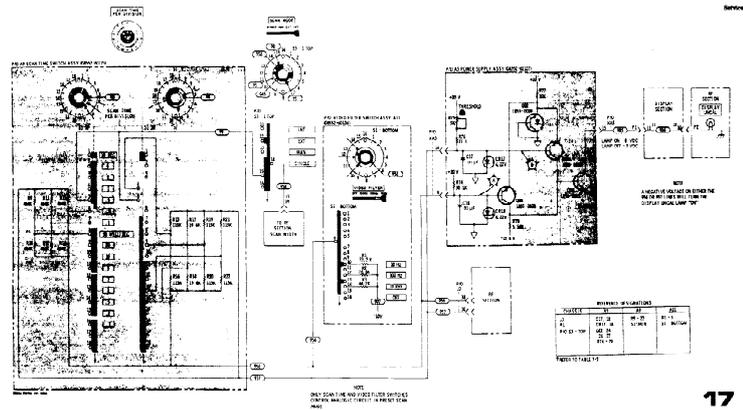


Figure 8-6. P.D. Power Supply AS Component Identification



EN 11 8453-0781-11-1

Service

Model: K1523A

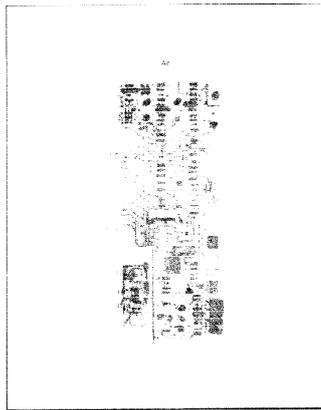


Figure 8-10 750 Watt Generator AC Component Identification

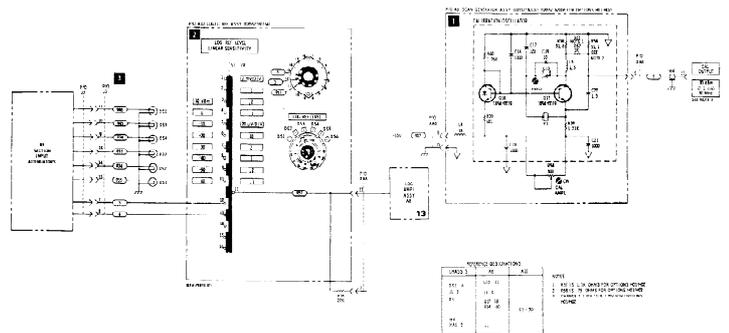


Figure 8-11 Generator Controller and 5000 RPM/1500 Hz Output
Output Light Circuit

28-11-0000-000-01-1
Rev. 0

Model 8542B

SERVICE SHEET 19

It is assumed that for 120 volt, 100 watt, and 110 volt models. For details, see the appropriate section of the manual.

TESTING PROCEDURE

When trouble has been located in the 15 Volt or 20 Volt regulator, see Error Signal section. All should be checked and corrected on the appropriate board or service menu as appropriate.

EQUIPMENT REQUIREMENTS

DIGITAL MULTIMETER	HP 34401A
VOLTMETER	HP 412A
SERVING KIT	HP 21850A

CONTROL SETTINGS

See

VOLTAGE REGULATOR

The 20 and 10 volt regulators are operational voltage regulators. In each of them, a voltage divider from the output is applied to one of the inputs of the error amplifier. The other input of the error amplifier is a reference level obtained from the output of the error amplifier.

When the current requirements of the output are constant, the regulator output voltage will remain constant. When the current requirements of the output change, the error amplifier will detect the unbalanced condition between the two inputs and produce an output to change the operating rate of the control amplifier. The error amplifier will then cause the error regulator to increase or decrease the output voltage to return the error signal to zero.

The error regulator acts like a variable resistance in series with the series feedback network. When the output voltage increases above the setpoint, the error regulator is biased to decrease the output voltage to the setpoint.

The output voltage regulation can be checked by a "closed loop" test. The output voltage will be checked with the error regulator in series with the output. The output voltage will be checked with the error regulator in series with the output. The output voltage will be checked with the error regulator in series with the output.

TEST PROCEDURE

Voltage regulation is checked as a "closed loop" test. The output voltage will be checked with the error regulator in series with the output. The output voltage will be checked with the error regulator in series with the output.

The HP 34401A should be used to check for the presence of errors of the levels at various points. The HP 412A should be used for load regulation measurements. Continuity of the output is completely missing or considerably high, the error regulator should be checked for an open or shorted condition. Also, if voltage is high the error regulator should be checked.

14-0215522

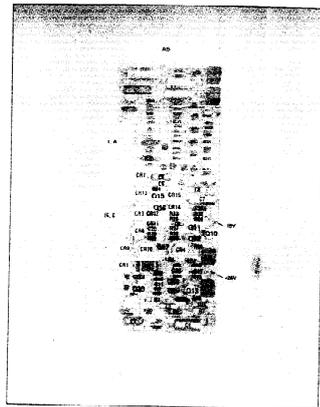
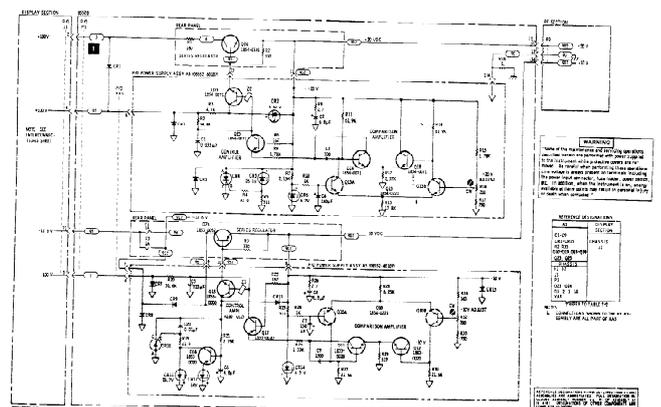


Figure 8-30. PDP-11 Power Supply PCB Component Distribution

14-0215522-01-1
Rev. 1



APPENDIX A
REFERENCES

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	US Army Equipment Index of Modification Work Orders.
TB 43-0118	Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).
TM 11-6625-2781-14&P	Operator's Organizational, Direct Support and General Support Maintenance Manual Including Repair Parts and Special Tools List for Spectrum Analyzer IP-1216(P)/GR (Hewlett-Packard Model 141T).
TM 11-6625-2781-14-4	Operator's, Organizational, Direct Support, and General Support Maintenance Manual for Plug-in Unit, Electronic Test Equipment PL-1400/U (Hewlett-Packard Model 8555A).

APPENDIX D

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

D-1. General

This appendix provides a summary of the maintenance operations for PL-1388/U. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

D-2. Maintenance Function

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system,

i. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., D.MWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipment./components.

D-3. Column Entries

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for pur-

pose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "worktime" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "worktime" figures will be shown for each category. The number of task-hours specified by the "worktime" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the allocation chart. Subcolumns of column 4 are as follows:

C-Operator/Crew
O-Organizational
F-Direct Support
H-General Support
D-Depot

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets (not

individual tools) and special tools, test, and support equipment required to perform the designated function.

f. Column 6, Remarks. Not applicable.

D-4. Tool and Test Equipment Requirements (Sect. III)

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. Maintenance Category. The codes in this column indicate the maintenance category allocated the tool or test equipment.

c. Nonenclature. This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specific tool or test equipment.

e. Tool Number. This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for manufacturers (5-digit) in parentheses.

D-5. Remarks (Sect. IV)

Not applicable.

(Next printed page is D-3)

SECTION II MAINTENANCE ALLOCATION CHART
FOR
PLUG-IN UNIT, ELECTRONIC TEST EQUIPMENT PL-1388/U

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
00	PLUG-IN UNIT, ELECTRONIC TEST EQUIPMENT PL-1388/U (HEWLETT-PACKARD MODEL 8552B)	Inspect Test Service Align Adjust Install Replace Repair Overhaul	0.5					8 1 thru 8 1 thru 8 1 thru 8 1 thru 8 8 1 thru 8 1 thru 8	
			0.3	0.3				2.0 24.0	
01	CIRCUIT CARD ASSEMBLY, LC FILTER, A1	Inspect Adjust Replace Repair						0.3 0.3 0.3 1.0	8 1 thru 8 1 thru 8 1 thru 8
02	3 MHZ AMPLIFIER BOARD ASSEMBLY, A2	Inspect Adjust Replace Repair						0.3 0.3 0.3 1.0	8 1 thru 8 1 thru 8 1 thru 8
0201	CIRCUIT CARD ASSEMBLY, 300 KHZ, A2A1	Inspect Replace Repair						0.3 0.3 0.5	8 1 thru 8 1 thru 8
03	50-MHZ CONVERTER, A3	Inspect Adjust Replace Repair						0.3 0.3 0.3 0.5	8 1 thru 8 1 thru 8 1 thru 8
0301	FILTER ASSEMBLY, 50 MHZ, A3A1	Inspect Replace						0.3 0.5	8 1 thru 8
0302	OSCILLATOR ASSEMBLY, 47 MHZ, A3A2	Inspect Adjust Replace						0.3 0.3 0.5	8 1 thru 8 1 thru 8
04	CIRCUIT CARD ASSEMBLY, CRYSTAL FILTER, A4	Inspect Adjust Replace Repair						0.3 0.5 0.5 1.5	8 1 thru 8 1 thru 8 1 thru 8
05	CIRCUIT CARD ASSEMBLY, POWER SUPPLY, A4	Inspect Adjust Replace Repair						0.3 0.3 0.3 1.0	8 1 thru 8 1 thru 8 1 thru 8
06	CIRCUIT CARD ASSEMBLY, SCAN GENERATOR, A6	Inspect Adjust Replace Repair						0.3 0.3 0.3 1.0	8 1 thru 8 1 thru 8 1 thru 8
07	CIRCUIT CARD ASSEMBLY, DEFLECTION AMPLIFIER, A7	Inspect Adjust Replace Repair						0.3 0.3 0.3 1.0	8 1 thru 8 1 thru 8 1 thru 8
08	CIRCUIT CARD ASSEMBLY, LOG AMPLIFIER, A8	Inspect Adjust Replace Repair						0.3 0.3 0.3 1.0	8 1 thru 8 1 thru 8 1 thru 8
09	SWITCH ASSEMBLY, SCAN TIME, A9	Inspect Replace Repair						0.3 1.0 1.0	8 1 thru 8 1 thru 8
10	SWITCH ASSEMBLY, REFERENCE LEVEL, A10	Inspect Replace Repair						0.3 1.0 1.0	8 1 thru 8 1 thru 8
11	SWITCH ASSEMBLY, VIDEO FILTER, A11	Inspect Replace Repair						0.3 1.0 1.0	8 1 thru 8 1 thru 8
12	CIRCUIT CARD ASSEMBLY, 47-MHZ APC, A12	Inspect Adjust Replace Repair						0.3 0.3 0.5 1.0	8 1 thru 8 1 thru 8 1 thru 8

SECTION II MAINTENANCE ALLOCATION CHART

FOR

PLUG IN UNIT, ELECTRONIC TEST EQUIPMENT PL-1388/U

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
13	CIRCUIT CARD ASSEMBLY, 2-MHZ OSCILLATOR, A13	Inspect Adjust Replace Repair				0.3 0.3 0.5	0.5	8 1 thru 8 1 thru 8 1 thru 8	

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS
F O B
PLUG-IN UNIT, ELECTRONIC TEST EQUIPMENT PL-1388/U

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	H, D	TEST SET, ELECTRICAL METER TS-682/GSM-1	6625-00-669-0747	
2	H, D	VOLTMETER, ELECTRONIC AN/URM-145	6625-00-973-3986	
3	H, D	GENERATOR, SIGNAL AN/URM-127	6625-00-783-5965	
4	H, D	OSCILLOSCOPE AN/USM-281C	6625-00-106-9622	
5	H, D	TRANSISTOR TEST SET TS-1836C/U	6625 00 159 2263	
6	H, D	MULTIMETER ME-26 D/U	6625-00-913-9781	
7	H, D	H-P SERVICE ACCESSORY KIT (SEE SECTION IV, REF CODE A)		
8	C, D, H, D	TOOLS AND EQUIPMENT ASSIGNED TO TECHNICIAN FOR ASSIGNED MISSION		

SECTION IV. REMARKS

REFERENCE CODE	REMARKS		
A	H-P SERVICE ACCESSORY KIT CONSISTING OF:	PL-1388/U	PL-1400/U
	140/141 DISPLAY SECTION TO SPECTRUM ANALYZER PLUG-IN EXTENDER CABLE ASSEMBLY (HP-11592-60015)	(HP-8552B) X	(HP-8555A) X
	IF TO RF UNIT INTERCONNECTION EXTENDER CABLE ASSEMBLY (HP-11592-60016)	X	X
	SELECTRO FEMALE TO ENC MALE TEST CABLE, 36 IN. LONG (HP-11592-60001)	X	X
	SELECTRO MALE TO SELECTRO FEMALE TEST CABLE, 8 IN. LONG, YELLOW (HP-11592-60003)	X	X
	SELECTRO FEMALE TO SELECTRO FEMALE CABLE, 8 IN. LONG, RED (HP-11592-60002)	X	X
	EXTENDER BOARD ASSEMBLY, 15 PINS, 30 CONDUCTORS, FOR PLUG-IN CIRCUIT BOARDS (HP-11592-60011)	X	X
	EXTENDER BOARD ASSEMBLY, 10 PINS, 20 CONDUCTORS, FOR PLUG-IN CIRCUIT BOARDS (HP-5060-0256)		X
	EXTENDER BOARD ASSEMBLY, 12 PINS, 24 CONDUCTORS, FOR PLUG-IN CIRCUIT BOARDS (HP-5060-0257)		X
	EXTENDER BOARD ASSEMBLY, 24 PINS, 48 CONDUCTORS, FOR PLUG-IN CIRCUIT BOARDS (HP-5060-0258)		X
	CABLE ASSEMBLY, R & P FEMALE TO BNC MALE (HP-11592-60013)		X
	CABLE ASSEMBLY, SMA MALE TO BNC MALE (HP-08555-60076)		X
	WRENCH, BOX-END SLOTTED, 3/16-IN. (HP-08555-20097)		X
	SELECTRO JACK-TO-JACK ADAPTER (HP-1250-0827)	X	X
	WRENCH, OPEN-END, 15/64-IN. (HP-8710-0946)	X	X
	OSM PLUG-TO-PLUG ADAPTER (HP-1250-1158)	X	X
	FASTENER ASSEMBLY, 8553 CIRCUIT BOARD EXTENDER, TWO EACH (HP-11592-20001 AND HP-1390-0170)	X	
	BNC JACK-TO-OSM PLUG ADAPTER (HP-1250-1200)	X	
	CABLE ASSEMBLY R & P CONNECTOR (HP-11592-60013)	X	

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL MANUALS



SOMETHING WRONG WITH THIS MANUAL?

THEN... JOT DOWN THE DOPE ABOUT IT ON THIS FORM, TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

FROM: (YOUR UNIT'S COMPLETE ADDRESS)
 Commander
 Stateside Army Depot
 ATTN: AMSTA-US
 Stateside, N.J. 07703
 DATE 10 July 1975

PUBLICATION NUMBER: TM 11-5840-340-12 DATE: 23 Jan 74 TITLE: Radar Set AN/SPC-76

BE EXACT... PIN-POINT WHERE IT IS				IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.	
2-25	2-28			Recommend that the installation antenna alignment procedure be changed through to specify a 2° IFF antenna lag rather than 1°. REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 27 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.
3-10	3-3		3-1	Item 5, Functions column. Change "2 db" to "3db." REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
		FO3		Zone C 3. On J1-2, change "+24 VDC to "+5 VDC." REASON: This is the output line of the 5 VDC power supply. + 24 VDC is the input voltage.

TEAR ALONG DOTTED LINE

TYPED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
 SSG I. M. DeSpirito 999-1776

SIGN HERE:
SSG I. M. DeSpirito

DA FORM 2028-2 1 AUG 74

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR MANUAL "FIND," MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

HISA 1686-75

FILL IN YOUR
UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

Commander
US Army Communications and
Electronics Materiel Readiness Command
ATTN: DRSEL-MA-Q
Fort Monmouth, New Jersey 07703

TEAR ALONG DOTTED LINE

FOLD BACK

BERNARD W. ROGERS
General, United States Army
Chief of Staff

Official:

J.C. PENNINGTON
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:

Active Army:

USAINSCOM (2)
COE (1)
TSG (1)
USASAE (2)
USAAENBD (1)
DARCOM (1)
TECOM (2)
USACC (4)
TRADOC (2)
OS Maj Cored (4)
MDW (1)
Armies (2)
corps (2)
HISA (Ft Monmouth) (33)
Fort Gillem (10)
Fort Gordon (10)
Fort Huachuca (10)
Fort Carson (5)
Svc Colleges (1)
USASIGS (6)
USAICS (3)
USAADS (2)
USAFAS (2)

USAARMS (2)
USASATC&S (2)
USAIS (2)
USAES (2)
Ft Richardson (CERCOM Ofc) (2)
AD (1) except
SAAD (30)
LBAD (14)
TOAD (14)
SHAD (3)
USA Dep (1)
Sig Sec USA Dep (1)
MAAG (1)
USARMIS (1)
USAERDAA (1)
USAERDAW (1)
Units org under fol TOE:
29-134 (1)
29-136 (1)
29-207 (2)
29-610 (2)
32-52 (1)
32-57 (1)

ARNG & (USAR: None.

For explanation of abbreviations used, see AR 310-50.

