

# **83525A RF PLUG-IN (Including Options 002 and 004)**

## **SERIAL NUMBERS**

This manual applies directly to HP Model 83525A  
RF Plug-in having serial number prefix 2040A.

For additional information about serial numbers,  
refer to INSTRUMENTS COVERED BY  
MANUAL in Section I.

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MANUAL PART NO. 83525-90003  
Microfiche Part No. 83525-90004

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### CERTIFICATION

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

### WARRANTY

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

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

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

### LIMITATION OF WARRANTY

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

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

### EXCLUSIVE REMEDIES

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

### ASSISTANCE

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

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

## SAFETY CONSIDERATIONS

### GENERAL

This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation. This product has been designed and tested in accordance with international standards.

### SAFETY SYMBOLS



Instruction manual symbol: the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual (refer to Table of Contents).



Indicates hazardous voltages.



Indicates earth (ground) terminal.

**WARNING**

The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed could result in personal injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

**CAUTION**

The CAUTION sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

### SERVICING

**WARNING**

*Any servicing, adjustment, maintenance, or repair of this product must be performed only by qualified personnel.*

*Adjustments described in this manual may be performed with power supplied to the product while protective covers are removed. Energy available at many points may, if contacted, result in personal injury.*

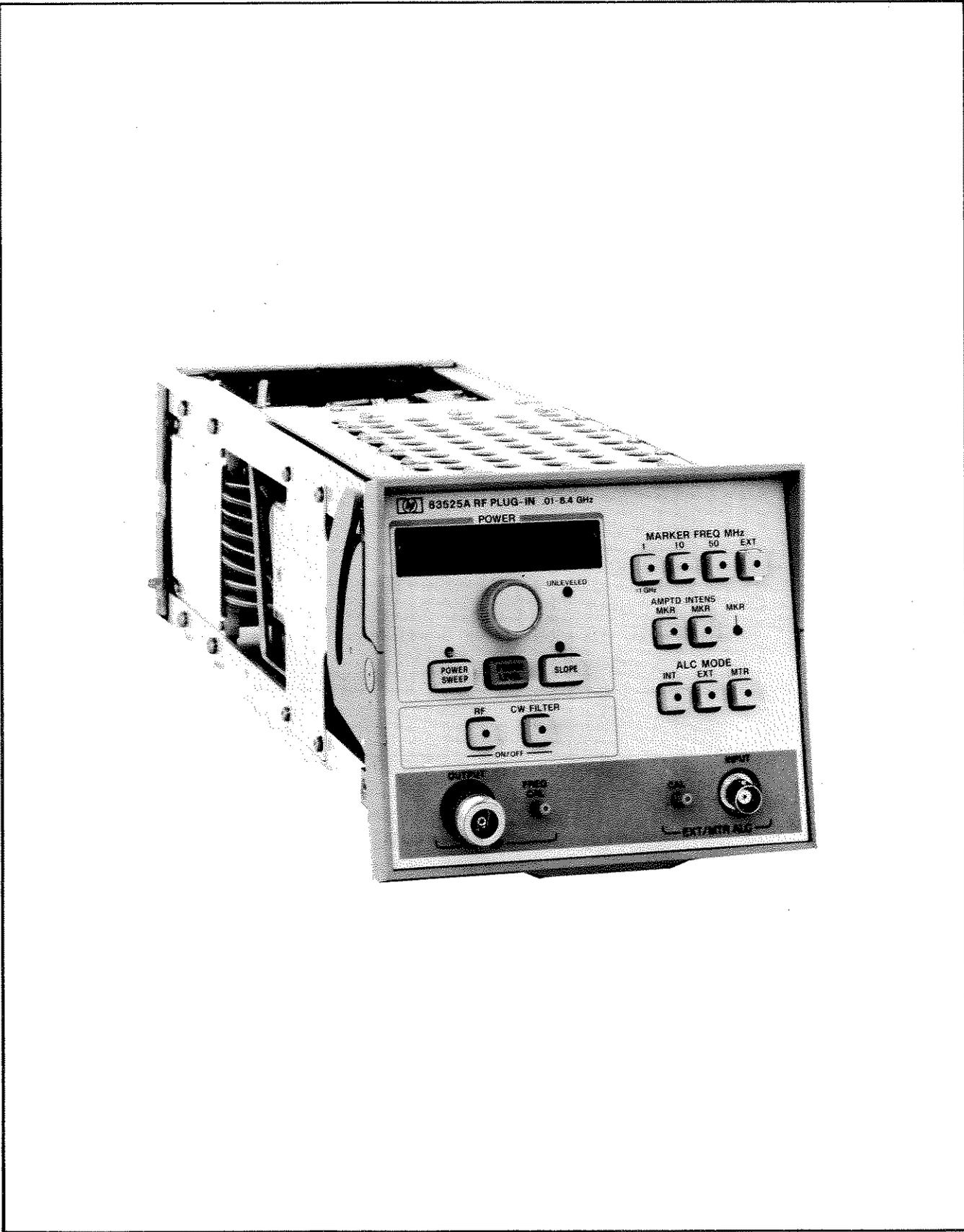


Figure 1-1. Model 83525A RF Plug-in

## SECTION I GENERAL INFORMATION

### 1-1. INTRODUCTION

1-2. This Operating and Service Manual contains information required to install, operate, test, adjust, and service the Hewlett-Packard Model 83525A RF Plug-in. Figure 1-1 shows the Model 83525A.

1-3. This manual is divided into eight major sections which provide the following information:

- a. **SECTION I, GENERAL INFORMATION**, includes a brief description of the instrument, safety considerations, specifications, supplemental characteristics, instrument identification, options available, accessories available, and a list of recommended test equipment.
- b. **SECTION II, INSTALLATION**, provides information for initial inspection, preparation for use, storage, and shipment.
- c. **SECTION III, OPERATION**, explains the frequency band switching and resolution characteristics of the RF plug-in in CW and swept frequency modes. Operating instructions include a front panel **FREQUENCY CALIBRATION** procedure, FM switch parameter settings, and crystal and power meter leveling instructions. A description of front and rear panel features and plug-in error codes is also given.
- d. **SECTION IV, PERFORMANCE TESTS**, presents procedures required to verify that performance of the RF Plug-in is in accordance with published specifications.
- e. **SECTION V, ADJUSTMENTS**, presents procedures required to properly adjust and align the Model 83525A RF Plug-in after repair.
- f. **SECTION VI, REPLACEABLE PARTS**, provides information required to order all parts and assemblies.
- g. **SECTION VII, MANUAL BACKDATING CHANGES**, provides backdating information required to make this manual compatible with earlier shipment configurations.
- h. **SECTION VIII, SERVICE**, provides an overall instrument block diagram with troubleshooting and repair procedures. Each assembly within the instrument is covered on a separate Service Sheet which contains a circuit description, schematic diagram, component location diagram, and troubleshooting information to aid in the proper maintenance of the instrument.

1-4. Supplied with this manual is an Operating Information Supplement. This is simply a copy of the first three sections of the manual which should be kept with the instrument for use by the instrument operator.

1-5. On the front cover of this manual is a "Microfiche" part number. This number may be used to order 4- by 6-inch microfilm transparencies of the manual. Each 4- by 6-inch microfiche contains up to 60 photo duplicates of the manual pages. The microfiche package also includes the latest Manual Changes sheet as well as all pertinent Service Notes.

1-6. Refer any questions regarding this manual, the Manual Changes sheet, or the instrument to the nearest HP Sales/Service Office. Always identify the instrument by model number, complete name, and complete serial number in all correspondence. Refer to the inside rear cover of this manual for a worldwide listing of HP Sales/Service Offices.

### 1-7. SPECIFICATIONS

1-8. Listed in Table 1-1 are the specifications for the Model 83525A RF Plug-in. These specifications are the performance standards, or limits, against which the instrument may be tested. Table

1-2 lists the RF Plug-in supplemental performance characteristics. Supplemental performance characteristics are not specifications but are typical characteristics included as additional information for the user.

### 1-9. SAFETY CONSIDERATIONS

1-10. This product has been manufactured and tested in accordance with international safety standards. Before operation, this product and related documentation must be reviewed for familiarization with safety markings and instructions. A complete listing of Safety Considerations precedes Section I of this manual.

### 1-11. INSTRUMENTS COVERED BY MANUAL

1-12. Attached to the rear panel of the instrument is a serial number plate. A typical serial number plate is shown in Figure 1-2. The serial number is in two parts. The first four digits followed by a letter comprise the serial number prefix. The last five digits form the sequential suffix that is unique to each instrument. The content of this manual applies directly to instruments having the same serial number prefix as those listed on the title page of this manual under SERIAL NUMBERS.

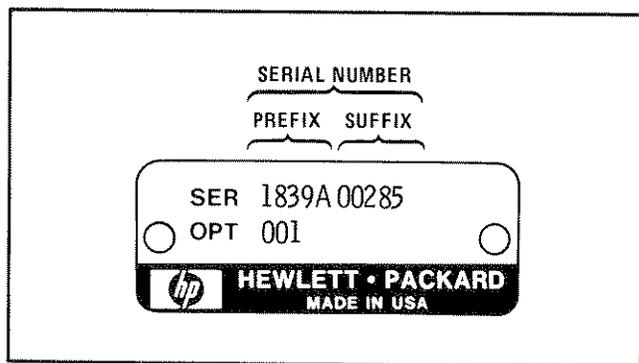


Figure 1-2. Typical Serial Number Plate

1-13. An instrument manufactured after the printing of this manual may have a serial prefix that is not listed on the title page. An unlisted serial prefix indicates that the instrument is different from those documented in this manual. The manual for the instrument is then supplied with a Manual Changes supplement that contains information which documents the differences.

1-14. In addition to change information, the Manual Changes supplement contains information

for correcting errors in the manual. To keep this manual as current as possible, Hewlett-Packard recommends that you periodically request the latest Manual Changes supplement. The supplement for this manual is keyed to the manual's print date and part number, both of which appear on the title page. Complimentary copies of the Manual Changes supplement are available on request from Hewlett-Packard.

1-15. For information concerning a serial number prefix that is not listed on the title page or in the Manual Changes Supplement, contact your nearest Hewlett-Packard Sales/Service Office.

### 1-16. DESCRIPTION

1-17. The Model 83525A is an RF plug-in which has been designed for use with the Model 8350A Sweep Oscillator. The Model 83525A covers the frequency range of 0.01 to 8.4 GHz in two bands. A YIG oscillator is used as the tunable RF frequency source for both bands. The upper band (Band 1) frequency range, 2.0 to 8.4 GHz, is obtained by amplifying the direct YIG oscillator output. The lower band (Band 0) uses a fixed 3.8 GHz oscillator which is mixed with the YIG oscillator to generate a 0.01 to 2.1 GHz RF output. Internal RF switches select the proper band to be output and are automatically switched when the frequency range being swept requires that both bands be utilized.

1-18. Model 83525A front panel functional controls, pushbuttons, and the Rotary Pulse Generator (RPG) are monitored by the Model 8350A via the RF plug-in interface circuits. The Model 8350A generates a tuning voltage ramp according to the mode of operation (CW, START/STOP, CF/ $\Delta$ F). This voltage ramp is scaled and offset in the Model 8350A to provide a voltage ramp which is proportional to the YIG oscillator frequency in the Model 83525A. The Model 83525A tuning circuits accept the tuning ramp voltage output by the Model 8350A and convert it to a current which drives the YIG oscillator tuning coil.

1-19. The Model 83525A offers a maximum leveled RF output power of +13 dBm. Internal (INT), External (EXT), and Power Meter (MTR) leveling is available as selected by the front panel pushbuttons. A front panel EXT/MTR ALC input connector and gain control (CAL) are provided to use with an external leveling loop. A front panel LED indicates when the RF output becomes

Table 1-1. Specifications for Model 83525A Installed in Model 8350A (1 of 4)

<b>FREQUENCY<sup>1</sup></b>			
<b>Range:</b>	0.01 to 8.4 GHz		
	<b>0.01 to 2 GHz</b>	<b>2 to 8.4 GHz</b>	<b>0.01 to 8.4 GHz</b>
<b>Accuracy</b> (25°C ±5°C)			
CW Mode	±5 MHz <sup>2</sup>	±15 MHz	
All Sweep Modes (Sweep time ≥100 ms)	±15 MHz <sup>2</sup>	±20 MHz	±25 MHz
Frequency Markers (Sweep time ≥100 ms)	±15 MHz ±0.5% of sweep width <sup>2</sup>	±20 MHz ±0.5% of sweep width	±25 MHz ±0.5% of sweep width
<b>Stability</b>			
With 10% Line Voltage Change	±20 kHz	±20 kHz	
With 10 dB Power Level Change	±100 kHz	±1 MHz	
With 3:1 Load SWR	±10 kHz	±250 kHz	
With Time (in a 10 minute period after one hour warmup)	±100 kHz	±200 kHz	
Residual FM, Peak (10 Hz to 10 kHz bandwidth)	<5 kHz	<9 kHz	
<b>POWER OUTPUT<sup>1</sup></b>			
<b>Maximum Leveled Output Power<sup>3</sup>:</b> (25°C ±5°C)	+13 dBm		
With Option 002:	+13 dBm		
<b>Power Level Accuracy:<sup>10</sup></b> (Internally Leveled)	±1.5 dB		
With Option 002 <sup>6</sup> : (at 0 dB attenuator step)	±1.7 dB		
<b>Calibrated Range:</b>	15 dB		
With Option 002:	85 dB		

Table 1-1. Specifications for Model 83525A Installed in Model 8350A (2 of 4)

**POWER OUTPUT<sup>1</sup> (Cont'd)**

**Attenuator Accuracy** ( $\pm$ dB referenced from the 0 dB setting):

	Attenuator Setting (dB)						
	10	20	30	40	50	60	70
<b>Attenuator Accuracy (dB)</b>	0.5	0.7	0.9	1.2	1.5	1.8	2.1

**Power Variation**

(at specified Maximum Levelled Power or below)

Internally Levelled:  $\pm 1$  dB

Externally Levelled<sup>7</sup>:

Negative Crystal Detector<sup>4</sup>:  $\pm 0.1$  dB

Power Meter<sup>5</sup>:  $\pm 0.1$  dB

	0.01 to 2 GHz	2 to 8.4 GHz
<b>Residual AM in 100 kHz Bandwidth</b> (in dB below carrier and at specified maximum levelled power)	$\geq 50$ dB	$\geq 50$ dB
<b>Spurious Signals</b> (at specified maximum levelled power)		
Harmonics (in dB below carrier)	$\geq 20$ dB	$\geq 20$ dB
Non-Harmonics (in dB below carrier)	$\geq 30$ dB	$\geq 60$ dB
<b>Output VSWR</b> (internally levelled)	$< 2.0$	$< 1.6$

**Power Sweep<sup>9</sup>**

Calibrated Range<sup>8</sup>:  $\geq 15$  dB

**MODULATION<sup>1</sup>**

**External AM**

Maximum Input: 15V

Table 1-1. Specifications for Model 83525A Installed in Model 8350A (3 of 4)

**MODULATION<sup>1</sup> (Cont'd)**

**Internal AM**

Selectable (by internal jumper in 8350A) to 1 kHz or 27.8 kHz square wave modulation. The 27.8 kHz modulation allows operation with HP Model 8755A/B/C Swept Amplitude Analyzer.

On/Off Ratio:  $\geq 30$  dB below specified maximum leveled power

Symmetry: 40/60

**External FM**

Maximum Deviations for Modulation Frequencies:

	<b>Cross Over Coupled</b>	<b>Direct Coupled</b>
DC to 100 Hz	$\pm 75$ MHz	$\pm 12$ MHz
100 Hz to 1 MHz	$\pm 7$ MHz	$\pm 7$ MHz
1 MHz to 2 MHz	$\pm 5$ MHz	$\pm 5$ MHz
2 MHz to 10 MHz	$\pm 1$ MHz	$\pm 1$ MHz

Frequency Response (DC to 2 MHz):  $\pm 3$  dB

**CRYSTAL MARKER CAPABILITY<sup>1</sup>**

**Internal Crystal Markers** (+3 to +13 dBm power level and  $\leq 10$  markers/sweep): Harmonic Markers of 10 MHz and 50 MHz are available below 2 GHz; 1 MHz harmonic markers are available below 1 GHz. Markers are output as intensity spots through the POS Z BLANK connector on the 8350A or as amplitude dips on the RF output.

**Marker Indicator Light:** LED lights when coincident with crystal or external marker for accurate CW calibration.

**GENERAL SPECIFICATIONS<sup>1</sup>**

**Minimum Sweep Time (over full band):** 17 ms

**Band Switch Point:** Internal band switch point between 2.0 and 2.1 GHz

**RF Output Connector:** Type N Female

Table 1-1. Specifications for Model 83525A Installed in Model 8350A (4 of 4)

<b>FOOTNOTES</b>	
1	Unless otherwise noted, all specifications are at the RF OUTPUT connector and at 0° to 55°C.
2	Accuracy when calibrated using internal crystal markers and FREQ. CAL. adjustment.
3	For temperatures greater than 30°C, maximum leveled output power typically degrades 0.1 dB/degree C.
4	Excluded coupler and detector variation. Crystal detector output should be between -10 mV and -200 mV as specified maximum leveled power.
5	Use HP Model 432A/B/C Power Meter. Sweep duration ≥50 seconds.
6	Attenuator switch points are every 10 dB starting at -2 dBm indicated power.
7	Discontinuity at bandswitch is typically <0.25 dB.
8	With Option 002, in power sweep or slope functions, power can exceed attenuator step by 5 dB.
9	Power Sweep and Slope Compensation total must not exceed 15 dB.
10	Includes internally leveled power variation.

Table 1-2. Supplemental Performance Characteristics for Model 83525A Installed in Model 8350A (1 of 4)

<b>NOTE</b>	
Values in this table are not specifications, but are typical characteristics included for user information.	
<b>FREQUENCY CHARACTERISTICS<sup>1</sup></b>	
<b>Accuracy</b> (25°C ±5°C)	
CW Mode Typically:	
	0.01 to 2 GHz: ±1.5 MHz
	2 to 8.4 GHz: ±3.5 MHz
Manual Sweep:	
	0.01 to 2 GHz: ±10 MHz <sup>2</sup>
	2 to 8.4 GHz: ±30 MHz
All sweep modes (sweep time 10 ms to 100 ms): ±25 MHz <sup>2</sup>	
Sweep Mode Linearity: <sup>3</sup>	
	0.01 to 2 GHz: ±1 MHz
	2 to 8.4 GHz: ±3 MHz
<b>Stability with Temperature: ±200 kHz/°C</b>	

Table 1-2. Supplemental Performance Characteristics for Model 83525A  
Installed in Model 8350A (2 of 4)

**OUTPUT CHARACTERISTICS<sup>1</sup>**

**Power Output:**

Resolution (displayed): 0.1 dB

Remote Programming (settable): Typically  $\pm 0.01$  dB

Stability with Temperature (at maximum specified leveled power):  $\pm 0.02$  dB/ $^{\circ}$ C

**Spurious Signals (in dB below carrier):**

Harmonics:

	0.01 to 2 GHz	2 to 8.4 GHz
At specified maximum leveled power, typically	$\geq 25$ dB	$\geq 25$ dB
At power level of +10 dBm, typically	$\geq 30$ dB	$\geq 30$ dB
Non harmonics at specified maximum leveled power, typically	$\geq 35$ dB	$\geq 60$ dB

**Impedance:** 50 Ohms

**Power Sweep:<sup>5</sup>**

Accuracy (including linearity): Typically  $\pm 1.5$  dB

Resolution (displayed): 0.1 dB

**Slope Compensation<sup>5</sup>**

Linearity: Typically  $< 0.2$  dB

Calibrated Range:<sup>4</sup> Up to 5 dB/GHz; up to 15 dB for full sweep range

Resolution (displayed): 0.01 dB/GHz

**MODULATION CHARACTERISTICS<sup>1</sup>**

**External AM:**

Frequency Response: Typically 100 kHz

Input Impedance: Approximately 10k Ohm

Range of Amplitude Control: Typically 15 dB

Sensitivity: Typically 1 dB/V

Table 1-2. Supplemental Performance Characteristics for Model 83525A  
Installed in Model 8350A (3 of 4)

**MODULATION CHARACTERISTICS (Cont'd)****Pulse In**

TTL compatible; Logic HIGH=RF ON  
Logic Low=RF OFF

Modulation for 0.01 to 2.0 GHz Band.

Square Wave modulation up to 30 KHz

Pulse Modulation for 2 to 8.4 GHz Band

Rise/Fall Time: Typically 20 ns

Minimum Pulse Width:

Leveled: Typically 1 us

Unleveled (power level set to +22 dBm): Typically 100 ns

**External FM:**

Sensitivity (switch selectable)

FM Mode: Typically -20 MHz/V

Phase-Lock Mode: Typically -6 MHz/V

Input Impedance: 2000 Ohms nominal

**CRYSTAL MARKER** (Operation when RF power set between +3 to +13 dBm and  $\leq 10$  markers per sweep)

**Accuracy of Center Frequencies (at 25°C):**  $\pm 5 \times 10^{-6}$

**Typical Marker Width Around Center Frequency:**

1 MHz Markers:  $\pm 100$  kHz

10 MHz Markers:  $\pm 200$  kHz

50 MHz Markers:  $\pm 300$  kHz

External Markers:  $\pm 300$  kHz

**Temperature Stability:** Typically  $\pm 2 \times 10^{-6}/^{\circ}\text{C}$

**EXTERNAL MARKER INPUT:**<sup>6</sup> Generates Amplitude or Z-axis marker when sweep frequency equals external input frequency.

**Frequency Range:** 0.01 to 2.0 GHz

Table 1-2. Supplemental Performance Characteristics for Model 83525A  
Installed in Model 8350A (4 of 4)

### GENERAL CHARACTERISTICS

**Frequency Reference Output:** 1 V/GHz  $\pm$  10 mV (over full sweep range) rear panel BNC output

**Weight:** Net 4.5 kg (10 lb.), Shipping 7.7 kg (17 lb.)

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- <sup>1</sup> Unless otherwise noted, all characteristics are at the RF OUTPUT connector and at 0° to 55°C.
- <sup>2</sup> Accuracy when calibrated using internal crystal markers and FREQ CAL adjustment.
- <sup>3</sup> With respect to the SWEEP OUT voltage.
- <sup>4</sup> With Option 002, in power sweep or slope functions, power can exceed attenuator step by 5 dB.
- <sup>5</sup> Power Sweep and Slope Compensation must not exceed 15 dB.
- <sup>6</sup> External marker input power typically between -10 dBm and +10 dBm (over limited power range).

unleveled. The RF output level is controlled by the Model 83525A RPG, the Model 8350A data entry controls (keypad and step keys), or through HP-IB control via the Model 8350A.

1-20. Internal frequency markers which are referenced to a crystal oscillator, are available to provide Z-axis intensity markers from the Model 8350A rear panel POS Z BLANK BNC output or 1 dB amplitude marker dips on the RF output. Harmonic markers of 10 and 50 MHz are available up to 2 GHz and 1 MHz markers are available up to 1 GHz. A rear panel BNC connector accepts an external marker reference frequency. Marker operation is selected by the front panel controls or through HP-IB control via the Model 8350A.

1-21. A power sweep function allows the RF output power to be swept at least 15 dB during CW mode or swept frequency modes. Power sweep is selected by the front panel POWER SWEEP pushbutton. Slope compensation control is also available by selecting the SLOPE pushbutton and rotating the Model 83525A RPG or manipulating the Model 8350A data entry controls. The power sweep function and slope compensation may both be selected and modified through HP-IB control via the Model 8350A.

1-22. The RF output may be internally or externally amplitude modulated, or externally

frequency modulated. Internal square wave amplitude modulation frequency is selectable by a Model 8350A internal jumper to be either 1 kHz or 27.8 kHz (for use with the Model 8755 Swept Amplitude Analyzer). Rear panel BNC connectors accept an external AM or FM frequency. FM coupling (direct coupled or cross-over) and sensitivity is selected by an internal configuration switch in the Model 83525A. Refer to Section III Operation of this manual for detailed information on the configuration switch.

1-23. A rear panel 1V/GHz signal corresponds to the RF output frequency. This output voltage may be used as a reference for pretuning external equipment in phase locking applications. (The Model 8410B/8411A Network Analyzer utilizes this output in such a configuration.)

1-24. The RF output may be turned off by the RF ON/OFF pushbutton. RF power ON is indicated by the LED in the center of the pushbutton. Additionally, in CW mode, the CW FILTER, when selected, places a capacitor across the YIG oscillator tuning coil to filter high frequency noise which would appear at the RF output. All front panel functions, with the exception of the FREQ CAL and CAL adjustments, may be set or altered by computer control via the HP-IB bus connection on the Model 8350A.

**1-25. OPTIONS****1-26. Option 002, 70 dB Attenuator**

1-27. Option 002 instruments contain a digitally controlled attenuator just before the RF output. Up to 70 dB of attenuation in 10 dB steps is automatically selected as required to attenuate the RF output power to the indicated level. The continuously variable power level function operates as in a standard instrument with the data entry controls.

**1-28. Option 004, Rear Panel RF Output**

1-29. Option 004 instruments have the Type N RF output connector and the BNC EXT/MTR ALC input connector on the rear panel instead of the front panel.

**1-30. EQUIPMENT REQUIRED BUT NOT SUPPLIED**

1-31. To have a complete operating sweep oscillator unit, the Model 83525A RF plug-in must be installed in a Model 8350A Sweep Oscillator. Refer to Section II Installation in this manual for a detailed description of RF plug-in installation.

**1-32. EQUIPMENT AVAILABLE****1-33. Service Accessories**

1-34. A Service Accessory Kit (HP Part No. 08350-60020) is available for servicing the Model 83525A RF Plug-in and the Model 8350A Sweep Oscillator. HP Part Numbers for the individual parts of the kit are provided in Table 1-3.

1-35. The Service Accessory Kit includes:

- Two 44-pin printed circuit board extenders. These boards have keyed slots which allow them to be used in each of the keyed pc board connectors in the Model 83525A and in the Model 8350A as well.
- An RF Plug-in extender cable set that provides all electrical connections to the RF plug-in when it is removed from the sweep oscillator. The RF Plug-in Interface connector (P2) and the Power Supply Interface connector (P1) are extended by separate cables.

- One Hex Balldriver for use in Model 8350A repairs.
- One 16-pin and one 20-pin integrated circuit test clip.

1-36. A listing of service accessories available including service cables, wrenches, adapters, and extender boards is given in Table 1-3.

**1-37. Model 8410B/8411A Network Analyzer**

1-38. The Model 8350A Sweep Oscillator, with the Model 83525A RF Plug-in installed, is compatible with the HP Model 8410B Network Analyzer system. The combination of the Model 8410B Network Analyzer, the Model 8411A Frequency Converter, and an appropriate display plug-in forms a phasemeter and a ratiometer for direct phase and amplitude ratio measurement on RF voltages. These measurements can be made on single frequencies and on swept frequencies from 110 MHz to 18 GHz. The Model 8350A/83525A combination is capable of operation from 110 MHz to 8.4 GHz within this range. The Model 8410B has an Auto-Frequency range mode which gives it the capability of automatically tracking the Model 8350A Sweep Oscillator over octave and multi-octave frequency bands. Two interconnections to the Model 8350A are necessary to ensure that the Model 8410B will phase lock properly. The Model 8410B Source Control Cable (HP 08410-60146) connects the Model 8410B rear panel SOURCE CONTROL connector to the Model 8350A rear panel PROGRAMMING CONNECTOR. Additionally, the Model 83525A RF Plug-in rear panel 1V/GHz output connects to the Model 8410B rear panel FREQ REF INPUT. The Model 8410B Source Control Cable connector pins and signals are illustrated in the Model 8350A Sweep Oscillator Operating and Service Manual.

**1-39. Model 8755 Frequency Response Test Set**

1-40. The Model 8350A Sweep Oscillator with the Model 83525A RF Plug-in installed is compatible with the Model 8755 Frequency Response Test Set for broadband swept scalar measurements. The Model 8350A provides internal 27.8 kHz square wave amplitude modulation of the RF output eliminating unnecessary cable connections to the Model 8755 or the use of an external modulator. The Model 8350A can also produce

alternate sweeps through use of the ALT n function which works in conjunction with the channel switching circuits in the Model 8755C. This permits Channel 1 on the Model 8755C to respond only to the Model 8350A current state and Channel 2 to the alternate state. A single cable (HP Part Number 8120-3174) connects between the Model 8350A rear panel ALT SWP INTERFACE connector and the Model 8755C front panel ALT SWP INTERFACE connector.

**1-41. Power Meters and Crystal Detectors**

1-42. The RF output can be externally leveled using the HP Model 432 Power Meter or negative polarity output crystal detectors. Refer to Section

III Operation of this manual for detailed information on leveling techniques that may be used with the Model 8350A/RF Plug-in combination.

**NOTE**

**The Model 435A and 436A Power Meters should not be used in Model 8350A/ Model 83525A external leveling systems.**

**1-43. RECOMMENDED TEST EQUIPMENT**

1-44. Equipment required for testing and adjusting the instrument is listed in Table 1-4. Other equipment may be substituted if it meets or exceeds the critical specifications indicated in the table.

*Table 1-3. Service Accessories Available*

NAME	HP PART NUMBER	DESCRIPTION
44-pin printed circuit board extender	08350-60031*	Extends printed circuit boards
RF Plug-in Extender Cables	08350-60034* 08350-60035*	Extends RF Plug-in Interface connector (P2) Extends RF Plug-in Power Supply Interface connector (P1)
Adjustment Tool	8830-0024	Fits miniature adjustment slot on potentiometers
Wrenches	08555-20097 8710-0946	5/16" slotted box/open end 15/64" open end
Service Cables	8120-1578 83525-60019	18" coax with SMA (m) connector on each end 10" coax with SMB snap on (f) and SMA (m)
Adapters	1250-0777 1250-0082 1250-1404 1250-1158 1250-0674 1250-0675 1250-0069	Type N (f) to BNC (m) Type N (m) to BNC (m) Type N (f) to SMA (f) SMA (f) to SMA (f) SMA (f) to SMB (m) SMA (f) to SMC (m) SMB snap on (m) to SMB snap on (m)
Hex Balldriver	8710-0523*	Removes front panel hold down plate hex screws in 8350A
IC Test Clip	1400-0734* 1400-0979*	16-pin IC test clip 20-pin IC test clip
*These items are included in a Service Accessories Kit HP Part No. 08350-60020 (2 board extenders are included in this kit).		

Table 1-4. Recommended Test Equipment (1 of 3)

Instrument	Critical Specifications	Recommended Model	Use <sup>1</sup>
Sweep Oscillator	No substitute	HP 8350A	P,A,T
Digital Voltmeter (DVM)	Range: -50V to +50V Accuracy: $\pm 0.01\%$ Input Impedance: $\geq 10M$ Ohms	HP3455A	P,A,T
Oscilloscope	Dual Channel Bandwidth: dc to 100 MHz Vertical Sensitivity: $\leq 5$ mV/Div Horizontal Sweep Rate: $\leq 0.1 \mu$ S/Div X vs. Y Display Mode	HP 1740A	P,A,T
Frequency Counter	Frequency Range: 0.01 to 8.4 GHz	HP 5343A	P,A
Spectrum Analyzer	Frequency Range: 0.01 to 18 GHz Residual FM: $\leq 100$ Hz Must have auxiliary IF output when used with the HP 8901A Modulation Analyzer	HP 8565A or HP 8566A	P,T
Modulation Analyzer	(May be used in addition to Spectrum Analyzer). Frequency Range: Must cover auxiliary IF Output frequency of Spectrum Analyzer used. Residual FM: $\leq 10$ Hz	HP 8901A	P,T
Swept Amplitude Analyzer	Capable of Transmission and Reflection measurements. Power Resolution: $\leq 0.25$ dB/Div	HP 8755C	P,A
Display Mainframe	Compatible with HP 8755C Swept Amplitude Analyzer and HP 8750A Storage-Normalizer	HP 182T, TR	P,A
Detector	Compatible with Swept Amplitude Analyzer Frequency Range: 0.01 to 8.4 GHz Power Range: -20 to +10 dBm	HP 11664A	P,A
Storage-Normalizer	Compatible with Display Mainframe and Swept Amplitude Analyzer	HP 8750A	P,A
RF Marker Source	CW Frequency: 1.2 GHz Output Power Level: $\geq -10$ dBm	HP 8350A/83522A	A
Frequency Meter	Frequency Accuracy: $\leq 0.17\%$ Calibration Increments: $\leq 2$ MHz Frequency Range: 0.96 to 4.0 GHz 4.0 to 8.4 GHz	HP 536A HP 537A	P,A P,A

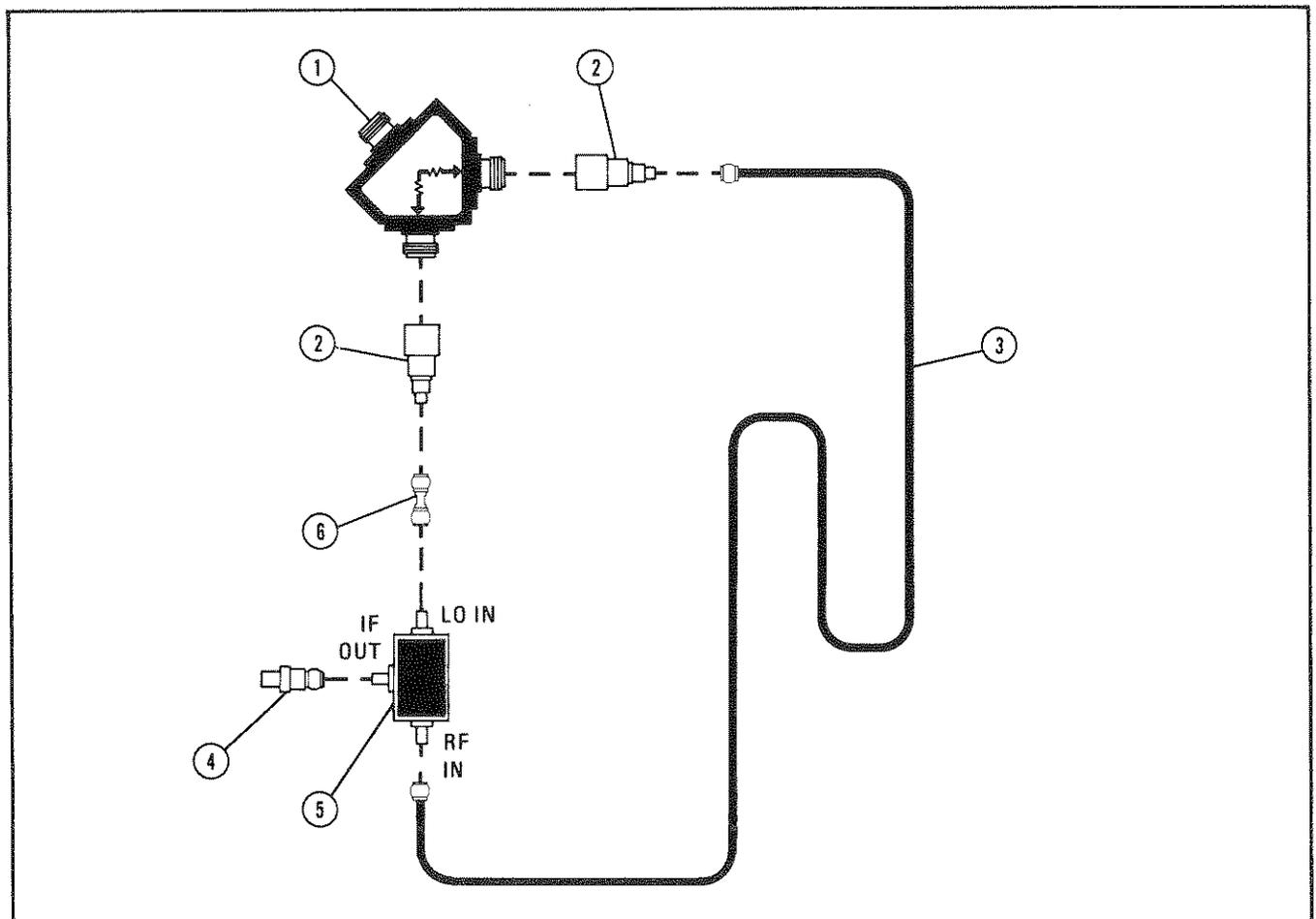
Table 1-4. Recommended Test Equipment (2 of 3)

Instrument	Critical Specifications	Recommended Model	Use <sup>1</sup>
Attenuator	Attenuation: 3 dB $\pm$ 0.5 dB Frequency Range: 0.01 to 8.4 GHz Maximum Input Power: $\geq$ +20 dBm Type-N Connector	HP 8491B Option 003	P
Attenuator	Attenuation: 6 dB $\pm$ 0.5 dB Frequency Range: 0.01 to 8.4 GHz Maximum Input Power: $\geq$ +20 dBm Type-N Connector	HP 8491B Option 006	P
Attenuator	Attenuation: 10 $\pm$ 0.5 dB Frequency Range: 0.01 to 8.4 GHz Maximum Input Power: $\geq$ +20 dBm Type-N Connector	HP 8491B Option 010	P,A
Attenuator	Attenuation: 20 $\pm$ 0.5 dB Frequency Range: 0.01 to 8.4 GHz Maximum Input Power: $\geq$ +20 dBm Type-N Connector	HP 8491B Option 020	P
Adjustable Short	Frequency Range: 1.8 to 12.4 GHz Impedance: 50 $\pm$ 1.5 Ohms	Maury Microwave <sup>2</sup> 1953-2	P
Adapter	APC-7 to Type N(m)	HP 11525A	P
Adapter	APC-3.5(f) to Type N(m)	Amphenol <sup>3</sup> 131-7018	P
Directional Coupler	Frequency Range: 0.1 to 2.0 GHz Nominal Coupling: $\geq$ 20 dB Maximum Coupling Variation: $\leq$ $\pm$ 1 dB Minimum Directivity: $\geq$ 32 dB	HP 778D	P
Directional Coupler	Frequency Range: 2 to 8.4 GHz Mean Output Coupling: $\geq$ 20 dB Output Coupling Variation: $\leq$ $\pm$ 1 dB Minimum Directivity: $\geq$ 26 dB	HP 779D	P
RMS Voltmeter	dB Range: -20 to -70 dBm (0 dBm = 1 mW into 600 Ohms) Frequency Range: 10 Hz to 10 MHz Accuracy: $\pm$ 5% of full scale	HP 3400A	P
Air Line Extension (2 required)	Impedance: 50 Ohms Frequency Range: dc to 8.4 GHz Reflection Coefficient: 0.018 + 0.001 (times the frequency in GHz)	HP 11567A	P
Step Attenuator	Frequency Range: dc to 8.4 GHz Incremental Attenuation: 0 to 70 dB in 10 dB steps Calibration Accuracy: $\leq$ $\pm$ 0.1 dB at all steps	HP 8495A Option 890	P

Table 1-4. Recommended Test Equipment (3 of 3)

Instrument	Critical Specifications	Recommended Model	Use <sup>1</sup>
Function Generator	Frequency Range: 0.1 Hz to 10 MHz Sine wave and square wave output Output Level: 10 V p-p into 50 Ohms Output Level Flatness: $\leq \pm 3\%$ from 10 Hz to 100 kHz $\leq \pm 10\%$ from 100 kHz to 10 MHz	HP 3312A	P,A,T
Power Meter	Power Range: -20 to +10 dBm (No substitute when used for external power meter leveling).	HP 432A	P,A
Thermistor Sensor (Used with HP 432A)	Frequency Range: 0.01 to 8.4 GHz Maximum SWR: $\leq 1.75$	HP 8478B	P,A
Power Meter	Power Range: 1 $\mu$ W to 100 mW	HP 436A	P,A
Power Sensor (Used with HP 436A)	Frequency Range: 0.01 to 8.4 GHz	HP 8481A	P,A
Crystal Detector	Frequency Response: 0.01 to 8.4 GHz Maximum Input Power: 100 mW	HP 423B	P,A
Power Splitter	Frequency Range: 0.01 to 8.4 GHz Output Port Tracking: $\leq 0.25$ dB Maximum Input Power: +20 dBm	HP 11667A	P,A
Band Pass Filters	Frequency Range: 4 to 8 GHz 6 to 8 GHz 8 to 12.4 GHz	HP Part No. 0960-0402 HP Part No. 0960-0200 HP Part No. 0960-0403	A A A
DC Power Supply	DC Output: 0 to 6.5 Vdc $\pm$ 0.05 Vdc	HP 6213A	A
50 Ohm Termination	Type N, 50 Ohms $\pm$ 0.5 Ohms	HP 909A	P,A
Delay Line Discriminator	Refer to Figure 1-3.		
PC Board Extender	44-pin, extends printed circuit boards	HP Part Number 08350-60031 (each)	T
RF Plug-in Extender Cable	Extends RF Plug-in Interface Connector (J2)	HP Part Number 08350-60034	T
RF Plug-in Extender Cable	Extends RF Plug-in Power Supply Interface Connector (J3)	HP Part Number 08350-60035	T

<sup>1</sup> P = Performance Test; A = Adjustments; T = Troubleshooting<sup>2</sup> Mauray Microwave Corp., 8610 Helms Ave., Cucamonga, CA 91730<sup>3</sup> Amphenol North America, Bunker-Ramo Corp., RF Operations, 33 E. Franklin St., Danbury, CT 06810



Item	Description	HP Part Number
1	Power Splitter	HP 11667A
2	Adapter: Type N Male to SMA Female (2 required)	1250-1250
3	Delay Line: >1 meter (3 feet) in length, SMA male connectors	08503-20038
4	Adapter: BNC Female to Male SMA	1250-1200
5	Mixer: Double Balanced 1 to 12 GHz: RHG Electronics Part No. DM 1-12 1 to 18 GHz: RHG Electronics Part No. DM 1-18  RHG Electronics Laboratories, Inc. Deer Park, NY 11729	0960-0451  None
6	Adapter: SMA Male to SMA Male	1250-1159

Figure 1-3. Delay Line Discriminator



## SECTION II INSTALLATION

### 2-1. INTRODUCTION

2-2. This section provides installation instructions for the Model 83525A RF Plug-in. This section also includes information about initial inspection, damage claims, preparation for use, packaging, storage, and shipment.

### 2-3. INITIAL INSPECTION

2-4. Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the instrument has been checked mechanically and electrically. The contents of the shipment should be as shown in Figure 1-1. Procedures for checking electrical performance are given in Section IV, Performance Tests, in the Model 8350A Operating and Service Manual. Performance Test limits are given in Section IV of this manual. If the instrument combination does not pass the electrical Performance Tests, refer to Section V, Adjustments, of this manual. If, after the adjustments have been made, the instrument combination still fails to meet specifications, and a circuit malfunction is suspected, refer to troubleshooting procedures in Section VIII, Service, in this manual. If the instrument does not pass the above electrical tests, if the shipment contents are incomplete, or if there is mechanical damage or defect, notify the nearest Hewlett-Packard office. If the shipping container is damaged, or if the cushioning material shows signs of stress, notify the carrier as well as the Hewlett-Packard office. Keep the shipping materials for carrier's inspection. The HP office will arrange for repair or replacement without waiting for claim settlement.

### 2-5. PREPARATION FOR USE

#### 2-6. Power Requirements

2-7. When the Model 83525A RF Plug-in is properly installed, it obtains all power through the rear panel interface connector from the Model 8350A Sweep Oscillator.

#### 2-8. RF Plug-in Configuration Switch

2-9. The Model 83525A RF Plug-in has a configuration switch (A3S1) located on the A3 Digital Interface Board. This switch must be preset prior to RF Plug-in operation in the Model 8350A. The configuration switch is an 8-section multiple switch. Each of the separate switches corresponds to a separate RF plug-in function such as FM sensitivity selection, FM modulation input coupling selection (direct coupled or cross-over), RF power level at power on (maximum or off), and Option 002 Step Attenuator operation. Refer to Section III, Operation, in this manual for a complete description of the configuration switch and instructions on how to set the switches.

#### 2-10. Interconnections

2-11. There are two rear panel interconnections on the Model 83525A RF Plug-in to the Model 8350A Sweep Oscillator. These are the RF Plug-in Interface connector (P2) and the Power Supply Interface Connector (P1). A complete listing of pins and associated signals and voltages for these connectors are listed on the Wiring List in Section VIII, Service, of this manual. Figures 2-1 and 2-2 provide the connector configuration and associated signal mnemonics.

#### 2-12. Mating Connectors

2-13. All of the externally mounted connectors on the Model 83525A are listed in Table 2-1. Opposite each connector is an industry identification, the HP part number of a mating connector, and the part number of an alternate source for the mating connector. For HP part numbers of the externally mounted connectors themselves, refer to Section VI, Replaceable Parts, of this manual.

#### 2-14. Operating Environment

2-15. **Temperature.** The instrument may be operated in temperatures from 0°C to +55°C.

2-16. **Humidity.** The instrument may be operated in environments with humidity from 5%

Table 2-1. Mating Connectors

83525A Connector		Mating Connector	
Connector Name	Industry Identification	HP Part No.	Alternate Source
J1 RF INPUT	TYPE N (f)	1250-0882	Specialty Connector 25-P117-2
J2 EXT/MTR ALC INPUT	BNC (f)	1250-0256	Specialty Connector 25-P118-1
J3 EXT MKR	BNC (f)	1250-0256	Specialty Connector 25-P118-1
J4 IV/GHz	BNC (f)	1250-0256	Specialty Connector 25-P118-1
J5 PULSE IN	BNC (f)	1250-0256	Specialty Connector 25-P118-1

to 80% relative at +25°C to +40°C. However, the instrument should also be protected from temperature extremes which cause condensation within the instrument.

**2-17. Altitude.** The instrument may be operated at altitudes up to 4572 meters (15,000 feet).

**2-18. Cooling.** When the Model 83525A RF Plug-in is properly installed in the Model 8350A Sweep Oscillator, it obtains all of its cooling airflow by forced ventilation from the fan in the Model 8350A. A diagram showing the various cooling airflow paths within the sweep oscillator is given in Section II, Installation, of the Model 8350A Sweep Oscillator Operating and Service Manual. Ensure that all airflow passages in the Model 8350A and the Model 83525A are clear before installing the RF Plug-in in the Sweep Oscillator.

**2-19. Installation Instructions**

2-20. To operate as a completely functional sweep oscillator, the Model 83525A RF Plug-in must be installed in a Model 8350A Sweep Oscillator. To install the Model 83525A RF plug-in in the Model 8350A Sweep Oscillator:

- a. Set the Model 8350A mainframe LINE switch to OFF.
- b. Remove all connectors and accessories from the front and rear panel connectors of the Model 83525A to prevent them from being damaged.

- c. Position the RF plug-in unit latching handle in the fully raised position. The latching handle should spring easily into the raised position and be held by spring tension.
- d. Ensure that the Model 8350A RF plug-in channel is clear, align the RF plug-in in the channel and slide it carefully into place towards the rear of the channel. It should slide easily without binding.
- e. The drawer latch handle slot will engage with the locking pin just before the RF plug-in is fully seated in position.
- f. Press the latch handle downward, while still pushing in on the RF plug-in, until the drawer latch is fully closed and the front panel of the RF plug-in is aligned with the sweep oscillator front panel.

**2-21. STORAGE AND SHIPMENT**

**2-22. Environment**

2-23. The instrument may be stored or shipped in environments within the following limits:

- Temperature..... -40°C to +75°C
- Humidity.... 5% to 95% relative at 0° to +40°C
- Altitude..... Up to 15240 meters (approximately 50,000 feet)

2-24. The instrument should also be protected from temperature extremes which may cause condensation in the instrument.

**2-25. Packaging**

**2-26. Original Packaging.** Containers and materials identical to those used in factory packaging are available through Hewlett-Packard offices. A complete diagram and listing of packaging materials used for the Model 83525A is shown in Figure 2-3. 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 (located on rear panel serial plate). Mark the container FRAGILE to assure careful handling. In any correspondence, refer to the instrument by model number and full serial number.

**2-27. Other Packaging.** The following general instructions should be used for repackaging with commercially available packaging materials:

- a. Wrap the instrument in heavy paper or plastic. If shipping to a Hewlett-Packard

Office or Service Center, attach a tag indicating the type of service required, return address, model number, and full serial number.

- b. Use a strong shipping container.
- c. Use enough shock-absorbing material around all sides of the instrument to provide a firm cushion and to 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.
- f. In any correspondence, refer to the instrument by model number and full serial number.

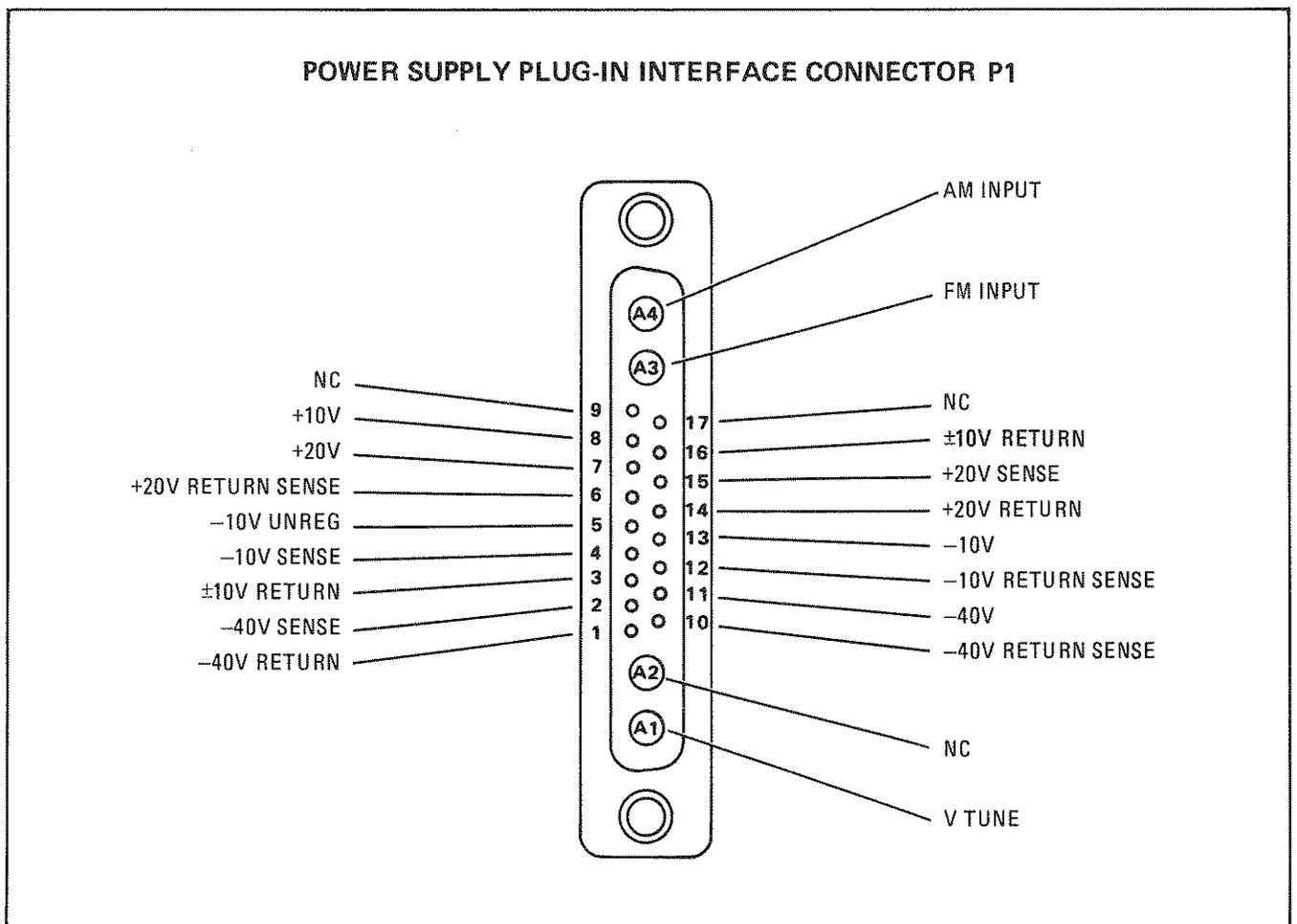


Figure 2-1. Interface Signals on Connector P1

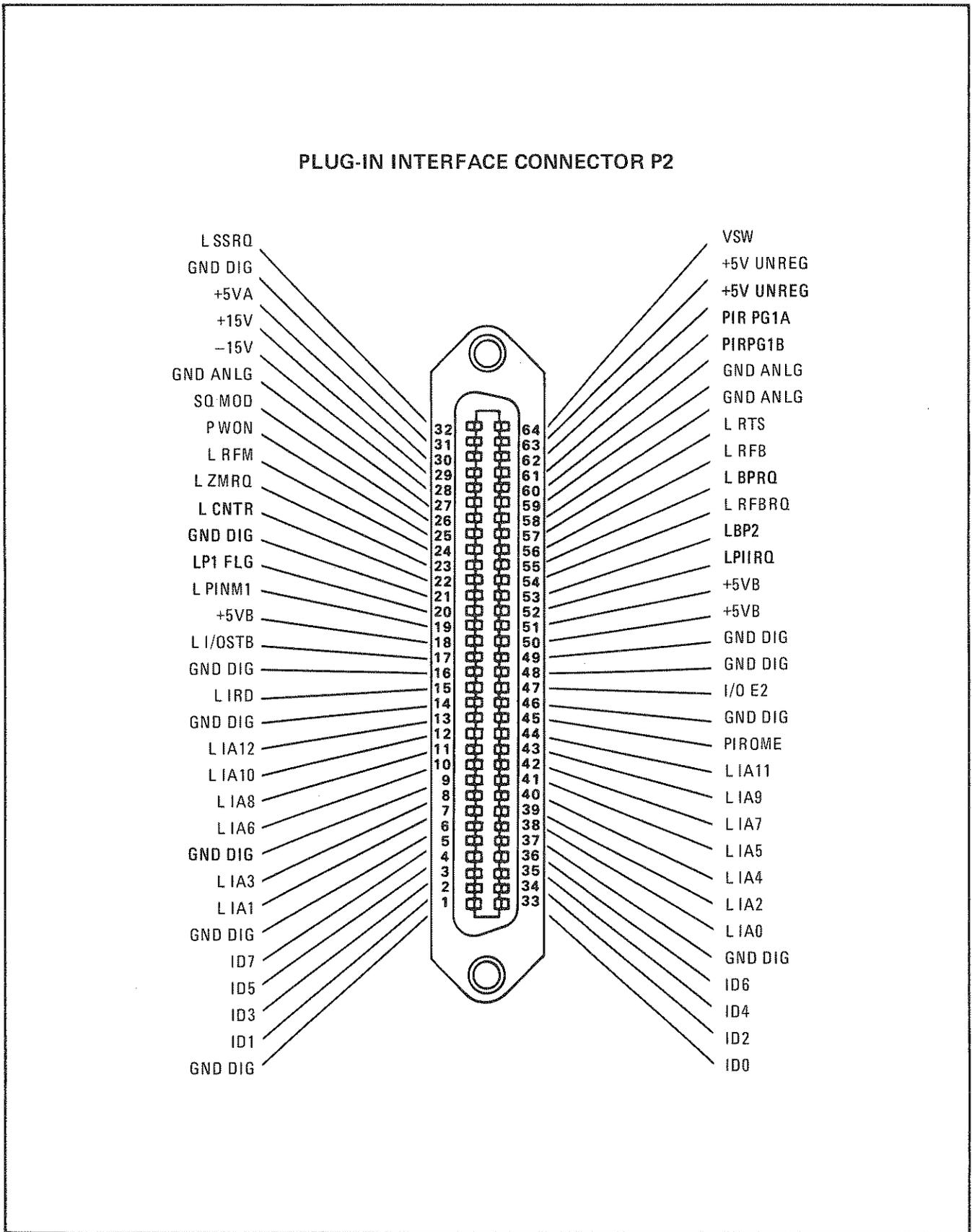
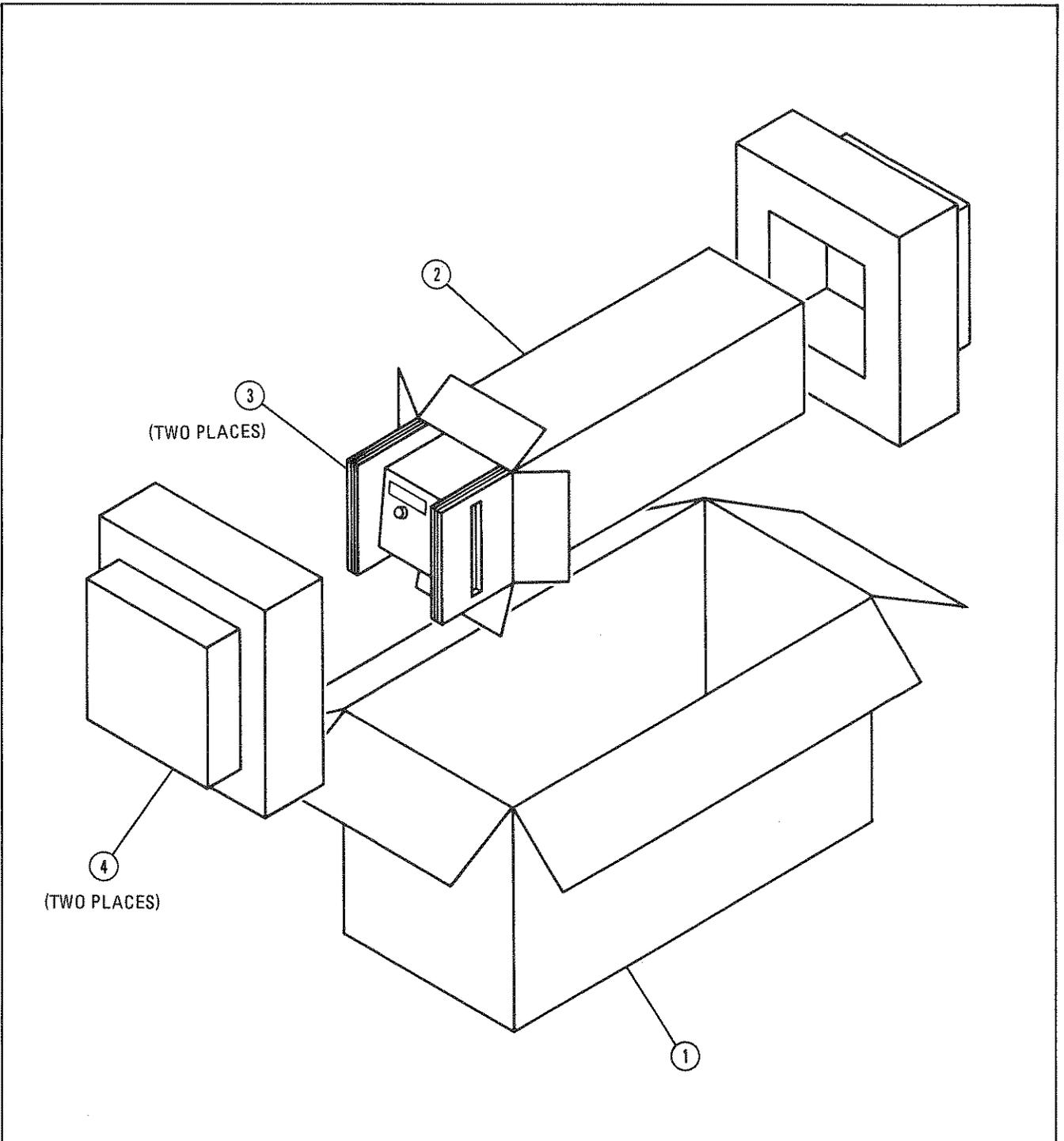


Figure 2-2. Interface Signals on Connector P2



Item	Quantity	HP Part Number	C D	Description
1	1	9211-3515	6	Outer Carton
2	1	9211-3514	5	Inner Carton
3	2	9220-3409	6	Side Pads — Corrugated Cardboard
4	2	9220-3406	3	Foam Pads
	1	9222-0352	6	Poly Bag — to cover instrument

Figure 2-3. Packaging for Shipment Using Factory Packaging Materials



## SECTION III OPERATION

### 3-1. INTRODUCTION

3-2. This operating section explains the frequency band switching and resolution characteristics in CW and swept modes. The operating instructions portion of this section provides the front panel **FREQ. CAL** procedure, FM switch setting instructions, and crystal and power meter leveling instructions. The operators maintenance portion has information on the plug-in error codes.

### 3-3. OPERATING CHARACTERISTICS

#### 3-4. Bandswitching And Resolution

3-5. The following paragraphs describe the band switching and frequency resolution characteristics of the 83525A RF Plug-in.

3-6. The 83525A 10 MHz to 8.4 GHz RF output is provided in two bands: 10 MHz to 2.1 GHz and 2 GHz to 8.4 GHz. When sweeping a range of frequencies larger than a single band, the switching between these bands is done automatically. Careful selection of sweep frequencies may avoid problems associated with band switching such as harmonics, sweep time, stability, or switching discontinuities. Figure 3-1 illustrates the band switching points in the swept and CW modes.

3-7. There are two areas of frequency resolution: input resolution and displayed resolution. Input resolution refers to the number of bits (8 bits = 256

points) in the digital to analog converter used to generate the tuning voltage for a particular mode. Table 3-1 cross-references input resolution with each DAC used. The display resolution refers to the digits displayed on the 8350A displays.

3-8. Figure 3-2 is a simplified block diagram of the frequency tuning circuits. The net tuning voltage results from the summation of the three DAC outputs. With this DAC configuration the **START/STOP** sweep mode is computed by the microprocessor into a center frequency and a  $\Delta F$  sweep width. Therefore the operation of all sweeps are set with a center frequency and sweep width. The center frequency is specified by the **CF DAC** and the **Vernier DAC**, and the sweep width is determined by the  $\Delta F$  DAC.

3-9. The **CF DAC** has 12 bits and hence 4096 points across any of the plug-in frequency bands (including overrange). The analog output ranges from zero to ten volts, which is used to coarsely specify the center frequency output of the plug-in. These parameters give the **CF DAC** a resolution of 0.024% (2.5mV) over the full band (including overrange).

3-10. Resolution of Center Frequency is enhanced by a summed voltage generated by an 8-bit (256 points) **Vernier DAC**. Vernier range is set to  $\pm 0.05\%$  of Bandwidth (including overrange). In multiband plug-ins, total range of the vernier will vary with each band sweep. Vernier resolution is

Table 3-1. Input Resolution

DAC Used	Voltage Resolution	Frequency Resolution		
		Low Band 0.01 – 2.1 GHz	High Band 2 – 8.4 GHz	Full Sweep 0.01 – 8.4 GHz
CF	2.5 mV	0.530 MHz	1.63 MHz	2.13 MHz
Vernier	40 $\mu$ V	8.28 kHz	25.4 kHz	33.2 kHz
$\Delta F$ 1–1/8 of band	10 mV	2.12 MHz	6.5 MHz	8.52 MHz
$\Delta F$ 1/8 – 1/64 of band	1.25 mV	0.265 MHz	0.81 MHz	1.06 MHz
$\Delta F \leq 1/64$ of band	0.156 mV	33.2 kHz	101.6 kHz	133.1 kHz

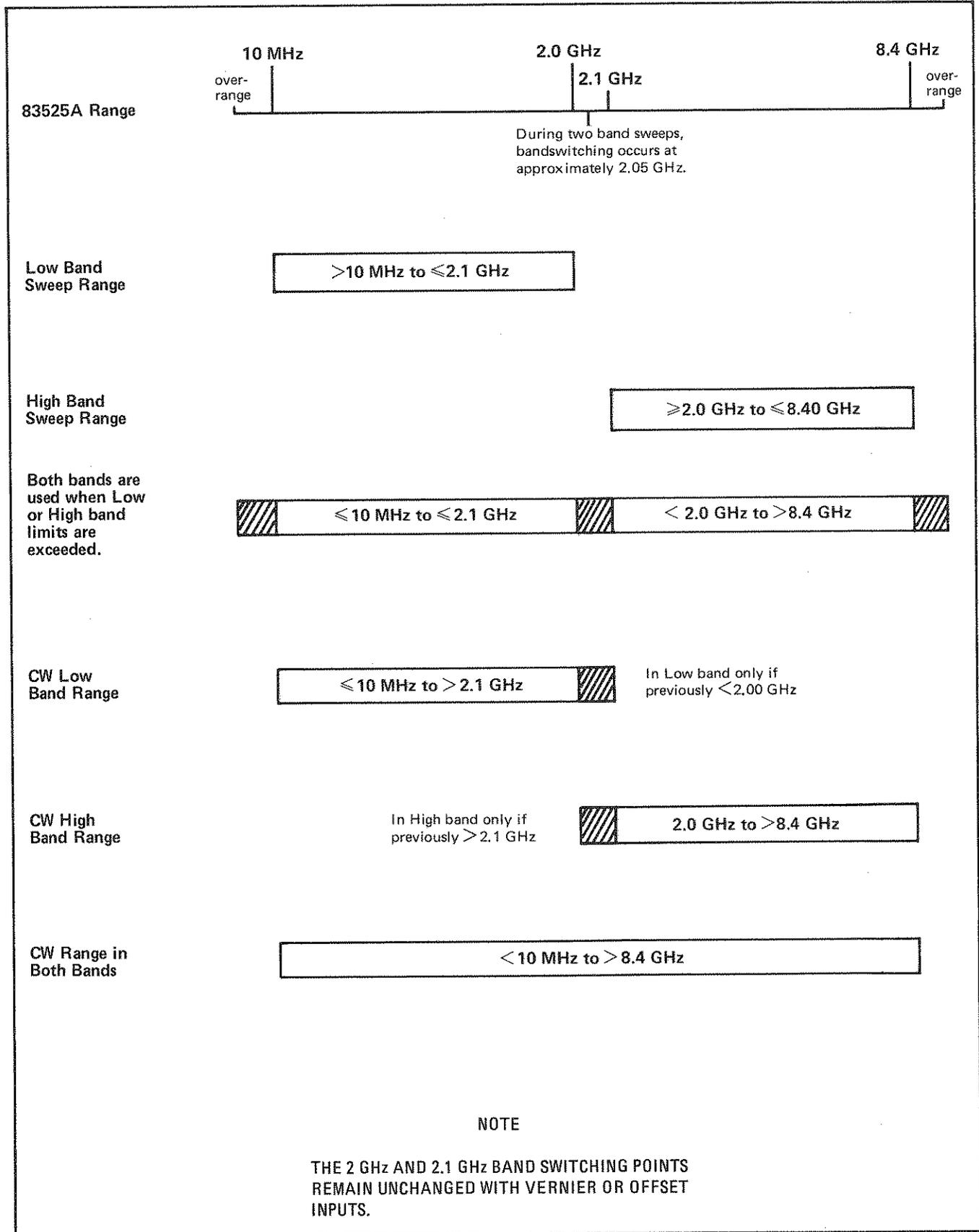


Figure 3-1. Band Switching in CW and Swept Frequency Modes

determined by dividing  $\pm 0.05\%$  bandwidth by 256 points (128 points either side of CF). The 256 points on the Vernier DAC equate with four points on the 12-bit CF DAC (two points on either side of CF), increasing CF resolution from 0.024% (2.5mV) to 0.00038% (0.04mV), and improving the relative accuracy of the CF by a similar factor.

**NOTE**

**When adjusting the vernier through its zero-point, the CF DAC is incremented or decremented by the total value of the vernier (2 points on the CF DAC). At this time the accuracy of the Center Frequency is again wholly dependent on the CF DAC, 0.005% of bandwidth.**

3-11. The  $\Delta F$  DAC has 10 bits (1024 points). The analog conversion ranges from  $-5$  to  $+5$  volts to produce an even sweep on either side of the center frequency. The  $\Delta F$  resolution improves with narrower sweep widths. For broad sweeps, the resolution is 0.1% of the full band. Greater resolution is provided for sweep widths less than 1/8 of the full band range. At these sweep widths,

the resolution is improved to 0.012% of the full band.

3-12. Center Frequency (CF) is always displayed with 1 MHz resolution. Likewise, Vernier is always displayed at 10 kHz resolution. Display resolutions for  $\Delta F$  values vary with frequency and band. See Figure 3-3.

**3-13. PANEL FEATURES**

3-14. Front and rear panel features are described in Figure 3-4 and 3-5. Description numbers match the numbers on the illustration.

**3-15. OPERATORS CHECKS**

3-16. The Operator's Checks (local and remote) in the 8350A sweep oscillator manual provide a quick evaluation of both instruments main functions. Error codes 50 to 99 are reserved for plug-in errors. The local check covers the sweep oscillator and RF plug-in; therefore, if the correct indications are not obtained, trouble may be in either of the units. If the RF plug-in is suspected, follow the troubleshooting information in Section VIII to isolate the problem.

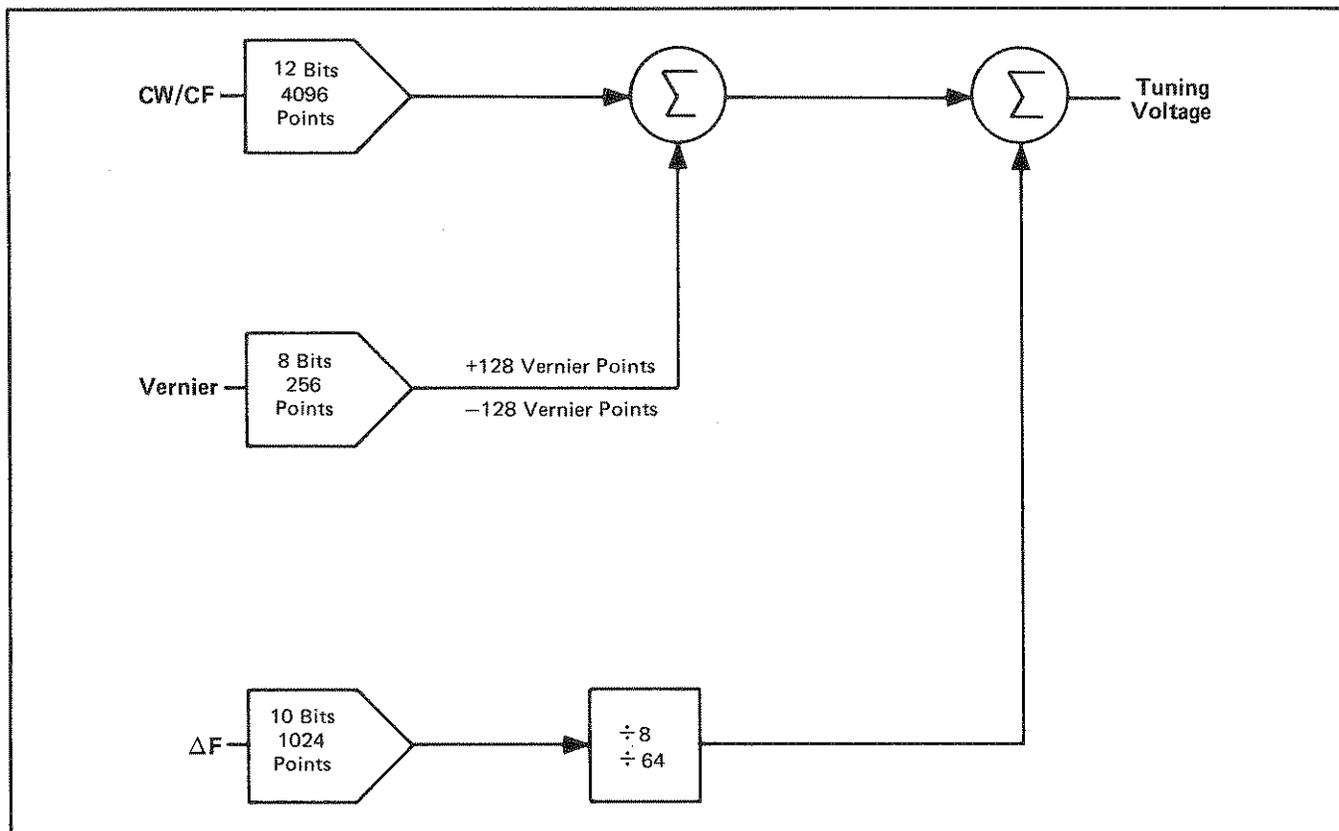


Figure 3-2. Simplified Tuning Voltage Block Diagram

		$\Delta F$ Display Frequency Width				
		0 MHz	*50 MHz	420 MHz	4.17 GHz	8.4 GHz
<b>Displayed Resolution</b>		*10 kHz	100 kHz	1 MHz	10 MHz	
<b><math>\Delta F</math> Display Indication</b>		0.00 MHz	0.0 MHz	0 MHz 0.000 GHz	0.00 GHz	

\* For Band 0 sweeps only, with  $\Delta F \leq 50$  MHz, display resolution increases to 10 kHz. See Figure 3-1 for bandswitch points.

Figure 3-3. Delta F Sweep Mode Displayed Resolution

### 3-17. OPERATING INSTRUCTIONS

#### 3-18. Front Panel FREQ CAL

**NOTE**

The 83525A RF Plug-in may not meet the frequency accuracy specifications unless the front panel FREQ CAL (frequency calibration) procedure is performed.

3-19. The front panel FREQ CAL procedure, Figure 3-6, should be performed after the instrument has warmed up for at least one hour. Performing this procedure adjusts the RF output frequency to the crystal marker frequency.

#### 3-20. Internal Leveling

3-21. The most convenient method of RF output leveling is internal leveling. A portion of the RF output is coupled out of a directional detector, producing a dc voltage proportional to the RF output signal. This detected dc voltage is applied to the automatic leveling control circuit (ALC).

#### 3-22. External Crystal Detector Leveling

3-23. Power may be leveled externally using a power splitter (or directional coupler) and crystal detector. This leveling system uses a power splitter

to sample the RF output signal and a crystal detector to produce a dc voltage proportional to RF signal level. The detector voltage is compared with an internal reference voltage, and the difference voltage changes the output power level to keep it constant at the output. A directional coupler may be used instead of a power splitter to sample the RF signal for the leveling loop. Directional couplers are usually narrow band, whereas the power splitter is flat over a wide frequency range. The advantage of a directional coupler is that it does not have a 6 dB loss like the power splitter, therefore a higher maximum leveled power output may be obtained. Figure 3-7 illustrates a typical crystal detector leveling setup.

#### 3-24. External Power Meter Leveling

3-25. RF power may be leveled with a power meter and power splitter or directional coupler as shown in Figure 3-8. The sweep time is limited to greater than 50 seconds when this leveling is used. A sample of the RF output signal is routed to a power meter which produces a dc voltage proportional to the RF signal level. This dc voltage is applied to the 83525A ALC circuits and compared with an internal reference voltage. A difference voltage is produced and amplified by the ALC amplifier before being applied, as modulator drive, to a PIN Modulator. Figure 3-8 illustrates a typical power meter leveling setup.

### 3-26. External FM

3-27. The 83525A RF output signal can be frequency modulated using an external modulating signal applied to the 8350A rear panel FM INPUT connector. The external FM function provides a means of obtaining an output frequency that varies under the control of an external modulating signal. A positive going voltage at the FM INPUT causes output frequency to decrease while a negative going voltage causes output frequency to increase. The sensitivity and coupling of the modulating signal may be set via configuration switch (A3S1). Figure 3-9 lists the available configuration switch settings. The Configuration Switch settings override 8350A Sweep Oscillator non-volatile memory settings at Instrument Preset.

### 3-28. External Amplitude Modulation

**3-29. Pulse Modulation (PULSE IN Connector on Plug-in).** The PULSE IN connector provides pulsed or square wave modulation, where the RF output is switched on and off. This input provides an on/off power ratio of greater than 30 dB below specified maximum leveled power. The PULSE IN input is normally at a TTL HIGH (approximately +3 Volts dc). When a TTL LOW signal (approximately 0 Volts dc) is applied, the RF output is turned off. To get the best pulse modulation performance, the RF output power should be set at +22 dBm. With this power setting, pulse repetition rates up to 1 MHz is achievable in the 2 to 8.4 GHz band. With leveled power in this band, pulse repetition rates may be up to 100 KHz. In the 0.01 to 2.0 GHz band, RF power may be square-wave modulated at repetition rates up to 30 KHz at any power output setting. The input impedance for TTL level signals is approximately 500 Ohms. If the PULSE IN circuit is driven beyond TTL levels, the input impedance is reduced to approximately 200 Ohms due to the diode clamping action. See the specifications and supplemental characteristics in Section I for more details on the modulation characteristics when using this input.

**3-30. Amplitude Modulation (AM INPUT Connector on 8350A).** The AM INPUT connector provides linear amplitude changes (up to approximately 15 dB) proportional to the modulating input voltage. It is limited to a

frequency response of about 100 kHz. For maximum depth of modulation (i.e., maximum modulation index), the RF power level should be set to the middle of the control range (e.g., +5.5 dBm for a plug-in with calibrated power control from -2 to 13 dBm). For plug-ins equipped with Option 002 (70 dB Step Attenuator), the middle of the attenuator range should be selected. The center of the power control range may be selected with the front panel power control knob or by applying a dc bias voltage on the external modulating signal. A positive (+) dc voltage into the AM INPUT causes a decrease in RF output power; a negative (-) dc voltage causes an increase in RF output power.

### 3-31. RF Power Control

3-32. The RF power selected at power-up (Instrument Preset) may be either maximum power (+13 dBm) or power OFF as chosen on the configuration switch (A3S1); refer to Figure 3-9 for this setting. The configuration switch also has switch settings for the model plug-in and use of option 002 Step Attenuator. The configuration switch settings override Sweep Oscillator non-volatile memory settings at Instrument Preset. Switch numbers 1, 2, 3 and 7 are set at the factory and should not be changed.

### 3-33. Option 002 Step Attenuator

3-34. With Option 002 installed, when the selected POWER setting goes below -2 dBm, the step attenuator increments as required in 10 dB steps down to -72 dBm. Within the individual 10 dB steps of the attenuator, the ALC loop adjusts the power output to the power level programmed at the front panel POWER control.

### 3-35. Alternate Sweep Mode With Option 002

3-36. If Option 002 attenuator is installed, and alternate sweep mode is selected, a slow sweep default condition of 1 sec/sweep may occur. This default condition only occurs when the POWER settings of the two alternate sweeps require the attenuator to switch after each sweep. The program prevents the attenuator from switching faster than 1 sec per attenuator change to prevent damage to the attenuator coils due to overheating.

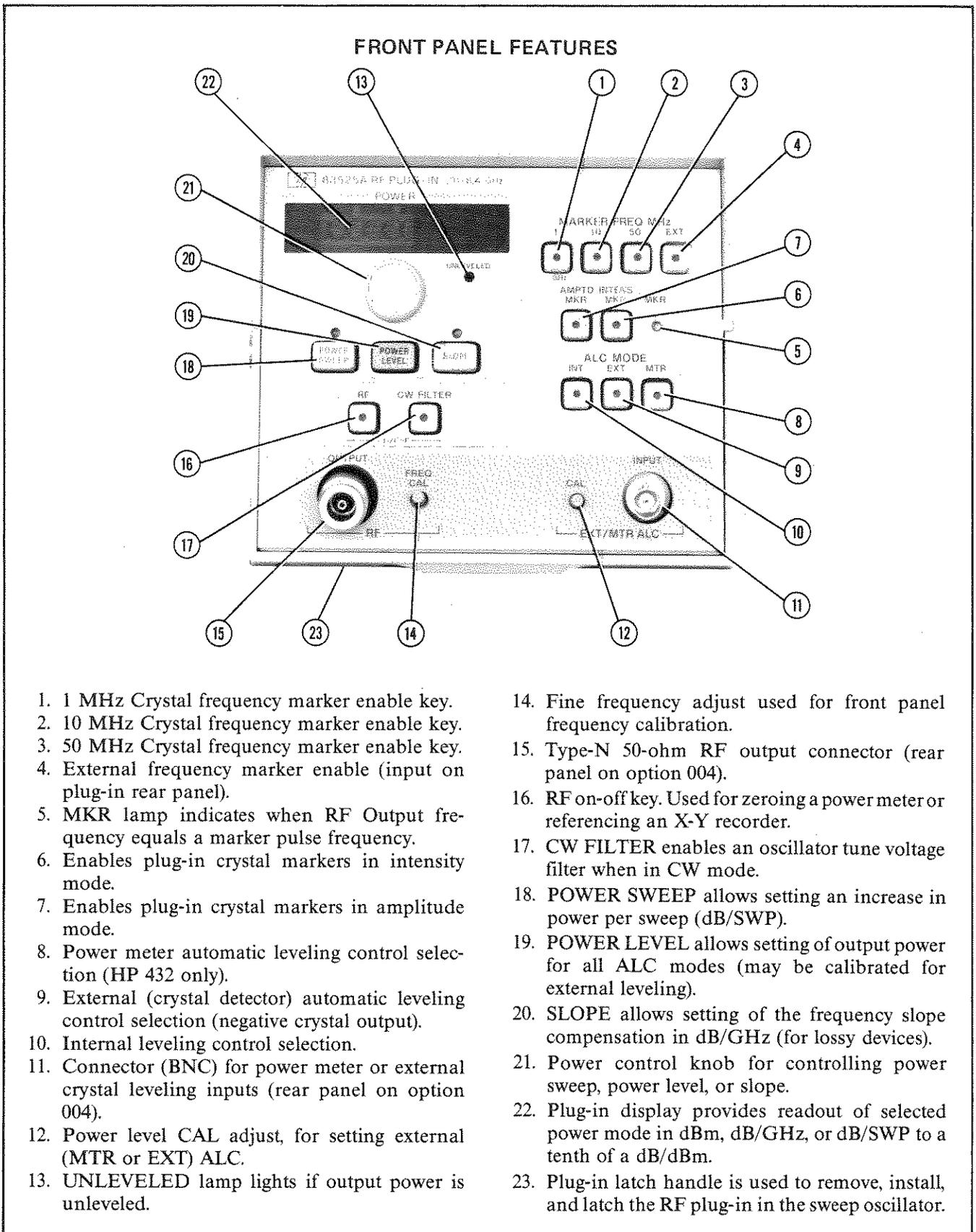
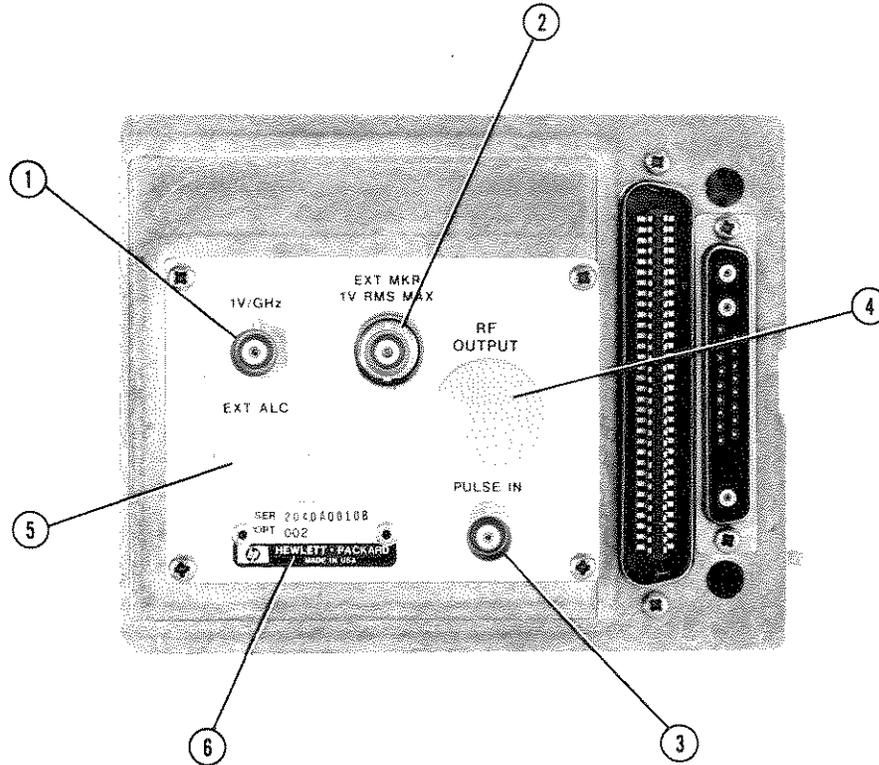


Figure 3-4. Front Panel Features

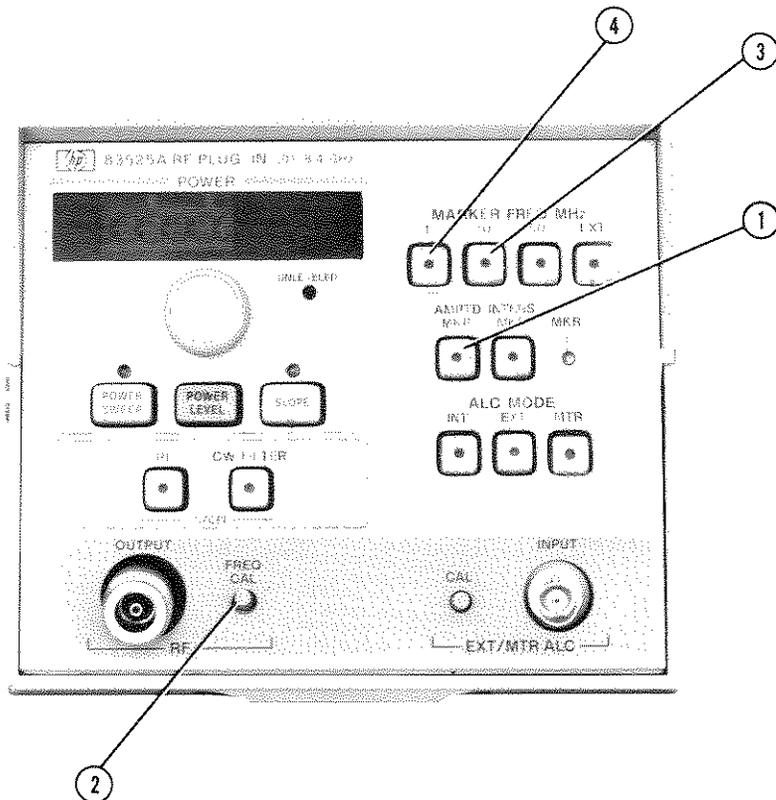
## REAR PANEL FEATURES



1. 1V/GHz connector provides a frequency reference output of approximately 1 volt dc per GHz.
2. EXT MKR (1V RMS MAX) input connector allows use of external marker when plug-in EXT marker is engaged.
3. PULSE IN connector is used to input external pulse or squarewave modulation.
4. RF OUTPUT connector replaces front panel RF output connector in Option 004 plug-ins.
5. EXT ALC connector replaces front panel EXT ALC connector on Option 004 plug-ins.
6. Serial Number Plate has a ten digit serial number (used in any correspondence concerning plug-in) and Option number if applicable.

Figure 3-5. Rear Panel Features

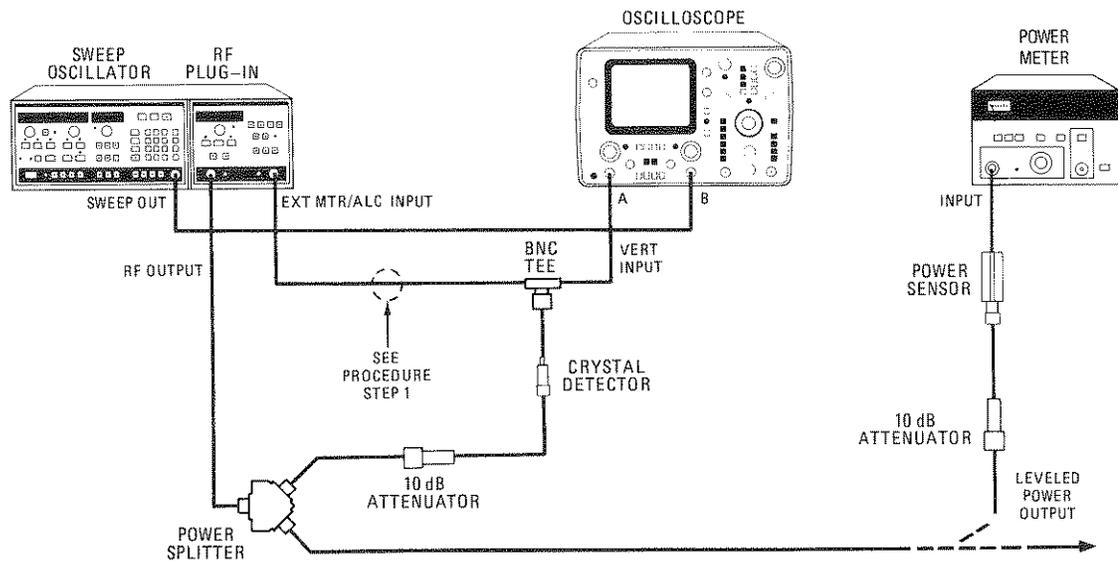
## FREQ CAL PROCEDURE



1. Press 8350A INSTR PRESET CW 5 0 MHz
2. Press 83525A AMPTD MKR ① (50 MHz switch on automatically).
3. Adjust FREQ CAL ② control until MKR lamp is on.
4. Press 8350A 1 0 MHz .
5. Press 83525A 10 MHz ③ Marker.
6. Fine adjust FREQ CAL ② control (if needed) until MKR lamp is on.
7. Press 83525A 1 MHz ④ Marker.
8. A small adjustment of FREQ CAL ② control may be needed for MKR lamp to light.

Figure 3-6. Front Panel FREQ CAL Procedure

### EXTERNAL CRYSTAL DETECTOR LEVELING



**EQUIPMENT:**

Sweep Oscillator .....	HP 8350A
RF Plug-in .....	HP 83525A
Oscilloscope .....	HP 1740A
Power Meter .....	436A
Power Sensor .....	HP 8482A
Crystal Detector .....	HP 423B
Power Splitter .....	HP 11667A
10 dB Attenuator (2 required) .....	HP 8491A, Option 010
BNC Tee .....	HP 1250-0781

**PROCEDURE:**

**NOTE**

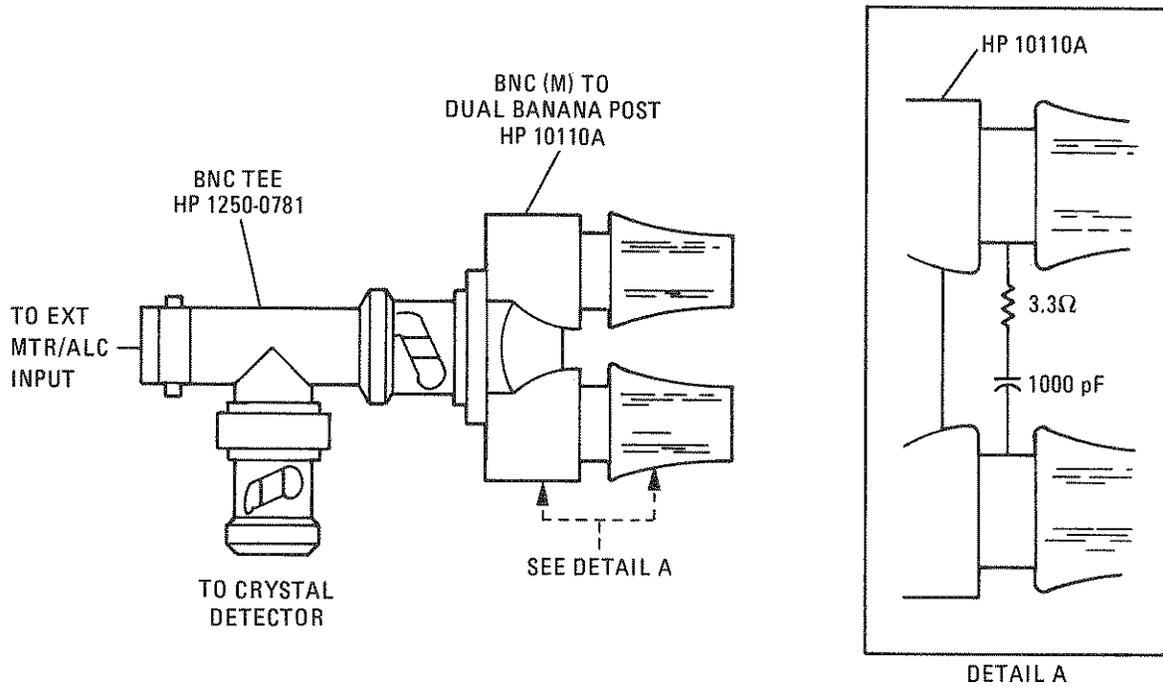
Crystal output signal must be between  $-10$  mVdc and  $-200$  mVdc.

1. Connect equipment as shown in test setup.

Figure 3-7. External Crystal Detector Leveling (1 of 2)

**NOTE**

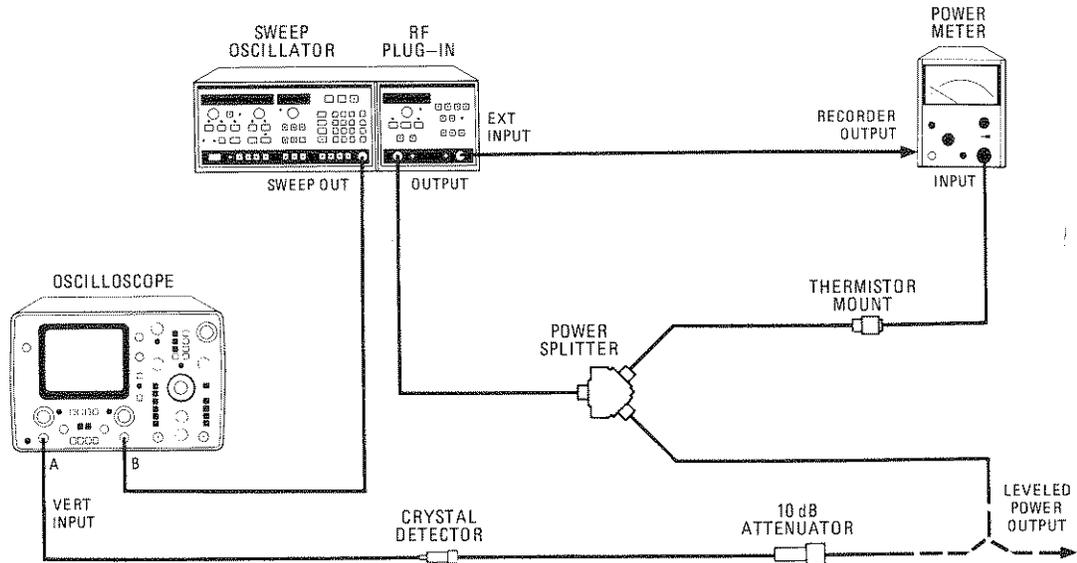
Between 10 MHz and 50 MHz RF feedthrough as high as 3 dB may be observed on the envelope of the video output. During external leveling at 10 to 50 MHz, the RF feedthrough may be damped out by insertion of the circuit shown below in the test setup. The circuit may be inserted in the line to the EXT INPUT of the RF Plug-in.



2. Switch on 8350A LINE switch. Press INSTR PRESET key. The START and STOP indicators should be on.
3. Set controls as follows:  
 83525A:  
 ALC MODE ..... EXT
4. Adjust EXT/MTR ALC CAL for a power meter reading equal to the front panel output power.
5. To use leveled RF power output for testing external equipment, make connection at point marked "Leveled Power Output".

Figure 3-7. External Crystal Detector Leveling (2 of 2)

### EXTERNAL POWER METER LEVELING



#### EQUIPMENT:

Sweep Oscillator .....	HP 8350A
RF Plug-in.....	HP 83525A
Power Meter.....	HP 432A
Thermistor Mount.....	HP 8478A
Oscilloscope.....	HP 1740A
Crystal Detector.....	HP 423B
10 dB Attenuator.....	HP 8491A, Option 010
Power Splitter.....	HP 11667A

#### NOTE

For power meter leveling, sweep rates should be slower than 50 sec/sweep to ensure proper leveling due to the slow response of the thermistor mount. The HP 435 and 436 power meters will not power meter level this plug-in. Only an HP 432 may be used.

#### PROCEDURE:

1. Connect equipment as shown in test setup.

Figure 3-8. Power Meter Leveled (1 of 2)

2. Set LINE switch to turn on sweep oscillator. The START and STOP indicators should light, indicating the START/STOP mode is selected.
3. Set controls as follows:
  - 8350A: Press INSTR PRESET
  - SWEEP TIME ..... 50 sec
  - 83525A: Set power to maximum specified.
  - ALC MODE ..... MTR
4. Select +10 dBm range on power meter.
5. Adjust 83525A EXT/MTR ALC CAL for a +7 dBm reading on the 432A power meter. Press 8350A SWEEP TRIGGER SINGLE key twice to set single sweep mode and start a sweep.
6. To use level RF power output for testing external equipment, make connection at point marked "Leveled Power Output".

Figure 3-8. Power Meter Leveled (2 of 2)

**3-37. Phase Lock Operation**

3-38. The 83525A RF plug-in RF output (CW) signal may be phase-locked using an external phase-lock signal applied to the 8350A sweep oscillator FM INPUT connector (rear panel). The phase-lock function provides a means of obtaining a very stable CW frequency by transferring the frequency stability of the reference oscillator to the source. If the CW frequency starts to drift, the phase difference between the CW frequency and the reference frequency (reference oscillator) is detected, producing a dc voltage. The dc voltage is a correction signal which restores the CW frequency to its previous point. Stability of this CW frequency is determined by the stability of the reference oscillator. The CW filter should be turned off in phase lock operation.

**3-39. OPERATOR'S MAINTENANCE**

**3-40. Plug-in Error Codes**

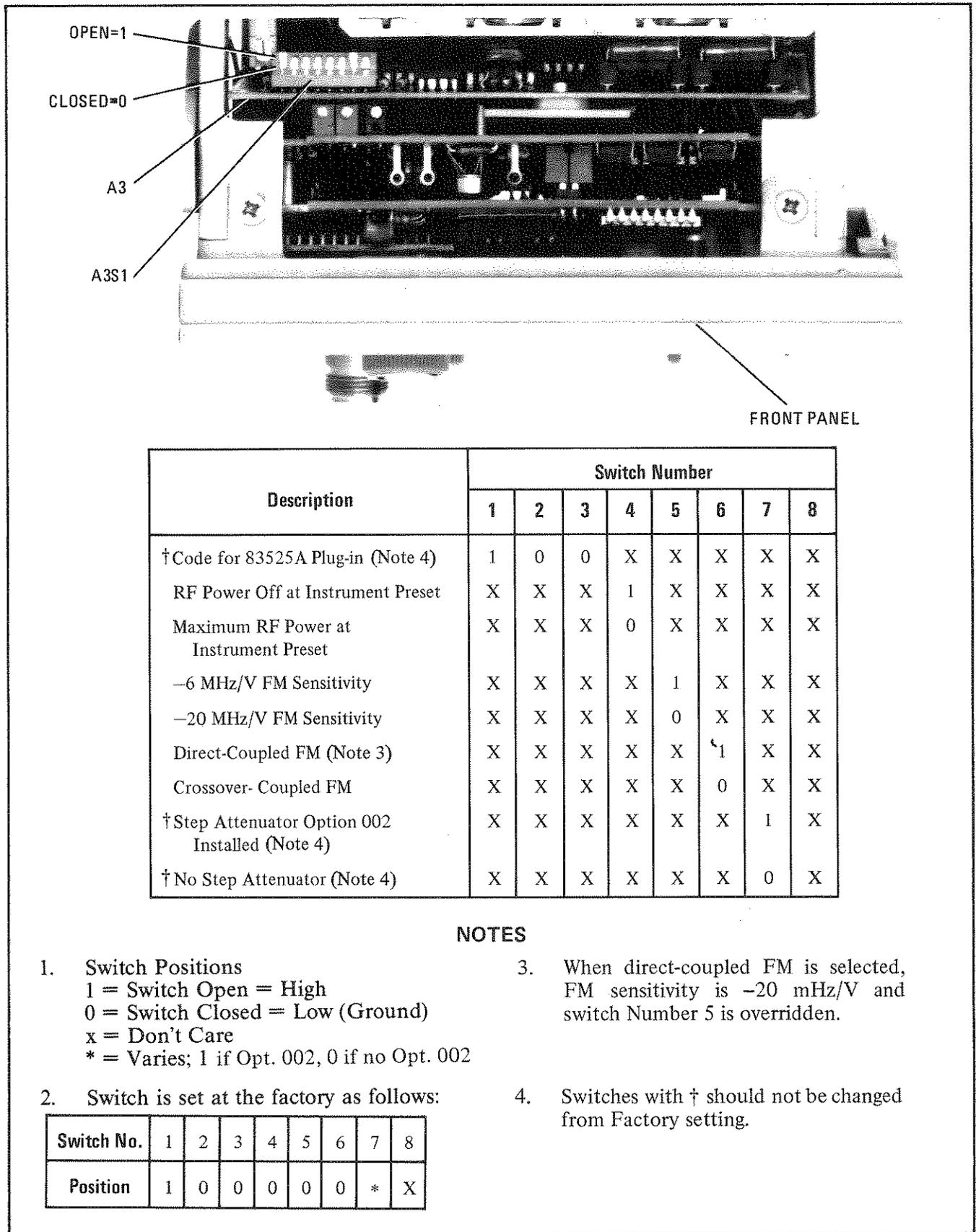
3-41. The sweep oscillation FREQUENCY display will display plug-in error codes (50 to 99) or sweep oscillator error codes. Information on plug-in error codes may be found in section VIII of this manual.

**3-42. Fuses**

3-43. Power circuits for the Model 83525A RF Plug-in are fused in the 8350A sweep oscillator. See 8350A Sweep Oscillator Operating and Service Manual for fuse replacement.

**3-44. Blue Service Tags**

3-45. If the 83525A RF Plug-in requires service the instrument may be sent as per Section II to your local HP service organization. Before sending the instrument back, fill out and attach one of the blue service tags. Record any error codes noted on the failure symptoms/special control settings section of the tag.



Description	Switch Number							
	1	2	3	4	5	6	7	8
† Code for 83525A Plug-in (Note 4)	1	0	0	X	X	X	X	X
RF Power Off at Instrument Preset	X	X	X	1	X	X	X	X
Maximum RF Power at Instrument Preset	X	X	X	0	X	X	X	X
-6 MHz/V FM Sensitivity	X	X	X	X	1	X	X	X
-20 MHz/V FM Sensitivity	X	X	X	X	0	X	X	X
Direct-Coupled FM (Note 3)	X	X	X	X	X	1	X	X
Crossover-Coupled FM	X	X	X	X	X	0	X	X
† Step Attenuator Option 002 Installed (Note 4)	X	X	X	X	X	X	1	X
† No Step Attenuator (Note 4)	X	X	X	X	X	X	0	X

**NOTES**

- Switch Positions  
 1 = Switch Open = High  
 0 = Switch Closed = Low (Ground)  
 x = Don't Care  
 \* = Varies; 1 if Opt. 002, 0 if no Opt. 002
- Switch is set at the factory as follows:
- When direct-coupled FM is selected, FM sensitivity is -20 mHz/V and switch Number 5 is overridden.
- Switches with † should not be changed from Factory setting.

Switch No.	1	2	3	4	5	6	7	8
Position	1	0	0	0	0	0	*	X

Figure 3-9. Configuration Switch



## SECTION IV

### PERFORMANCE TESTS

#### 4-1. INTRODUCTION

4-2. The 83500-series RF plug-ins must be used in conjunction with the 8350A Sweep Oscillator. In order to maintain a high degree of consistency, procedures for testing the electrical performance of the RF plug-ins are found in Section IV of the 8350A Operating and Service Manual. However, information specific to the performance testing of the HP 83525A can be found on the following pages (refer to paragraph 4-6).

4-3. Performance tests unique to this plug-in are also found in this section. None of the tests performed in this section expose the operator to hazardous voltage, nor do they require that any protective covers be removed.

#### 4-4. EQUIPMENT REQUIRED

4-5. Equipment required for testing or adjusting the 83525A is listed in Section I, Table 1-4. Any equipment which satisfies the critical specifications listed in Table 1-4 may be substituted for the recommended model.

#### 4-6. TEST RECORD

4-7. Table 4-2 provides a tabulated index of the performance tests, their acceptable limits, and a column for recording actual measurements.

4-8. The test procedures in Section IV of the 8350A Operating and Service Manual frequently refer the operator to the Test Record Card in this

section. Measurement conditions unique to this plug-in are tabulated under the columns entitled "Step" and "TEST Conditions". The number in the Step column refers to the procedure step in the 8350A manual; the information in the Conditions column corresponds to the instructions given within that step. For example, in the Frequency Accuracy Test, 8350A Operating and Service Manual, step 6 instructs the operator to set CW frequencies at "three points in each band as shown on the test card". The corresponding Step 6 on the test card provides six CW frequencies specifically for the 83525A.

#### 4-9. RELATED ADJUSTMENTS

4-10. If a test offers marginal results, go to Section V and perform the associated adjustment. Table 4-1 correlates adjustments and performance tests.

#### 4-11. CALIBRATION CYCLE

4-12. The performance tests listed in Table 4-2 should be performed in intervals of one year or less.

#### 4-13. OPERATION VERIFICATION

4-14. Operation Verification is a subset of the performance tests, providing reasonable assurance that the 8350A Sweep Oscillator and RF plug-in are operating properly. Paragraph 4-5 in the 8350A Operating and Service Manual specifies these tests and includes an HP-IB Operation Verification program for use with a 9825A/B Desktop Computer.

Table 4-1. Related Adjustments

Performance Test (In 8350A O & S Manual)	83525A Adjustment	8350A Adjustment
<b>4-13. Frequency Range and Accuracy</b>		
CW Accuracy	5-17	5-19
Swept Frequency Accuracy	5-15 thru 5-19	
Marker Accuracy	5-15 thru 5-19	5-20
<b>4-14. Output Amplitude</b>		
Power Meter Leveling	5-26	
Power Variations	5-20 thru 5-23	
Power Level Accuracy	5-20	
	5-23	
Power Sweep	5-25	
Slope Compensation	5-22	
<b>4-15. Frequency Stability</b>		5-11
<b>4-16. Residual FM</b>		5-11
<b>4-17. Harmonics</b>	5-21	
<b>4-19. Residual AM</b>		5-11
<b>4-21. FM Response</b>	5-28	
<b>4-16* Internal Crystal Markers</b>	5-29	
*Refers to paragraph number 4-16 in this 83525A manual.		

**4-15. PERFORMANCE TESTS****NOTE**

Allow one hour warm up of instrument before attempting the following tests.

**4-16. Internal Crystal Markers****SPECIFICATION:**

Conditions: RF power level = +3 to +13 dBm;  $\leq 10$  markers/sweep. Harmonic markers of 10 and 50 MHz are available below 2 GHz; 1 MHz harmonic markers are available below 1 GHz. Markers are available as intensity spots or as amplitude dips on the RF output.

**DESCRIPTION:**

The RF output is detected and displayed on a CRT. Sweep widths are selected to accommodate 10 harmonic markers generated by the internal 50 MHz crystal. Both amplitude and intensity markers are verified. The procedure is repeated for 1 and 10 MHz harmonic markers.

## EQUIPMENT:

Sweep Oscillator .....	HP 8350A
Oscilloscope .....	HP 1740A
Crystal Detector .....	HP 423B
10 dB Attenuator .....	HP 8491A OPT: 010

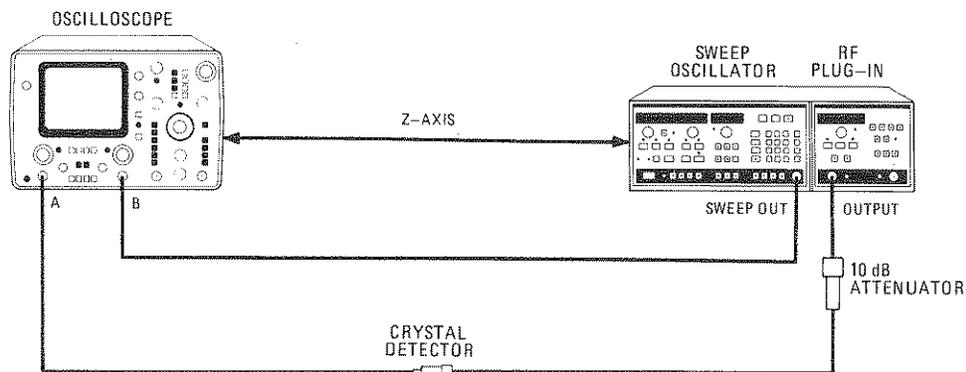


Figure 4-1. Crystal Marker Test Setup

## PROCEDURE:

1. Connect equipment as shown in Figure 4-1.
2. Set oscilloscope for A vs. B measurement mode. Set Channel B gain at 1V/DIV. Set Channel A gain as necessary.
3. On the 8350A, press INSTR PRESET. Set 83525A power output between +3 and +13 dBm. Adjust oscilloscope POSITION control to center trace on screen.

**50 MHz MARKERS**

4. Press 8350A CF and at DATA ENTRY, enter 260 MHz. Press  $\Delta$ F and at DATA ENTRY enter 500 MHz. On the 83525A select AMPTD MKR and 50 MHz markers.
5. Verify the presence of 10 equally spaced and stable markers. Disengage AMPTD MKR and engage INTENS MKR. If necessary, decrease CRT beam intensity to verify that markers are operational as intensity spots.
6. Press 8350A CF. Press 83525A AMPTD MKR. Monitor markers while slowly rotating the left RPG until CF equals 1750 MHz. Verify that amplitude markers are equally spaced and stable across the frequency band.

**10 MHz MARKERS**

7. On the 8350A, press **CF** and at **DATA ENTRY** enter 60 MHz. Press **ΔF**, and at **DATA ENTRY** enter 100 MHz. On the 83525A, press 10 MHz markers and **AMPTD MKR**.
8. Verify the presence of 10 equally spaced and stable markers.
9. On the 8350A, press **CF**. Monitor markers while slowly rotating the left **RPG** until **CF** equals 1950 MHz. Verify that amplitude markers are equally spaced and stable across the frequency band.

**1 MHz MARKERS**

10. Press 8350A **CF** and at **DATA ENTRY**, enter 15 MHz. Press **ΔF** and at **DATA ENTRY** enter 10 MHz. On the 83525A, press 1 MHz markers.
11. Verify the presence of 10 equally spaced and stable markers.
12. On the 8350A, press **CF**. Monitor markers while slowly rotating left **RPG** until **CF** equals 995 MHz. Verify that amplitude markers are equally spaced and stable across the frequency band.

Table 4-2. 83525A Performance Test Record Card (1 of 4)

<b>83525A Performance Test Record Card</b>					
<b>NOTE</b>					
Unless otherwise indicated, procedures for the following tests are found in the 8350A Operating and Service Manual.					
Specifications Tested: Limits	Step	Test Conditions	Lower Limit	Measured Value	Upper Limit
<b>4-13. Frequency Range and Accuracy</b>					
<b>NOTE</b>					
Perform FREQ CAL adjustment in Section III before proceeding with test.					
CW Mode 0.01 – 2 GHz: ±5 MHz 2 – 8.4 GHz: ±15 MHz  Swept Frequency Accuracy 0.01 – 2 GHz: ±15 MHz 2 – 8.4 GHz: ±20 MHz 0.01 – 8.4 GHz: ±25 MHz  Marker Accuracy 0.01 – 2 GHz: ±15 MHz ± 0.5% of sweep width 2 – 8.4 GHz: ±20 MHz ±0.5% of sweep width 0.01 – 8.4 GHz: ±25 MHz ±0.5% of sweep width					
	4	Start frequency = 10 MHz			10 MHz
	5	Stop frequency = 8.4 GHz	8.4 GHz		
	6	CW frequency = 1.00 GHz	0.995 GHz		1.005 GHz
		CW frequency = 10 MHz	5 MHz		15 MHz
		CW frequency = 2.00 GHz	1.995 GHz		2.005 GHz
		CW frequency = 6.0 GHz	5.985 GHz		6.015 GHz
		CW frequency = 2.1 GHz	2.085 GHz		2.115 GHz
		CW frequency = 8.4 GHz	8.385 GHz		8.415 GHz
	8	Start frequency = 10 MHz	0 MHz		35 MHz
	8A	Start frequency = 1 GHz	985 MHz		1.015 GHz
	9	Stop frequency = 8.400 GHz	8.375 GHz		8.425 GHz
	10	Start frequency = 10 MHz	0 MHz		25 MHz
10A	Start frequency = 1 GHz	0.985 GHz		1.015 GHz	
	Stop frequency = 2.00 GHz	1.985 GHz		2.015 GHz	
	Start frequency = 2 GHz	1.980 GHz		2.020 GHz	
	Stop frequency = 8.4 GHz	8.380 GHz		8.420 GHz	
12	Sweep width: 0.01 – 8.4 GHz				
	M1 = 1.00 GHz	0.933 GHz		1.067 GHz	
	M2 = 500 MHz*	433 MHz		567 MHz	
	M3 = 100 MHz*	33 MHz		167 MHz	
	M4 = 4.7 GHz	4.633 GHz		4.767 GHz	
	M5 = 8.2 GHz	8.133 GHz		8.267 GHz	
	* Not used for alternate test method.				
13	Sweep width: 0.01 – 2 GHz				
	M1 = 1.00 GHz	0.975 GHz		1.025 GHz	
	M2 = 1.800 GHz	1.775 GHz		1.825 GHz	
	Sweep width: 2–8.4 GHz				
	M1 = 2.5 GHz	2.448 GHz		2.552 GHz	
	M2 = 8.0 GHz	7.948 GHz		8.052 GHz	

Table 4-2: 83525A Performance Test Record Card (2 of 4)

Specifications Tested: Limits	Step	Test Conditions	Lower Limit	Measured Value	Upper Limit
<b>4-14. Output Amplitude</b>					
Pwr Mtr Leveled: $\pm 0.1$ dB	9			_____	$\leq 0.2$ dB
Pwr Lvl Accuracy: $\pm 1.5$ dBm	12	Power = +13.0 dBm	+11.5 dBm	_____	+14.5 dBm
Opt. 002: $\pm 1.7$ dBm	13	+12.0	+10.5	_____	+13.5
Calibrated Range: $\geq 15$ dB		+11.0	+ 9.5	_____	+12.5
		+10.0	+ 8.5	_____	+11.5
		+ 9.0	+ 7.5	_____	+10.5
		+ 8.0	+ 6.5	_____	+ 9.5
		+ 7.0	+ 5.5	_____	+ 8.5
		+ 6.0	+ 4.5	_____	+ 7.5
		+ 5.0	+ 3.5	_____	+ 6.5
		+ 4.0	+ 2.5	_____	+ 5.5
		+ 3.0	+ 1.5	_____	+ 4.5
		+ 2.0	+ 0.5	_____	+ 3.5
		+ 1.0	- 0.5	_____	+ 2.5
		0.0	- 1.5	_____	+ 1.5
		- 1.0	- 2.5	_____	+ 0.5
		- 2.0	- 3.5	_____	- 0.5
Max Leveled Pwr: +13 dBm	15			_____	+15 dBm
Internal Leveled: $\pm 1$ dB					
Pwr Sweep: $\geq 15$ dB/SWP	17	Power level = -2 dBm	$\geq 15$ dB/SWP	_____	
<b>4-15. Frequency Stability</b>					
+5 to -10% V Line Change:	2	CW frequency = 1.0 GHz			
0.01 - 8.4 GHz: $\leq \pm 20$ kHz	3	Low line voltage		_____	$\leq \pm 20$ kHz
	4	High line voltage		_____	$\leq \pm 20$ kHz
Time (10 minutes):	5	Power = +13 dBm			
0.01 - 2 GHz: $\leq \pm 100$ kHz		CW frequency = 1.00 GHz			
2 - 8.4 GHz: $\leq \pm 200$ kHz	7			_____	$\leq \pm 100$ kHz
	8	CW frequency = 4.0 GHz		_____	$\leq \pm 200$ kHz
10 dB Power Change:	9	Power = 13 dBm			
0.01 - 2 GHz: $\leq \pm 100$ kHz		CW frequency = 1.0 GHz			
2 - 8.4 GHz: $\leq \pm 1$ MHz	10	Reduce power to +3 dBm		_____	$\leq \pm 100$ kHz
	11	Power = +13 dBm			
		CW frequency = 4.0 GHz			
		Reduce power to +3 dBm		_____	$\leq \pm 1$ MHz
3 : 1 Load SWR:	13	Power = +13 dBm			
0.01 - 2 GHz: $\leq \pm 10$ kHz		CW frequency = 1.3 GHz			
2 - 8.4 GHz: $\leq \pm 250$ kHz	14			_____	$\leq 20$ kHz
	15	CW frequency = 8.4 GHz		_____	$\leq 500$ kHz
<b>4-16. Residual FM</b>					
0.01 - 2 GHz: $< 5$ kHz	2	CW frequency = 1 GHz			
2 - 8.4 GHz: $< 9$ kHz	5			_____	$< 5$ kHz
	6	CW frequency = 6.0 GHz		_____	$< 9$ kHz

Table 4-2. 83525A Performance Test Record Card (3 of 4)

Specifications Tested: Limits	Step	Test Conditions	Lower Limit	Measured Value	Upper Limit
<b>4-17. Spurious Signals</b> Harmonic: 0.01 – 8.4 GHz: >–20 dB Non-harmonic: 0.01 – 2 GHz: >–30 dB 2 – 8.4 GHz: >–60 dB	3	Measure relative to carrier	>–20 dB	_____	
			>–30 dB	_____	
			>–60 dB	_____	
<b>4-18. Output VSWR</b> 0.01 – 2 GHz: <2.0 2 – 8.4 GHz: <1.6	6	Range: 0.01 – 2 GHz		_____	<2.0
	11	Range: 2 – 8.4 GHz		_____	<1.6
<b>4-19. Residual AM</b> 0.01 – 8.4 GHz: >50 dB	3	Power = +13 dBm CW frequency = 1.0 GHz		_____	
	5	Measure relative to carrier	>–50 dB	_____	
	6	CW frequency = 4.0 GHz	>–50 dB	_____	
<b>4-20. External FM</b> Direct coupled: DC – 100 Hz: ≥±12 MHz Crossover Coupled: DC – 100 Hz: ≥±75 MHz Direct/Crossover coupling: 100 Hz – 1 MHz: ≥±7 MHz 1 – 2 MHz: ≥±5 MHz 2 – 10 MHz: ≥±1 MHz	1	A3S1: Close switch 5, open 6.		_____	
	3		≥±12 MHz	_____	
	4	A3S1: Close switch 6.		_____	
			≥±75 MHz	_____	
	9		≥±7 MHz	_____	
	10		≥±5 MHz	_____	
	11	A3S1: Change switch 6 from previous setting.	≥±1 MHz	_____	
		≥±7 MHz	_____		
		≥±5 MHz	_____		
		≥±1 MHz	_____		
<b>4-21. FM Frequency Response</b> DC – 2 MHz: ≤±3 dB	5	Test limits measured by display divisions.	2.9 div.	_____	5.6 div.
<b>4-22. AM On/Off Ratio</b> <b>Square-Wave Symmetry</b> On/Off Ratio: >30 dB below specified max leveled power Symmetry of ON/OFF time: 40/60	1	CW frequency = 1 GHz Power = +13 dBm		_____	
	3		>30 dB	_____	
	4		40%	_____	60%
	5	CW frequency = 4 GHz	>30 dB	_____	
			40%	_____	60%

Table 4-2. 83525A Performance Test Record Card (4 of 4)

Specifications Tested: Limits	Step	Test Conditions	Lower Limit	Measured Value	Upper Limit																								
<b>4-23. Step Attenuator Accuracy</b> <table border="0"> <tr> <td><b>Attn. Step</b></td> <td><b>Accuracy</b></td> </tr> <tr> <td>10 dB</td> <td>≤±0.5 dB</td> </tr> <tr> <td>20 dB</td> <td>≤±0.7 dB</td> </tr> <tr> <td>30 dB</td> <td>≤±0.9 dB</td> </tr> <tr> <td>40 dB</td> <td>≤±1.2 dB</td> </tr> <tr> <td>50 dB</td> <td>≤±1.5 dB</td> </tr> <tr> <td>60 dB</td> <td>≤±1.8 dB</td> </tr> <tr> <td>70 dB</td> <td>≤±2.1 dB</td> </tr> </table>	<b>Attn. Step</b>	<b>Accuracy</b>	10 dB	≤±0.5 dB	20 dB	≤±0.7 dB	30 dB	≤±0.9 dB	40 dB	≤±1.2 dB	50 dB	≤±1.5 dB	60 dB	≤±1.8 dB	70 dB	≤±2.1 dB	1	CW frequency = 4.0 GHz											
	<b>Attn. Step</b>	<b>Accuracy</b>																											
	10 dB	≤±0.5 dB																											
	20 dB	≤±0.7 dB																											
	30 dB	≤±0.9 dB																											
	40 dB	≤±1.2 dB																											
	50 dB	≤±1.5 dB																											
	60 dB	≤±1.8 dB																											
	70 dB	≤±2.1 dB																											
		4	Power = +7.0 dBm Ref. Atten. = 70 dB																										
		<table border="0"> <tr> <td><b>Ref Attn Step</b></td> <td><b>Attenuator Error</b></td> <td><b>Deviation From 0 ref</b></td> </tr> <tr> <td>70-60</td> <td>_____</td> <td>+ _____</td> </tr> <tr> <td>70-50</td> <td>_____</td> <td>+ _____</td> </tr> <tr> <td>70-40</td> <td>_____</td> <td>+ _____</td> </tr> <tr> <td>70-30</td> <td>_____</td> <td>+ _____</td> </tr> <tr> <td>70-20</td> <td>_____</td> <td>+ _____</td> </tr> <tr> <td>70-10</td> <td>_____</td> <td>+ _____</td> </tr> <tr> <td>70-0</td> <td>_____</td> <td>+ _____</td> </tr> </table>	<b>Ref Attn Step</b>	<b>Attenuator Error</b>	<b>Deviation From 0 ref</b>	70-60	_____	+ _____	70-50	_____	+ _____	70-40	_____	+ _____	70-30	_____	+ _____	70-20	_____	+ _____	70-10	_____	+ _____	70-0	_____	+ _____			
<b>Ref Attn Step</b>	<b>Attenuator Error</b>	<b>Deviation From 0 ref</b>																											
70-60	_____	+ _____																											
70-50	_____	+ _____																											
70-40	_____	+ _____																											
70-30	_____	+ _____																											
70-20	_____	+ _____																											
70-10	_____	+ _____																											
70-0	_____	+ _____																											
				_____	≤± 0.5 dB																								
				_____	≤± 0.7 dB																								
				_____	≤± 0.9 dB																								
				_____	≤± 1.2 dB																								
				_____	≤± 1.5 dB																								
				_____	≤± 1.8 dB																								
				_____	≤± 2.1 dB																								
<p><b>NOTE</b></p> <p>The procedure for the following test is found on the pages immediately preceding this test card.</p>																													
<b>4-16. Internal Crystal Markers</b> (+3 to +13 dBm; ≤10 mkrs/SWP) 50 MHz: 10 Mkrs/SWP, <2 GHz 10 MHz: 10 Mkrs/SWP, <2 GHz 1 MHz: 10 Mkrs/SWP, <1 GHz	5			10 Mkrs/SWP	_____																								
	6			10 Mkrs/SWP	_____																								
	8			10 Mkrs/SWP	_____																								
	9			10 Mkrs/SWP	_____																								
	11			10 Mkrs/SWP	_____																								
	12			10 Mkrs/SWP	_____																								

## SECTION V ADJUSTMENTS

### 5-1. INTRODUCTION

5-2. This section provides adjustment procedures for the Model 83525A RF Plug-in. These procedures should not be performed as routine maintenance but should be used (1) after replacement of a part or component, or (2) when performance tests show that the specifications of Table 1-1 cannot be met. Table 5-1 lists all of the adjustments by reference designation, adjustment name, adjustment paragraph, and description. Each procedure includes a test setup illustration and one or more adjustment location illustrations.

#### NOTE

Allow the 83525A RF Plug-in and the 8350A Sweep Oscillator to warm up for 30 minutes prior to making any adjustments.

### 5-3. SAFETY CONSIDERATIONS

5-4. Although this instrument has been designed in accordance with international safety standards, this manual contains information, cautions, and warnings which must be followed to ensure safe operation and to retain the instrument in safe condition. Service and adjustments should be performed only by a skilled person who is aware of the hazard involved.

#### WARNING

Adjustments in this section are performed with power supplied to the instrument while protective covers are removed. There are voltages at points in the instrument which can, if contacted, cause personal injury. Be extremely careful. Adjustments should be performed only by a skilled person who is aware of the hazard involved.

Capacitors inside the instrument may still be charged, even if the instrument has been disconnected from its source of supply.

### NOTE

Use a non-metallic adjustment tool whenever possible.

### 5-5. EQUIPMENT REQUIRED

5-6. Table 1-4 lists the equipment required for the adjustment procedures. If the test equipment recommended is not available, other equipment may be used if its performance meets the critical specifications listed in Table 1-4. The specified equipment required for each adjustment is referenced in each procedure.

### 5-7. FACTORY-SELECTED COMPONENTS

5-8. Table 5-2 contains a list of factory-selected components that include the reference designation, the related adjustment procedure, the allowable range of values, and the basis of selection. Nominal values are given for the factory-selected components, designated by an asterisk (\*), on the schematic diagram and in the replacement parts list. HP Part Numbers for selected values are given in Table 5-3.

### 5-9. RELATED ADJUSTMENTS

5-10. Interactive adjustments are noted in the adjustment procedures. Table 5-4 indicates by paragraph numbers the adjustments that must be performed if an assembly has been repaired or replaced or if an adjustment has been made to an assembly. Table 5-5 lists the adjustment procedures included in this section.

### 5-11. ADJUSTMENT PROCEDURE

5-12. Adjustment procedures are given in the proper sequence to allow for interrelated adjustments. However, adjustments having to do with the leveling loop (paragraph 5-20 through 5-24) are interactive and should be performed as a group.

Table 5-1. Adjustable Components (1 of 3)

Reference Designation	Adjustment Name	Adjustment Paragraph	Description
A2R1	GAIN V/GHz	5-20	Sets gain of frequency reference to 1 V/GHz output.
A2R4	BAND 1 OFFSET	5-20	Sets offset of frequency reference (1 V/GHz) in high band (2 to 8.4 GHz).
A2R6	BAND 0 OFFSET	5-20	Sets offset of frequency reference (1 V/GHz) in low band (0.01 to 2 GHz).
A3S1	Configuration Switch	5-13	Selects plug-in code, power-up power, FM sensitivity, FM modulation coupling, and step attenuator option code.
A4R1	SLP	5-21	Slope adjustment for frequency tracking voltage.
A4R2	0 HI	5-24	Sets power calibration at the high end of the power range (+13 dBm) in the low frequency band.
A4R3	1 HI	5-24	Best trace continuity at the band switch point.
A4R4	BIAS	5-21	Sets bias on the internal detector band 0 line for 0 Volts with RF power OFF.
A4R5	1 LO	5-21	Sets band 1 low power calibration.
A4R6	0 LO	5-21	Sets band 0 low power calibration.
A4R7	0 MD	5-21	Sets band 0 midpower calibration.
A4R8	1 MD	5-21	Sets band 1 midpower calibration.
A4R9	PM	5-27	Sets power meter leveling calibration.
A4R11	GAIN	5-25	Sets the gain of the main ALC amplifier.
A4R47	OFS 1	5-21	Adjusts for zero offset through U7-Q6 log amplifier circuit.
A4R56	OFS 2	5-21	Adjusts for zero offset through U5 log amplifier circuit.
A4R59	OFS 3	5-21, 5-24	Adjusts for zero offset through U8-Q1 Sample and Hold circuit.
A4R67	OFS 4	5-21	Adjusts for zero offset through U11 Main ALC amplifier.
A5C14	LO	5-28	Adjusts low frequency for best frequency response flatness of FM coil.
A5R19	FM	5-28	Sets DC offset of U10 video amplifier.
A5R34	BP 1	5-23	Breakpoint that works with SL1 (slope 1) for ALC flatness.
A5R36	BP 2	5-23	Breakpoint that works with SL2 (slope 2) for ALC flatness.

Table 5-1. Adjustable Components (2 of 3)

Reference Designation	Adjustment Name	Adjustment Paragraph	Description
A5R38	BP 3	5-23	Breakpoint that works with SL3 (slope 3) for ALC flatness.
A5R40	BP 4	5-23	Breakpoint that works with SL4 (slope 4) for ALC flatness.
A5R41	SL 1	5-23	Slope adjustment for best ALC flatness.
A5R42	SL 2	5-23	Slope adjustment for best ALC flatness.
A5R43	SL 3	5-23	Slope adjustment for best ALC flatness.
A5R44	SL 4	5-23	Slope adjustment for best ALC flatness.
A5R48	SLP	5-23	Sets overall slope of internal leveling ALC.
A5R50	PWSP	5-26	Sets range for power sweep.
A5R75	HI	5-28	Works in conjunction with C14 to set frequency response flatness of FM coil.
A6R11	G (gain)	5-15	Fine adjustment of tuning voltage from the scaling DAC.
A6R21	-10V	5-16	Sets -10 Volt reference.
A6R25	ZRO (zero)	5-15	Adjusts for gain and offset inaccuracies between +20 Volt frequency reference from U11 and summing amplifier U16.
A6R30	OFS (offset)	5-15	Fine adjustment of drive voltage from offset DAC.
A6R45	SP (switch point)	5-18	Sets the point where the frequency switches from Band 0 to Band 1 (sweep mode only).
A6S1	OFFSET	5-17	Sets low frequency end of Band 1.
A6S2	GAIN	5-17	Sets high frequency end of Band 1.
A7R5	50M	5-29	Sets 50 MHz marker pulse width.
A7R6	10M	5-29	Sets 10 MHz marker pulse width.
A7R7	1M	5-29	Sets 1 MHz marker pulse width.
A7R20	B2	5-14	Sets oscillator bias voltage at high end of band.
A7R21	S2	5-14	Sets break point of bias voltage at high end of band.
A7R26	S1	5-14	Sets break point of bias voltage at low end of band.
A7R27	B1	5-14	Sets oscillator bias voltage at low end of band.

Table 5-1. Adjustable Components (3 of 3)

Reference Designation	Adjustment Name	Adjustment Paragraph	Description
A7R47	Z (zero)	5-19	Sets offset to minimize the frequency difference between CW and $\Delta F \pm 0$ with delay compensation circuits connected.
A7R65	LO	5-19	Sets delay compensation at low frequency end of Band 1.
A7R66	HI	5-19	Sets delay compensation at high frequency end of Band 1.
A8C4	50 MHz	5-17, 5-29	Adjusts frequency of 50 MHz oscillator.
A8R29	1M	5-29	Adjusts bias of internal mixer when 1 MHz marker is selected.
A8R30	10M	5-29	Adjusts bias of internal mixer when 10 MHz marker is selected.
A8R31	50M	5-29	Adjusts bias of internal mixer when 50 MHz marker is selected.
A8R53	1 MHz	5-29	Sets gain of video amplifier U1 when the 1 MHz marker is selected.
A8R54	10 MHz	5-29	Sets gain of video amplifier U1 when the 10 MHz marker is selected.
A8R55	50 MHz	5-29	Sets gain of video amplifier U1 when the 50 MHz marker is selected.
A8R67	EXT	5-30	Sets gain of video amplifier U1 when EXTERNAL MARKER is selected.
A12A1R4	HARMONICS	5-22	Set for minimum harmonic content in RF output signal.
A13A1R2	"4" DRAIN BIAS	5-22	Set for minimum harmonic content in Band 1.
A13A1R8	"1" GATE BIAS	5-22	Set for minimum harmonic content in Band 1.
A13A1R10	"2" GATE BIAS	5-22	Set for minimum harmonic content in Band 1.
A13A1R12	"3" GATE BIAS	5-22	Set for minimum harmonic content in Band 1.

Table 5-2. Factory Selected Components

Reference Designator	Adjustment Paragraph	Allowable Range of Values	Basis of Selection
A5R31	5-28	75 to 125 Ohms	Selects scaling of current drive of YIG Oscillator FM coil near 100 kHz.
A6R1	None		Selected at factory to correct for frequency nonlinearity in YIG Oscillator A12.
A6R38	None		
A6R39	None		
A6R40	None		
A6R41	None		
A7R4	5-29	Typ = 1200 Ohms Min = 1000 Ohms	Allows maximum marker OFF pulse without overlapping the ON pulse.
A8C3	5-17, 5-29	5 to 12pf	Centers the range of 50 mHz frequency adjustment.
A8R28	5-30	Typ = 3160 Ohms Max = 5100 Ohms	Minimizes feedthrough of 27.8 kHz square wave into the external marker birdie.
A12A1R1	None	51.1 to 464 Ohms 0.5 Watt	Selected at factory for optimum bandwidth, power, and minimum harmonics.
A12A1R1	None	162 to 619 Ohms 0.5 Watt	

Table 5-3. HP Part Numbers of Standard Value Replacement Components

RESISTORS								
RANGE: 10 to 464K Ohms								
TYPE: Fixed-Film								
WATTAGE: .125 at 125°C								
TOLERANCE: ±1.0%								
								
Value (Ω)	HP Part Number	C D	Value (Ω)	HP Part Number	C D	Value (Ω)	HP Part Number	C D
10.0	0757-0346	2	464	0698-0082	7	21.5K	0757-0199	3
11.0	0757-0378	0	511	0757-0416	7	23.7K	0698-3158	4
12.1	0757-0379	1	562	0757-0417	8	26.1K	0698-3159	5
13.3	0698-3427	0	619	0757-0418	9	28.7K	0698-3449	6
14.7	0698-3428	1	681	0757-0419	0	31.6K	0698-3160	8
16.2	0757-0382	6	750	0757-0420	3	34.8K	0757-0123	3
17.8	0757-0294	9	825	0757-0421	4	38.3K	0698-3161	9
19.6	0698-3429	2	909	0757-0422	5	42.2K	0698-3450	9
21.5	0698-3430	5	1.0K	0757-0280	3	46.4K	0698-3162	0
23.7	0698-3431	6	1.1K	0757-0424	7	51.1K	0757-0458	7
26.1	0698-3432	7	1.21K	0757-0274	5	56.2K	0757-0459	8
28.7	0698-3433	8	1.33K	0757-0317	7	61.9K	0757-0460	1
31.6	0757-0180	2	1.47K	0757-1094	9	68.1K	0757-0461	2
34.8	0698-3434	9	1.62K	0757-0428	1	75.0K	0757-0462	3
38.3	0698-3435	0	1.78K	0757-0278	9	82.5K	0757-0463	4
42.2	0757-0316	6	1.96K	0698-0083	8	90.9K	0757-0464	5
46.4	0698-4037	0	2.15K	0698-0084	9	100K	0757-0465	6
51.1	0757-0394	0	2.37K	0698-3150	6	110K	0757-0466	7
56.2	0757-0395	1	2.61K	0698-0085	0	121K	0757-0467	8
61.9	0757-0276	7	2.87K	0698-3151	7	133K	0698-3451	0
68.1	0757-0397	3	3.16K	0757-0279	0	147K	0698-3452	1
75.0	0757-0398	4	3.48K	0698-3152	8	162K	0757-0470	3
82.5	0757-0399	5	3.83K	0698-3153	9	178K	0698-3243	8
90.0	0757-0400	9	4.22K	0698-3154	0	196K	0698-3453	2
100	0757-0401	0	4.64K	0698-3155	1	215K	0698-3454	3
110	0757-0402	1	5.11K	0757-0438	3	237K	0698-3266	5
121	0757-0403	2	5.62K	0757-0200	7	261K	0698-3455	4
133	0698-3437	2	6.19K	0757-0290	5	287K	0698-3456	5
147	0698-3438	3	6.81K	0757-0439	4	316K	0698-3457	6
162	0757-0405	4	7.50K	0757-0440	7	348K	0698-3458	7
178	0698-3439	4	8.25K	0757-0441	8	383K	0698-3459	8
196	0698-3440	7	9.09K	0757-0288	1	422K	0698-3460	1
215	0698-3441	8	10.0K	0757-0442	9	464K	0698-3260	9
237	0698-3442	9	11.0K	0757-0443	0			
261	0698-3132	4	12.1K	0757-0444	1			
287	0698-3443	0	13.3K	0757-0289	2			
316	0698-3444	1	14.7K	0698-3156	2			
348	0698-3445	2	16.2K	0757-0447	4			
383	0698-3446	3	17.8K	0698-3136	8			
422	0698-3447	4	19.6K	0698-3157	3			

Table 5-4. Related Adjustments

Assembly Changed or Repaired	Related Assemblies (in order of Adjustments)	Perform the Following Paragraph Number
A1/A2 Front Panel	A6, A2	5-17, 5-20
A3 Digital Interface	A3	5-13
A4 ALC	A4, A5	5-21 thru 5-25
A5 FM	A4, A5	5-21 thru 5-26, 5-28
A6 YO Driver	A6, A2, A7	5-14 thru 5-18, 5-20
A7 Marker	A6, A7, A8	5-14, 5-16, 5-19, 5-29
A8 Sampler	A7, A8	5-17, 5-29, 5-30
A11 RF Diode Switch	A4, A5, A12A1, A13A1	5-21, 5-22, 5-23, 5-24
A12 YIG Oscillator	A6, A7, A2, A12, A13, A5	5-14, 5-15, 5-16, 5-20, 5-21 thru 5-25, 5-28
A13 Modulator/Amplifier	A12, A13	5-21 thru 5-25
A14 Band 0 Amplifier	A4, A5	5-21, 5-23, 5-24, 5-25
A15 DC Return	A4, A5	5-21, 5-23, 5-24, 5-25
A16 Cavity Oscillator	A4, A5	5-21, 5-23, 5-24, 5-25
A17 Modulator/Mixer	A4, A5	5-21, 5-23, 5-24, 5-25
A18 RF Diode Switch	A4, A5, A12A1, A13A1	5-21 thru 5-25
CR1 Crystal Detector, Band 1	A4, A5, A12A1, A13A1	5-21 thru 5-25
DC1 Directional Detector, Band 0	A4, A5	5-21, 5-23, 5-24, 5-25
DC2 Directional Coupler, Band 1	A4, A5, A12A1, A13A1	5-21 thru 5-25

Table 5-5. Adjustments

Paragraph	Adjustments
5-13	Configuration Switch A3S1
5-14	Oscillator Bias on A7
5-15	-10V Reference on A6 YO Driver
5-16	YO Driver Board A6 DAC Calibration
5-17	Frequency Accuracy
5-18	Switch Point on A6
5-19	Delay Compensation
5-20	Frequency Reference 1 V/GHz
5-21	ALC Adjustment
5-22	Band 1 Harmonics
5-23	Internal Leveled Flatness
5-24	Power Calibration
5-25	ALC Gain Adjustment
5-26	Power Sweep
5-27	Power Meter Leveling Calibration
5-28	FM Driver
5-29	Marker and Sampler Adjustments
5-30	External Marker Adjustment

## ADJUSTMENTS

**5-13. CONFIGURATION SWITCH A3S1****REFERENCE:**

Performance Test: 8350A Paragraph 4-13.  
Service Sheet: A3

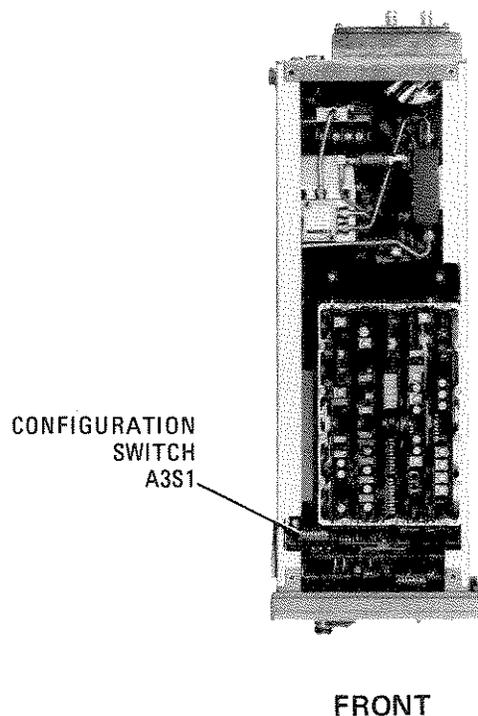
**DESCRIPTION:**

Switch A3S1 is set at the factory for a combination of operating modes. (Refer to Table 5-6.) Other operating modes are selected by setting the eight switches on A3S1.

**PROCEDURE:****NOTE**

**Adjustment procedures and performance tests all assume that A3S1 is set to the factory setting. If other procedures are to be performed, set A3S1 to the factory setting until the procedures are completed, then set A3S1 to any desired operating mode before putting the instrument back in service.**

1. Refer to Table 5-6 and determine if factory selected mode set at A3S1 is correct for your application.
2. Set configuration switch A3S1 (Figure 5-1) for the desired operating mode.



*Figure 5-1. Configuration Switch A3S1 Location*

**5-13. CONFIGURATION SWITCH A3S1 (Cont'd)**

*Table 5-6. Configuration Switch A3S1 on A3 Digital Interface Board*

Description	Switch Number							
	1	2	3	4	5	6	7	8
Plug-in Code for 83525A	1	0	0	x	x	x	x	x
RF Power Off at Power-Up	x	x	x	1	x	x	x	x
Maximum RF Power at Power-Up	x	x	x	0	x	x	x	x
-6 MHz/V FM Sensitivity	x	x	x	x	1	x	x	x
-20 MHz/V FM Sensitivity	x	x	x	x	0	x	x	x
Direct-Coupled FM Modulation	x	x	x	x	x	1	x	x
Cross-Over Coupled FM Modulation	x	x	x	x	x	0	x	x
Step Attenuator, Option 002, Installed	x	x	x	x	x	x	1	x
No Step Attenuator, Option 002, Installed	x	x	x	x	x	x	0	x

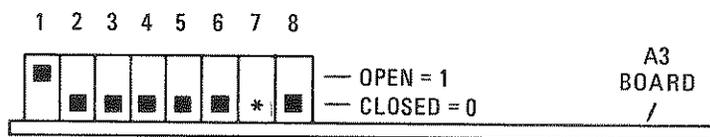
**NOTES**

- Switch Positions:  
 1 = Switch Open = High  
 0 = Switch Closed = Low (Ground)  
 x = Don't Care
- Switch A3S1 is set from the factory as follows:

Switch No.	Position
1	1
2	0
3	0
4	0
5	0
6	0
7	*
8	x

\*"1" if Opt. 002 installed; "0" if Opt. 002 not installed.

**A3S1**



■ = DEPRESSED SWITCH POSITION

ADJUSTMENTS

5-14. OSCILLATOR BIAS ON A7

REFERENCE:

Performance Test: 8350A Paragraph 4-14.  
 Service Sheet: A7

DESCRIPTION:

Oscillator bias is adjusted in accordance with the voltage requirements noted on the side of YIG Oscillator A12.

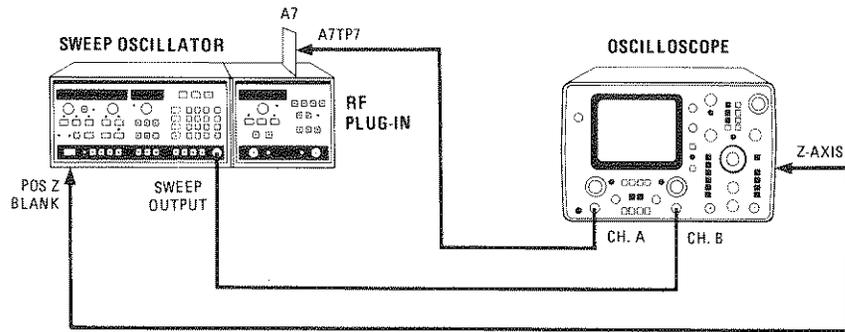


Figure 5-2. Oscillator Bias Adjustment Test Setup

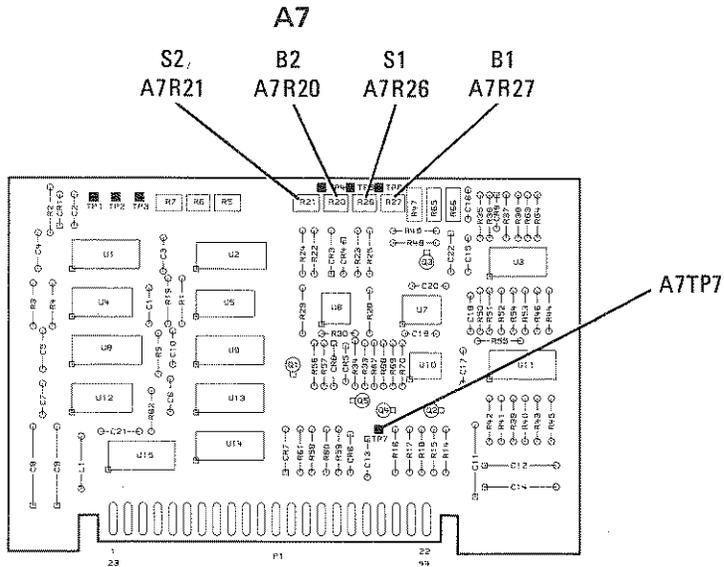


Figure 5-3. Oscillator Bias Test Point and Adjustment Location

## ADJUSTMENTS

**5-14. OSCILLATOR BIAS ON A7 (Cont'd)**

## EQUIPMENT:

Oscilloscope ..... HP 1740A

## PROCEDURE:

**NOTE**

Turn AC power OFF when removing or installing PC boards.

**NOTE**

This procedure assumes that A3S1 is set to the factory-set position (Table 5-6).

1. Connect equipment as shown in Figure 5-2 and 5-3. Place A7 Marker board on an extender board, connect oscilloscope probe to A7TP7 oscillator bias, and select A vs. B sweep mode.
2. Note the voltages and frequencies specified on the side of YIG oscillator A12. Correlation between the oscillator notations and the board adjustments are shown in Table 5-7.

Table 5-7. YIG Oscillator Break Point Notations

Notation on YIG Oscillator*	A7 Adjustment Control Name	Description
VL (Voltage Low)	S1	Voltage at low end of band.
FL (Frequency Low)	B1	Sets break point of bias voltage at low end of band. Adjust for break to occur at frequency given on oscillator.
VU (Voltage Upper)	S2	Voltage at high end of band.
FU (Frequency Upper)	B2	Sets break point of bias voltage at high end of band. Adjust for break to occur at frequency given on oscillator.

\* When voltages are not indicated on oscillator, turn the associated circuit off. For VL/FL, set B1 fully counterclockwise. For VU/FU, set B2 fully counterclockwise.

## ADJUSTMENTS

**5-14. OSCILLATOR BIAS ON A7 (Cont'd)**

- Set marker 1 to FL (frequency low) and set marker 2 to FU (frequency upper). (See Figure 5-4.) Set START frequency to 2 GHz.

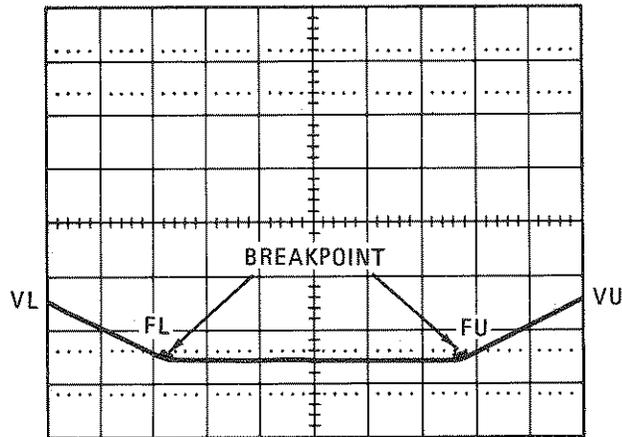


Figure 5-4. Display of Break Points

- Adjust A7R27 (B1) to position the break point at marker 1 (FL). Adjust A7R26 (S1) to position the beginning of the oscilloscope trace at VL (voltage low). Note: If voltage and frequency for VL and FL are not shown, adjust A7R27 (B1) fully counterclockwise. A7R26 (S1) should then have no effect on the display.
- Adjust A7R20 (B2) to position the break point at marker 2 (FU). Adjust A7R21 (S2) to position the end of the oscilloscope trace at VU (voltage upper). Note: If voltage and frequency for VU and FU are not shown, adjust A7R20 (B2) fully counterclockwise. A7R21 (S2) should then have no effect on the display.

**5-15. -10V REFERENCE ON A6 YO DRIVER****REFERENCE:**

Performance Test: 8350A Paragraph 4-14.  
Service Sheet: A6

**DESCRIPTION:**

The -10V REF in A6 is used as a reference voltage for the OFFSET DAC in A6, and in A4 ALC board, it is used as OFFSET REF for the power level reference circuit.

ADJUSTMENTS

5-15. -10V REFERENCE ON A6 YO DRIVER (Cont'd)

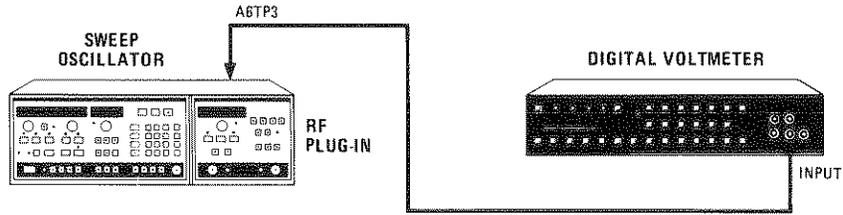


Figure 5-5. -10 Volt Reference Test Setup

EQUIPMENT:

Digital Voltmeter (DVM)..... HP 3455A

PROCEDURE:

1. Connect DVM to A6TP3 and common to A6TP5. (Figures 5-5 and 5-6).
2. Adjust "-10" control A6R21 for -10.000 Vdc  $\pm$ 0.001 Vdc.

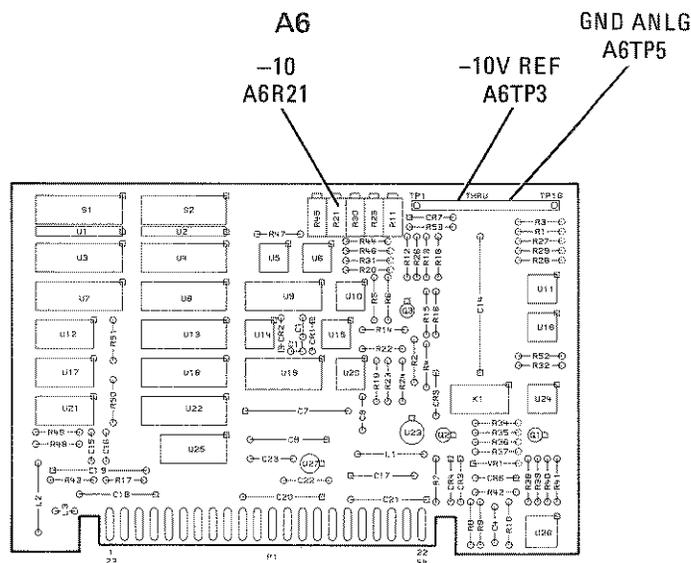


Figure 5-6. A6TP3 "10" Volt Reference Test Point

ADJUSTMENTS

5-16. YO DRIVER BOARD A6 DAC CALIBRATION

REFERENCE:

Performance Test: 8350A Paragraph 4-13.  
Service Sheet: A6

DESCRIPTION:

Adjustments are made to remove offsets and calibrate OFFSET and SLOPE DAC step sizes.

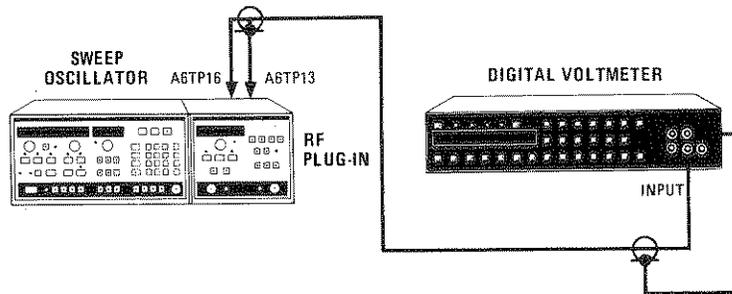


Figure 5-7. YO Driver Board Adjustment Test Setup

EQUIPMENT:

Digital Voltmeter..... HP3455A

PROCEDURE:

NOTE

YO Driver Board adjustments should be avoided if possible. Set up equipment as shown in Figure 5-10 and perform step 25 in Paragraph 5-17 to check frequency accuracy and sweep linearity across the band. If frequencies are within  $\pm 15$  MHz tolerance, do not make these YO Driver Board Adjustments.

1. Float ground on DVM and connect floating ground to A6TP13 (+20 V FREQ. REF.). Connect measurement lead of DVM to A6TP16. (See Figure 5-7 and 5-8.)
2. Press CW, then DATA ENTRY of 8.4 GHz.

NOTE

SHIFT 00 selects data entry, making key M1 function as address code entry, and key M2 as data code entry.

3. Press SHIFT, then DATA ENTRY of 00.

## ADJUSTMENTS

## 5-16. YO DRIVER BOARD A6 DAC CALIBRATION (Cont'd)

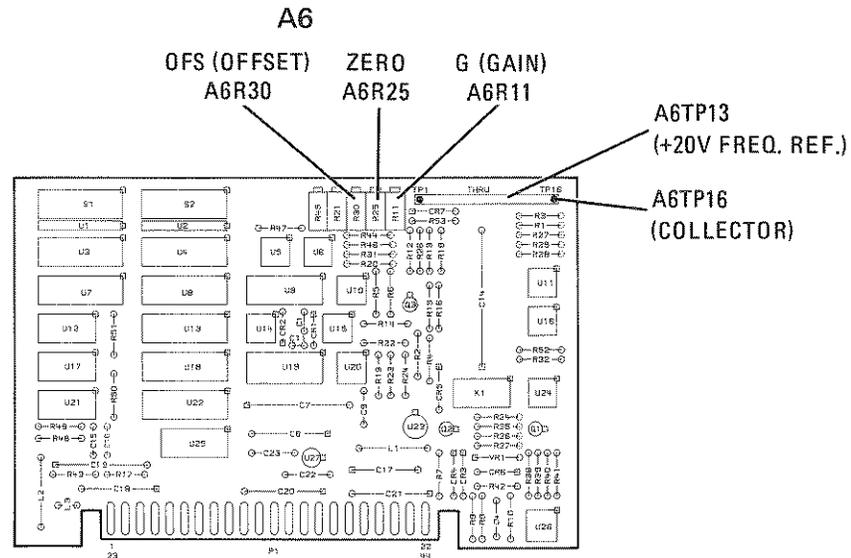


Figure 5-8. YO Driver Board Test Points

4. Make DATA ENTRY of 2C80. (Refer to HEX entry key diagram in Figure 5-9 for location of "C".)
5. Press **M2**, then DATA ENTRY of 00.
6. Press **▲** to shift address to 2C81.
7. Press **M2**, then DATA ENTRY of 40.
8. Press **▲** to shift address to 2C82.
9. Press **M2**, then DATA ENTRY of 00. Note DVM indication. If it is not approximately equal to  $-6.2500$  Vdc, adjust A6R11 "G" (gain) control for  $-6.2500$  Vdc  $\pm 1$  mVdc. Note the actual value obtained.

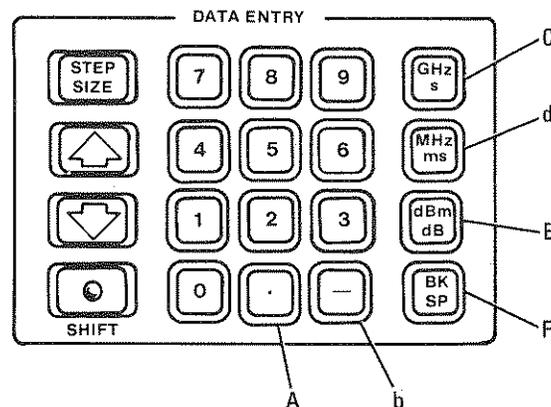


Figure 5-9. Front Panel Hexadecimal Entry Keys

## ADJUSTMENTS

**5-16. YO DRIVER BOARD A6 DAC CALIBRATION (Cont'd)**

10. Press **M2** then DATA ENTRY of FF.
11. Press **▼** to shift address to 2C81.
12. Press **M2** then DATA ENTRY of 4F.
13. Adjust A6R30 "OFS" (offset) for a difference between step 9 and step 12 of  $12.9968 \text{ Vdc} \pm 0.1 \text{ mVdc}$ .
14. Press **M2** then DATA ENTRY of 0F. Adjust A6R25 "ZERO" for  $-12.6218 \text{ Vdc} \pm 0.1 \text{ mVdc}$ .
15. Press **M2** then DATA ENTRY C0.
16. Press **▲** to shift address to 2C82.
17. Press **M2** then DATA ENTRY of 00.
18. Adjust A6R11 "G" (gain) for DVM indication of  $-19.5000 \text{ Vdc} \pm 0.1 \text{ mVdc}$ .
19. Repeat steps 4 through 18 to check for 12.9968 volt difference between steps 9 and 12 with no further adjustment.

**5-17. FREQUENCY ACCURACY**

## REFERENCE:

Performance Test: 8350A Paragraph 4-13  
 Service Sheet: A6 and A8

## DESCRIPTION:

Band 1 (2 to 8.4 GHz) is adjusted by selecting special calibration modes (90 for low end and 91 for high end). When the output frequency matches the front panel frequency display, the calibration switches on A6 are set for the appropriate correction factor. A6S1 affects the lower portion of the band and A6S2 affects the high section of the band.

After Band 1 is correctly calibrated, Band 0 (10 MHz to 2 GHz) may be calibrated with the front panel **FREQ CAL** control and 50 MHz marker.

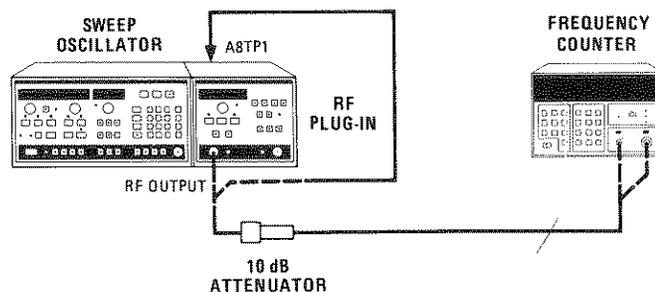


Figure 5-10. Test Setup for Frequency Accuracy Adjustments

## ADJUSTMENTS

**5-17. FREQUENCY ACCURACY (Cont'd)****EQUIPMENT:**

Frequency Counter ..... HP 5343A  
 10 dB Attenuator ..... HP 8491A Option 010

**PROCEDURE:****NOTE**

This procedure assumes that A3S1 is set to the factory-set position (Table 5-6).

**High Band Calibration**

1. Press 8350A INSTR PRESET, set STOP frequency to 2 GHz, and press 83525A AMPTD MKR. Connect Frequency Counter to A8TP1 (Figures 5-10 and 5-11) and check that output frequency is 50.000 MHz  $\pm$  250 Hz. If not, adjust A8C4 50 MHz Oscillator for correct frequency. If necessary, select A8C3 for correct adjustment range.

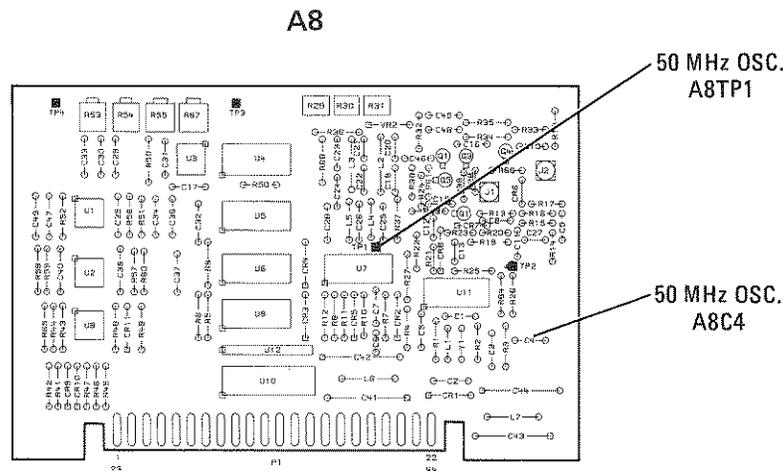


Figure 5-11. 50 MHz Oscillator Output and Adjustments

2. Connect equipment as shown in Figure 5-10 with frequency counter and 10 dB attenuator connected to RF OUTPUT.
3. Press INSTR PRESET.
4. Adjust FREQ CAL knob to the approximate center of its mechanical range.
5. Press CW key, then at DATA ENTRY enter 2.0 GHz.
6. Press SAVE then 1.
7. Press CW. At DATA ENTRY, press 8.4 GHz.

---

**ADJUSTMENTS**

---

**5-17. FREQUENCY ACCURACY (Cont'd)**

8. Press **SAVE** then 2.
9. Press **CW**, then at **DATA ENTRY** enter 50 MHz.
10. Press **SAVE** 3.
11. Press **CW**, then at **DATA ENTRY** enter 1.75 GHz.
12. Press **SAVE** 4.
13. Press **RECALL** 2 then **RECALL** 1 and 2.000 GHz should be displayed.
14. Press **SHIFT**, then 90. (This selects low end frequency calibration mode.)
15. Adjust **POWER** control for a reading of 2.000 GHz on external frequency counter.
16. Set switch A6S1 (Figure 5-12) for the value displayed in **POWER** window. Refer to the diagram in Figure 5-13.
17. Press **RECALL** 1.
18. Verify that a setting of 2.000 GHz on 8350A produces a 2.000 GHz  $\pm$  15 MHz indication on the external frequency counter.
19. Press **RECALL** 2 and 8.400 GHz should be displayed.
20. Press **SHIFT**, then 91. (This selects high end frequency calibration mode.)
21. Adjust **POWER** knob for a reading on the external frequency counter of 8.400 GHz.
22. Set A6S2 (Figure 5-12) for the reading displayed in the **POWER** window.
23. Press **RECALL** 2 keys.
24. Verify that a setting of 8.400 GHz on 8350A produces an 8.400 GHz  $\pm$  15 MHz indication on the external frequency counter.
25. Manually adjust **FREQUENCY** across high band and check for corresponding external counter readings  $\pm$ 15 MHz. Check at 2.2 GHz, 3.8 GHz, 5.8 GHz, 6.8 GHz, and 8.2 GHz.

**Low Band Calibration**

26. Press **RECALL** 3 and 50 MHz should be displayed.
  27. Press **50 MHz MARKER** then **INTENS MKR** keys.
  28. Adjust **FREQ CAL** control so the **MKR** lamp lights.
  29. Press **RECALL** 4 and 1.750 GHz should be displayed. The external frequency counter should indicate 1.750 GHz  $\pm$ 5 MHz.
-

5-17. FREQUENCY ACCURACY (Cont'd)

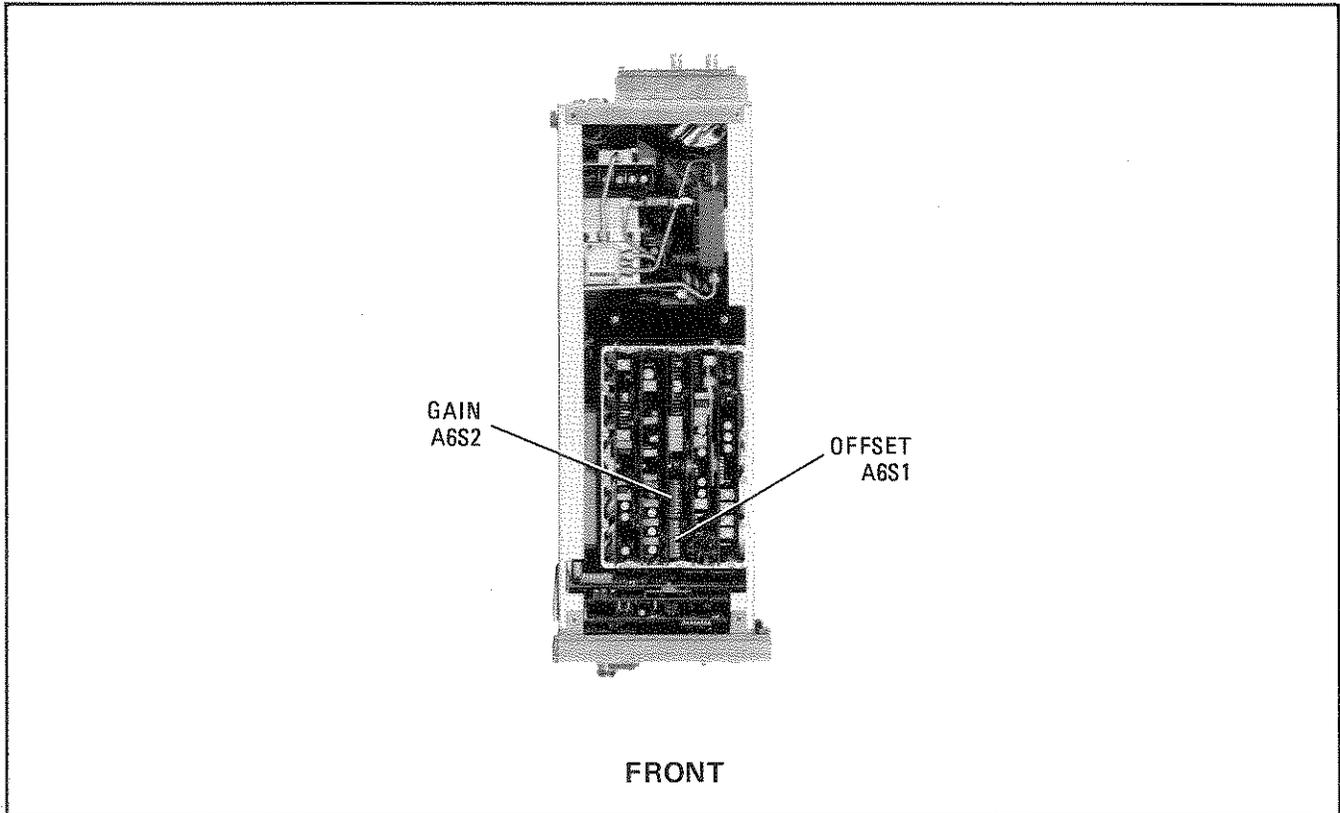


Figure 5-12. Frequency Calibration Adjustments Location

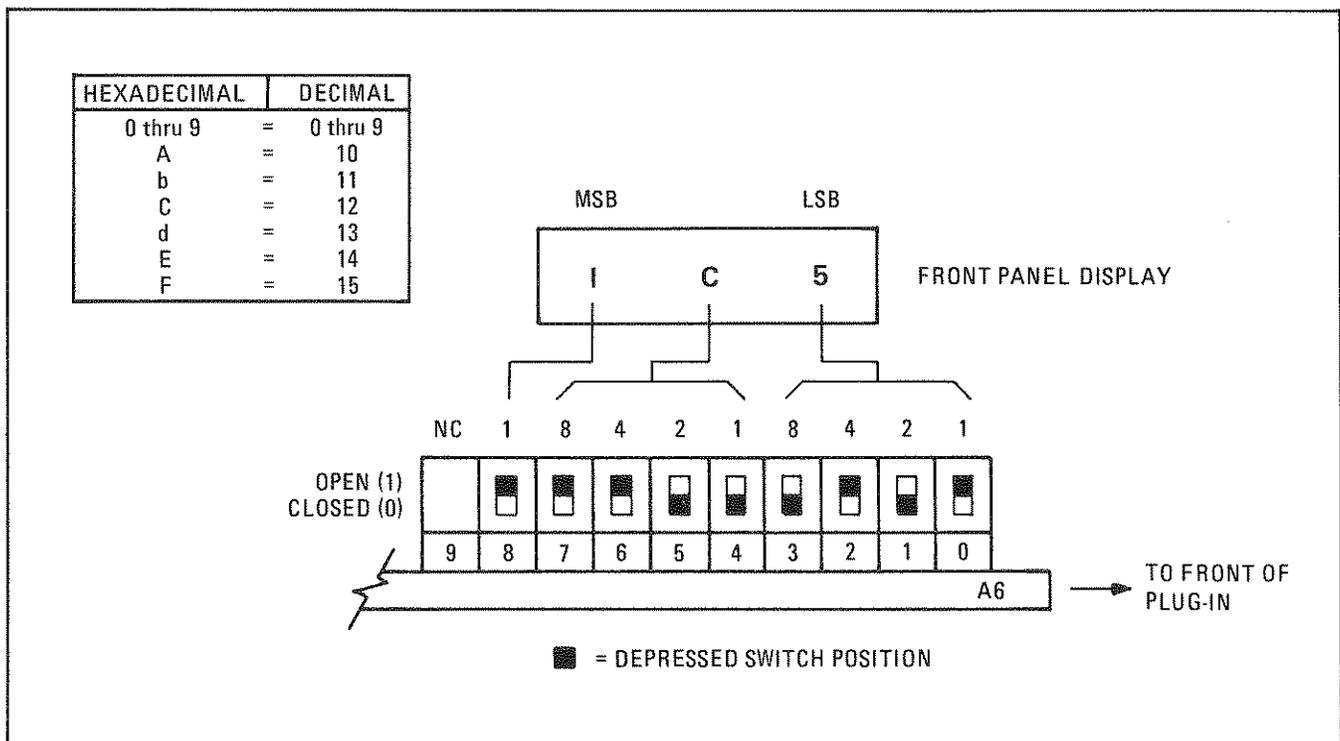


Figure 5-13. A6S1 and A6S2 Frequency Calibration Switch Configuration

ADJUSTMENTS

5-18. SWITCH POINT ON A6

REFERENCE:

Performance Test: 8350A Paragraph 4-13.  
 Service Sheet: A6

DESCRIPTION:

This circuit sets the switch point for A6U5 at 2.05 GHz for stop sweep request and interrupt logic when changing bands.

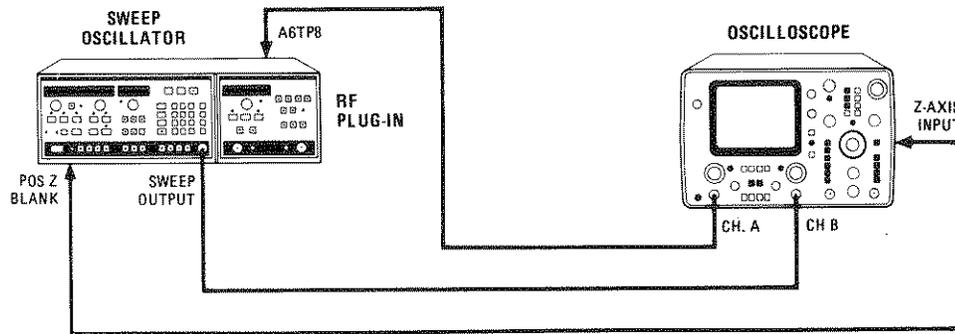


Figure 5-14. Stop Sweep Switch Point Test Setup

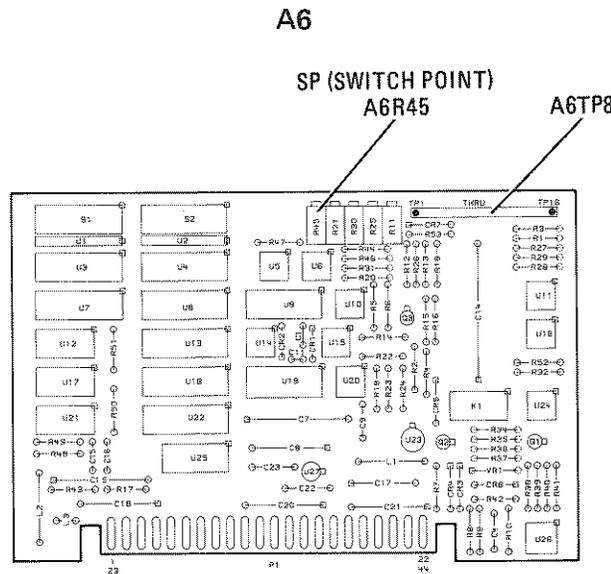


Figure 5-15. Stop Sweep Switch Point Adjustment Location

## ADJUSTMENTS

**5-18. SWITCH POINT ON A6 (Cont'd)**

## EQUIPMENT:

Oscilloscope ..... HP 1740A

## PROCEDURE:

1. Connect equipment as shown in Figures 5-14 and 5-15.
2. Press **CW**. Press **CF** and at **DATA ENTRY** enter 2.05 GHz. Press **ΔF** and at **DATA ENTRY** enter 125 MHz. Press **M1** and at **DATA ENTRY** enter 2.05 GHz.
3. On oscilloscope, select A vs. B sweep mode. The switch point should be displayed on the CRT.
4. Adjust A6R45 SP (switch point) to place the switch point at the 2.05 GHz marker on the oscilloscope screen.

**5-19. DELAY COMPENSATION**

## REFERENCE:

Performance Test: 8350A Paragraph 4-13.  
Service Sheet: A7

## DESCRIPTION:

This circuit compensates for the delay in the RF sweep output that occurs at faster sweep speeds. An external frequency meter is used to generate a frequency-dependent marker which is aligned with a tuning ramp-dependent marker generated from the 8350A mainframe. Sweep time is increased and delay due to hysteresis in the YO is observed as the difference between the two marker pips.

Delay compensation adjustments are made while observing the shift between the marker pips at a sweep time of 10 milliseconds (worst case). At sweep speeds greater than 100 milliseconds, delay should not exceed  $\pm 5$  MHz: the difference between CW and Swept Frequency accuracies.

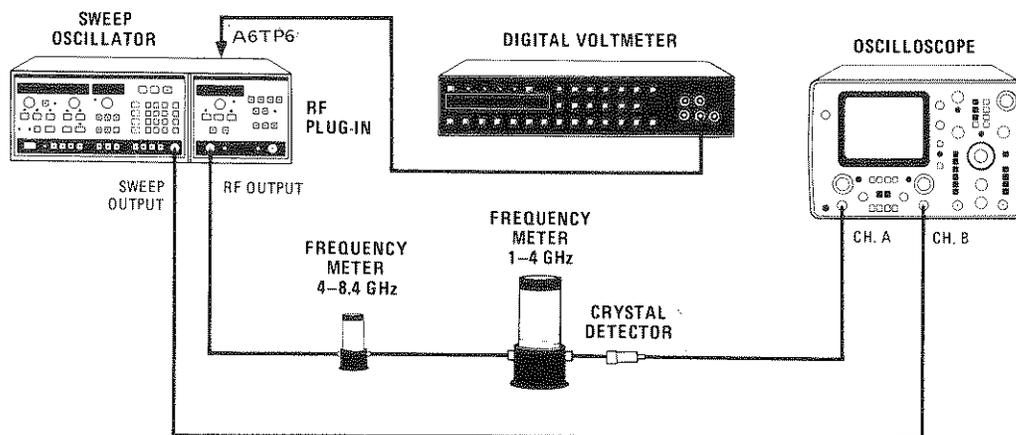


Figure 5-16. Test Setup for Delay Compensation Adjustment

ADJUSTMENTS

5-19. DELAY COMPENSATION (Cont'd)

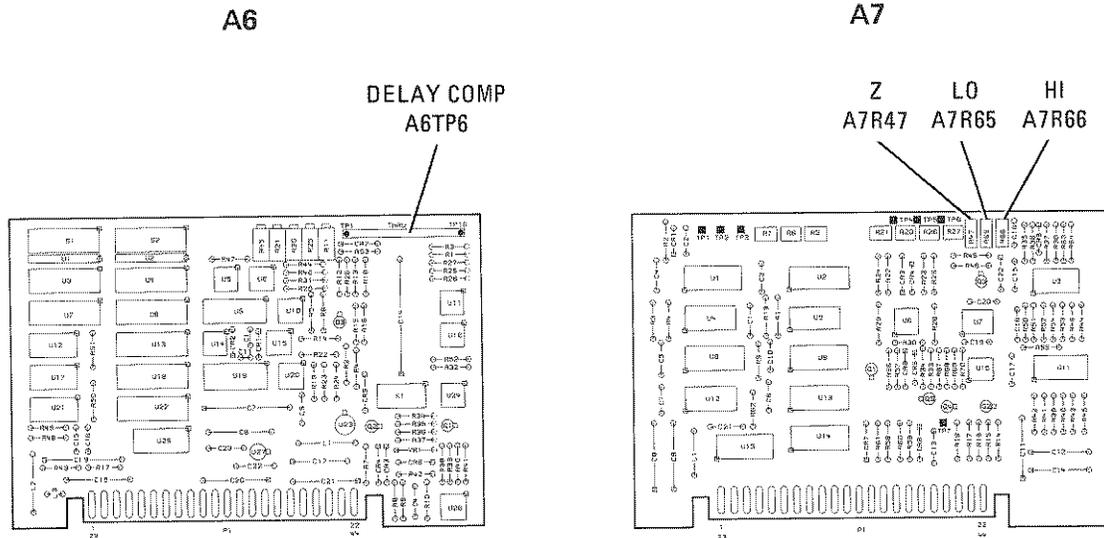


Figure 5-17. Delay Compensation Adjustments

EQUIPMENT:

Oscilloscope .....	HP 1740A
Frequency Meter 1 to 4 GHz .....	HP 536A
Frequency Meter 4 to 8.4 GHz.....	HP 537A
Crystal Detector .....	HP 423B

PROCEDURE:

NOTE

This procedure assumes that A3S1 is set to the factory-set position (Table 5-6).

1. Connect equipment as shown in Figures 5-16 and 5-17. At oscilloscope, select A vs. B sweep mode to obtain a CRT trace of amplitude versus frequency.
2. Press INSTR PRESET .
3. Select CW mode and with a DVM, measure and note the voltage at A6TP6.
4. Press CF then ΔF . At DATA ENTRY, enter 0 MHz.
5. Adjust "Z" control A7R47 on marker board (Figure 5-17) for the same reading at A6TP6 that was obtained in step 3 above. Remove DVM lead from A6TP6.

ADJUSTMENTS

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**5-19. DELAY COMPENSATION (Cont'd)**

6. At the 8350A, enter front panel data as follows:

Press INSTR PRESET

Press START then at DATA ENTRY enter 2.001 GHz

Press STOP then at DATA ENTRY enter 8.4 GHz

Press SWEEP TIME then at DATA ENTRY enter 10 ms

Press MKR M1 then at DATA ENTRY enter 2.30 GHz

Press AMPTD MKR

Press RF BLANK

7. Press SAVE then 2.
8. Press SWEEP TIME then at DATA ENTRY enter 200 ms.
9. Press SAVE then 1.
10. Press MKR M2 then at DATA ENTRY enter 6.5 GHz.
11. Press SAVE then 3.
12. Press SWEEP TIME then at DATA ENTRY enter 10 ms.
13. Press SAVE then 4.
14. Press RECALL 1.
15. Expand the oscilloscope trace at the marker by centering the marker on the oscilloscope then selecting "MAG X10". Set wavemeter so the peak of the pip is on the leading edge of the 2.300 GHz marker.
16. Press RECALL 2.
17. Adjust "LO" (low band) A7R65 on marker board (Figure 5-17) so the peak of the wavemeter pip is coincident with the leading edge of the marker.
18. Verify that the delay is accurate by manually adjusting sweep time from 10 to 200 ms. Iterate "LO" adjustment to optimize setting for minimum delay per sweep time. The position of the wavemeter pip should typically stay within  $\pm 5$  MHz as read on the wavemeter across the 10 to 200 ms range.
19. Press RECALL 3.
20. Set wavemeter so the peak of the pip is coincident with the leading edge of the 6.500 GHz marker.
21. Press RECALL 4.

ADJUSTMENTS

**5-19. DELAY COMPENSATION (Cont'd)**

22. Adjust "HI" (high band) A7R66 on marker board (Figure 5-17) so the peak of the wavemeter pip is coincident with the leading edge of the marker.
23. Verify that the delay is accurate by manually adjusting sweep time from 10 to 200 ms. Iterate "HI" adjustment to optimize setting for minimum delay per sweep time. The position of the wavemeter pip should typically stay within  $\pm 5$  MHz as read on the wavemeter across the 10 to 200 ms range.

**5-20. FREQUENCY REFERENCE 1 V/GHz OUTPUT**

REFERENCE:

Performance Test: 8350A Paragraph 4-13.  
 Service Sheet: A2

DESCRIPTION:

The frequency reference rear panel output is adjusted for 1 Volt per GHz across both bands.  
 Example: 1 GHz = 1 Volt; 2.5 GHz = 2.5 Volts, etc.

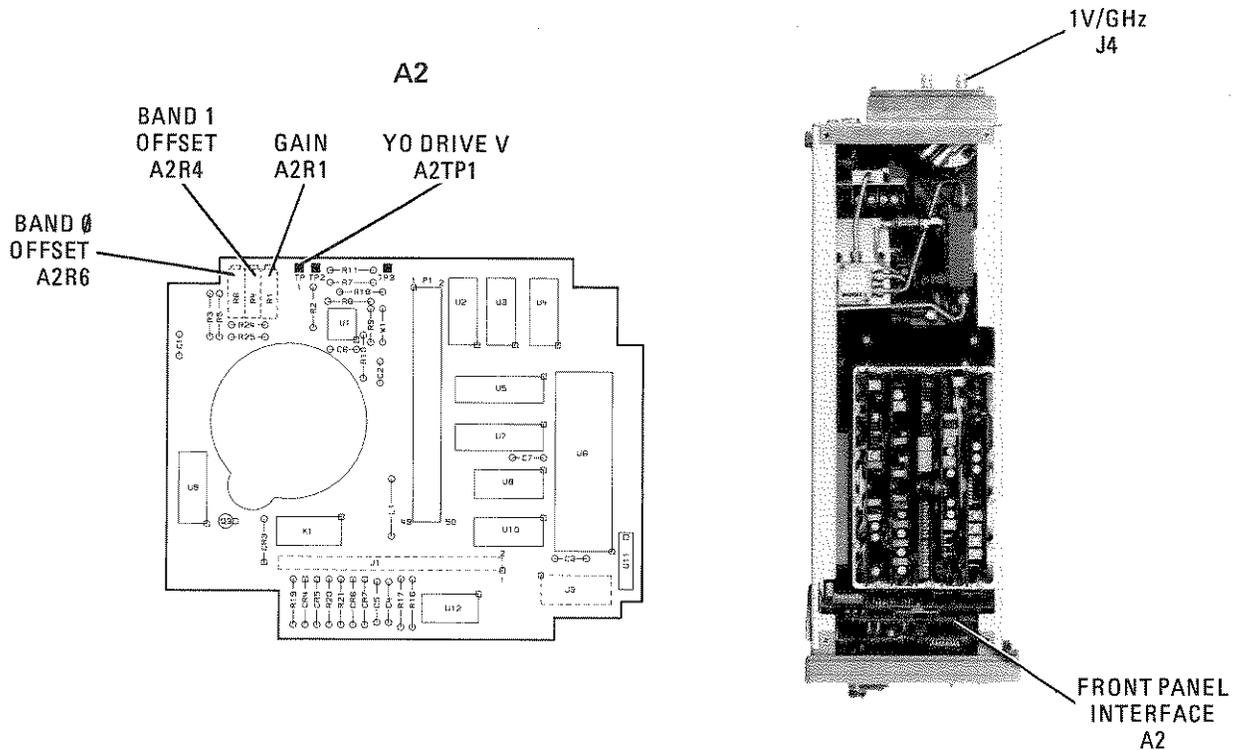


Figure 5-18. Frequency Reference Adjustments Location

## ADJUSTMENTS

**5-20. FREQUENCY REFERENCE 1 V/GHz OUTPUT (Cont'd)**

## EQUIPMENT:

Digital Voltmeter ..... HP 3455A

## PROCEDURE:

**NOTE**

**Low band frequency must be adjusted accurately (Paragraph 5-17) before adjusting Frequency Reference 1 V/GHz output.**

1. Connect a DVM to A2TP1 (Figure 5-18).
2. Select CW and set Frequency for zero Volt indication on DVM.
3. Connect DVM to rear panel 1 V/GHz Frequency Reference connector, J4.
4. Adjust A2R4 "BAND 1 OFFSET" (Figure 5-18) for the voltage that corresponds to the CW frequency (example: 6.4 GHz = +6.4 Vdc).
5. Set CW Frequency to 8.4 GHz. Adjust A2R1 "GAIN" for an output of +8.4 Vdc  $\pm$ 10 mVdc on DVM.
6. Set CW Frequency to 10 MHz. Adjust A2R6 "BAND 0 OFFSET" for 10 mVdc  $\pm$ 10 mVdc on DVM.

**5-21. ALC ADJUSTMENT****NOTE**

**Complete adjustment of the leveling loop requires several procedures to be performed in the order prescribed, from Paragraph 5-21 through 5-25. Deviation from this routine may cause improper leveling and/or flatness problems.**

## REFERENCE:

Performance Test: 8350A Paragraph 4-14.  
Service Sheet: A4

## DESCRIPTION:

Adjustments compensate for DC offsets in the detected RF path and the Main ALC amp. Power is roughly calibrated and low band flatness is optimized.

ADJUSTMENTS

5-21. ALC ADJUSTMENTS (Cont'd)

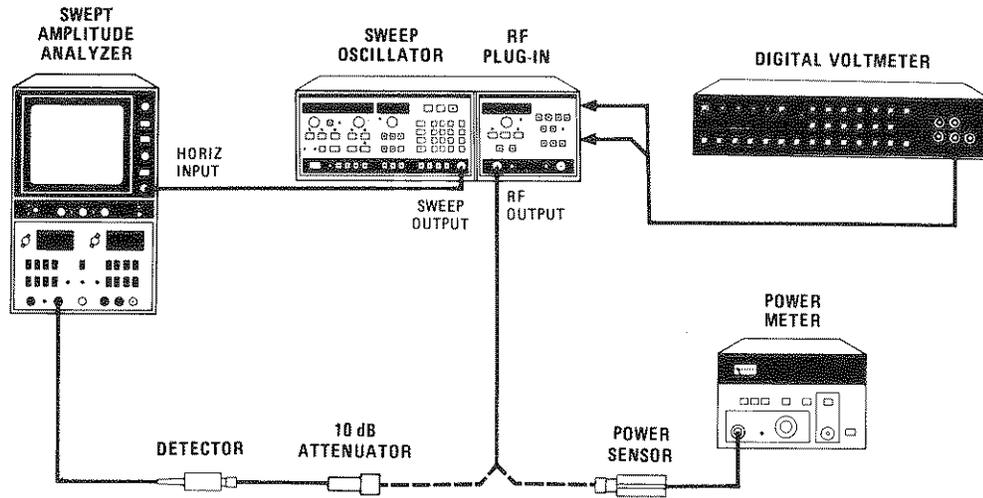


Figure 5-19. ALC Adjustment Test Setup

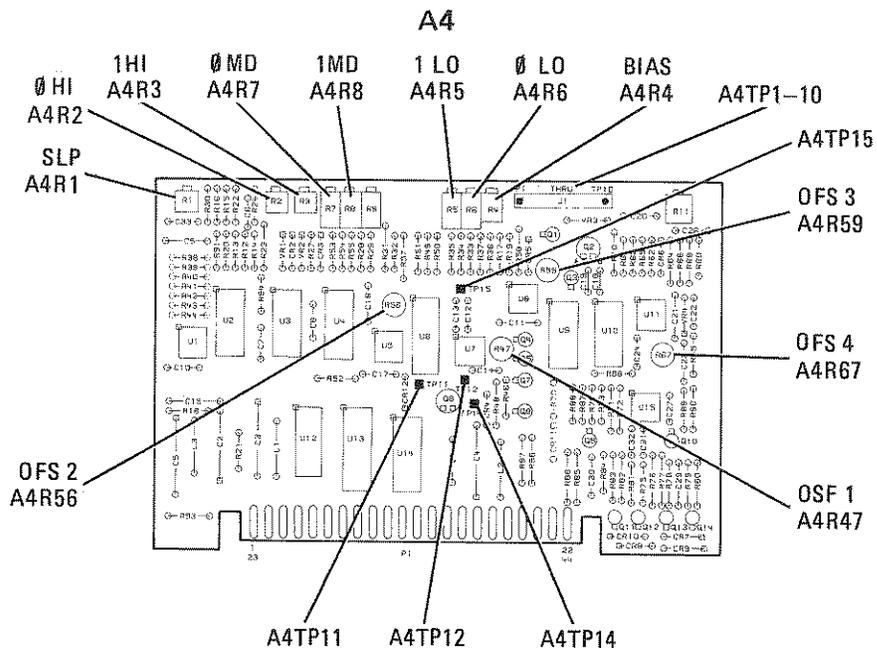


Figure 5-20. ALC Adjustments Location

## ADJUSTMENTS

## 5-21. ALC ADJUSTMENT (Cont'd)

## EQUIPMENT:

Digital Voltmeter.....	HP 3455A
Power Meter.....	HP 436A
Power Sensor.....	HP 8481A
Swept Amplitude Analyzer.....	HP 8755C
Detector.....	HP 11664A
Extender Board.....	HP 08350-60031
10 dB Pad.....	HP 8491A Opt. 010

## PROCEDURE:

**NOTE**

Turn AC power OFF when removing or installing PC boards.

**NOTE**

This procedure assumes that A3S1 is set to the factory-set position (Table 5-6), and at the 8350A Sweep Oscillator, 27.8 kHz square wave modulation is selected.

1. Remove A5 FM Driver board. Place A4 assembly on an extender board. Set A4R1 (SLP) fully counterclockwise. Sweep the full range of the plug-in at any leveled power.
2. Float the ground on the digital voltmeter and measure the voltage between A4TP12 and A4TP14 (Figure 5-20). Adjust A4R47 OFS 1 (offset 1) for  $0.000V \pm 0.001V$ .
3. Attach jumper from A4TP11 to ground. Connect DVM to A4TP5 (reference to ground). Adjust A4R56 OFS 2 (offset 2) for  $0.000V \pm 0.001V$ . Remove jumper.
4. Connect DVM low to A4TP15 (floating ground) and connect DVM high to A4TP12. Adjust A4R59 OFS 3 (offset 3) for  $-2mV \pm 0.1 mV$ .
5. Press 8350A front panel CW and ensure that the power is leveled (83525A UNLEVELED light off). Connect DVM to A4TP7 and adjust A4R67 OFS 4 (offset 4) for  $0.000V \pm 0.001V$ .
6. Set CW frequency to 50 MHz. Turn off RF power. Connect DVM to A4TP10 and adjust A4R4 (BIAS) for  $0.000V \pm 0.001V$ . Turn on RF power.
7. Turn instrument LINE power OFF. Remove A4 assembly from the extender board and reinsert A4 directly into the instrument. Turn ON LINE power to instrument. Connect power meter to 83525A RF OUTPUT.
8. Set POWER for plug-in front panel reading of +0 dBm at 50 MHz. Adjust A4R6 0 LO (band 0 low power) for an RF OUTPUT power at the 83525A connector of +0 dBm  $\pm 0.1$  dB.

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**ADJUSTMENTS**

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**5-21. ALC ADJUSTMENT (Cont'd)**

9. Set POWER for plug-in front panel reading of +9 dBm. Adjust A4R7 0 MD (band 0 mid power) for an RF OUTPUT power at the 83525A connector of +9 dBm  $\pm 0.1$  dB.
10. Iterate steps 8 and 9 until both low and midpower ranges are calibrated.
11. Set POWER for plug-in front panel reading of +13 dBm. Adjust A4R2 0 HI (band 0 high power) for an RF OUTPUT power at the 83525A connector of +13 dBm  $\pm 0.1$  dB.
12. Disconnect power meter and monitor the RF output with the 8755C. Press 8350A INSTR PRESET to sweep the full range of the plug-in. Select 8350A  $\square$  MOD for compatibility with the 8755C. Set power for front panel reading of +0 dBm. Select RF BLANK. Press SAVE 1.
13. Adjust A4R1 SLP (slope) for best overall flatness from 10 MHz to 2.2 GHz as observed on the 8755C. Adjust A4R5 1 LO (band 1 low power) for best trace continuity at the bandswitch point.
14. Set POWER for plug-in front panel reading of +9 dBm. Press SAVE 2. Adjust A4R8 1 MD (band 1 mid power) for best trace continuity at the bandswitch point.
15. Set POWER for plug-in front panel reading of +13 dBm. Press SAVE 3. Adjust A4R3 1 HI (band 1 high power) for best trace continuity.
16. Iterate steps 13, 14, and 15 (RECALL 1, 2, and 3) until trace continuity at all three power settings is achieved.

**NOTE**

The FM PC Board will be reinstalled in Paragraph 5-23.

---

**5-22. BAND 1 HARMONICS****NOTE**

Complete adjustment of the leveling loop requires several procedures to be performed in the order prescribed, from Paragraph 5-21 through 5-25. Deviation from this routine may cause improper leveling and/or flatness problems.

**REFERENCE:**

Performance Test: 8350A Paragraph 4-17.  
Service Sheet: RF Block Diagram and A13A1

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## ADJUSTMENTS

## 5-22. BAND 1 HARMONICS (Cont'd)

## DESCRIPTION:

Variable bias resistors set the operating points of the RF amplifier FETs to minimize harmonics in Band 1. Harmonics are observed using band pass filters to eliminate the fundamental frequency.

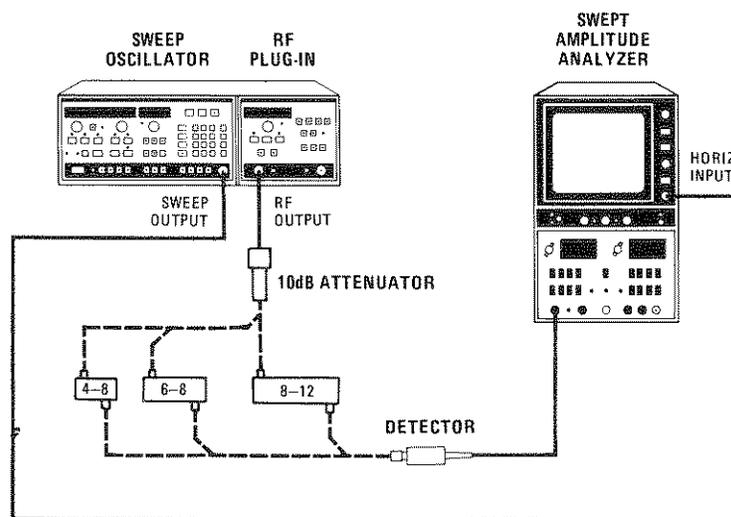


Figure 5-21. Band 1 Harmonics Test Setup

## EQUIPMENT:

Swept Amplitude Analyzer .....	HP 8755C
Detector .....	HP 11664A
4-8 GHz Band Pass Filter .....	HP 0960-0402
6-8 GHz Band Pass Filter .....	HP 0960-0200
8-12.4 GHz Band Pass Filter .....	HP 0960-0403
10 dB Attenuator .....	HP 8491A Option 010

ADJUSTMENTS

5-22. BAND 1 HARMONICS (Cont'd)

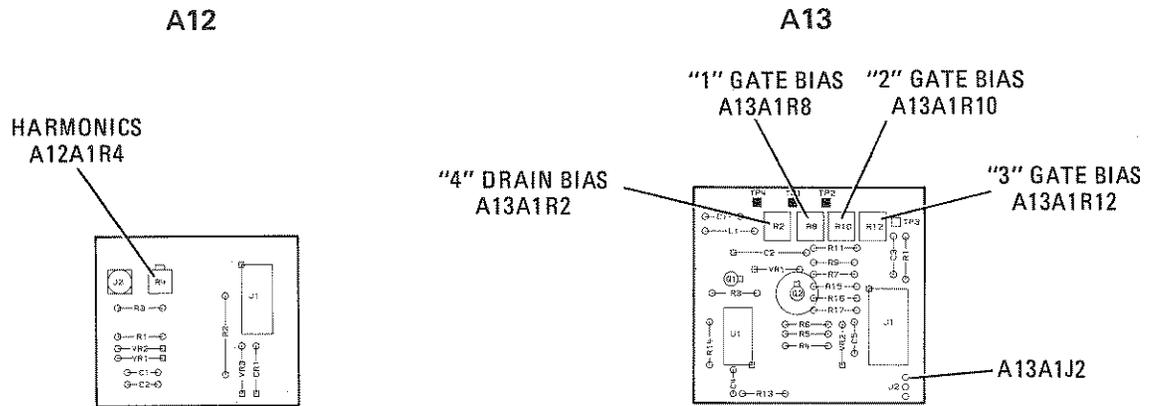


Figure 5-22. Band 1 Harmonics Adjustments Locations

PROCEDURE:

NOTE

This procedure assumes that A3S1 is set to the factory-set position (Table 5-6), and at the 8350A Sweep Oscillator, 27.8 kHz square-wave modulation is selected.

1. Connect equipment as shown in Figure 5-21, with the 4 to 8 GHz band pass filter in the RF path. Select 8350A **MOD** and **RF BLANK**. Sweep from 2 to 8.4 GHz at a leveled power of 13 dBm.
2. Check the band-reject region of the trace. Signals observed above the noise floor of the detector represent the second harmonics of the 2 to 4 GHz swept signal. Four adjustment pots on the A13A1 Modulator/Amplifier bias assembly and one on the A12A1 (Figure 5-22) are used to optimize harmonic levels in Band 1. Begin adjustments from left to right along the top of the A13A1 assembly with the drain bias pot, R2 ("4"), followed by three gate bias pots: R8 ("1"), R10 ("2"), and R12 ("3"). Then adjust A12A1R4. Adjust all five pots for optimum harmonic levels.
3. Insert the 6 to 8 GHz Band Pass Filter into the RF path. Signals in the band reject region represent the second harmonics of 3 to 4 GHz, and the third harmonics of 2 to 2.8 GHz. Repeat the adjustments as described in step 2.
4. Insert the 8 to 12 GHz Band Pass Filter into the RF path. Signal levels in the band reject region represent the second harmonic of 4 to 6 GHz and the third harmonic of 2.67 to 2.8 GHz. Adjust the five pots as instructed in step 2. Repeat steps 2 through 4 to ensure minimum harmonics levels. Harmonics should be at least 20 dB below the fundamental.

## ADJUSTMENTS

## 5-23. INTERNAL LEVELED FLATNESS

## NOTE

Complete adjustment of the leveling loop requires several procedures to be performed in the order prescribed, from Paragraph 5-21 through 5-25. Deviation from this routine may cause improper leveling and/or flatness problems.

## REFERENCE:

Performance Test: 8350A Paragraph 4-14.  
Service Sheet: A5

## DESCRIPTION:

Four parallel circuits on the A5 assembly provide adjustments for ALC flatness. BP1 through BP4 and SL1 through SL4 determine the slope of the flatness compensation signal input to the A4 ALC assembly. Breakpoint potentiometers (BP1-4) determine the frequency at which the corresponding slope potentiometers (SL1-4) begin to affect power output leveling.

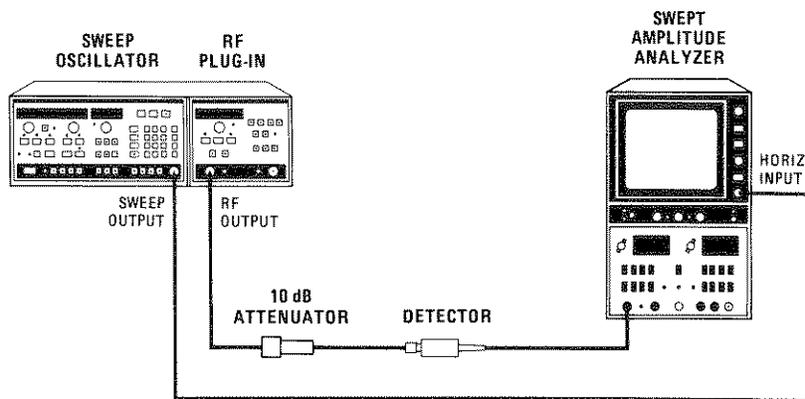


Figure 5-23. Internal Leveling Adjustment Test Setup

## EQUIPMENT:

Swept Amplitude Analyzer .....	HP 8755C
Detector .....	HP 11664A
10 dB Attenuator .....	HP 8491A Option 010

## ADJUSTMENTS

## 5-23. INTERNAL LEVELED FLATNESS (Cont'd)

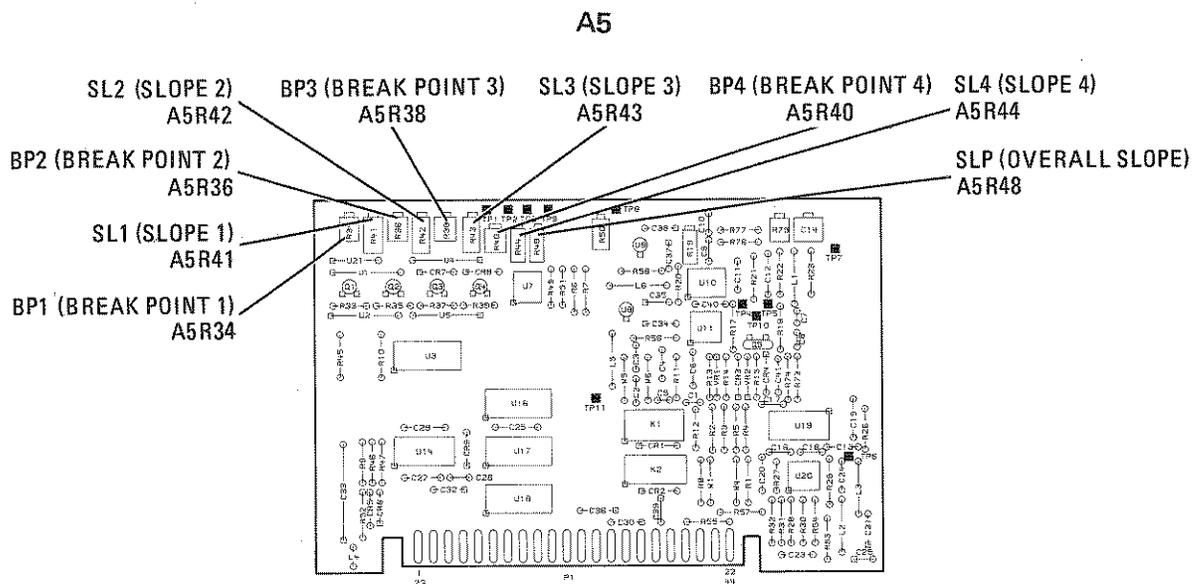


Figure 5-24. Internal Leveling Adjustments Location

## PROCEDURE:

## NOTE

This procedure assumes that A3S1 is set to the factory-set position (Table 5-6), and at the 8350A Sweep Oscillator, 27.8 kHz squarewave modulation is selected.

1. Connect equipment as shown in Figure 5-23, with the 8755C monitoring the RF output. Select 8350A  $\square$  MOD. Sweep the full range of the Plug-in.
2. Remove A5 FM Driver board. Obtain best trace continuity at 2.05 GHz by making fine adjustments as follows. Set RF power to 0 dBm and adjust A4R5 (1 LO), to +9 dBm and adjust A4R8 (1 MD), and to +13 dBm and adjust A4R3 (1 HI). (See Figure 5-20.)
3. Reinstall A5 FM Driver board. Set RF Power to +9 dBm. Adjust A5R48 (SLP) for best overall flatness.
4. Set breakpoint adjustments A5R34, A5R36, A5R38, and A5R40, (BP1-4) and slope adjustments A5R41 through A5R44 (SL1-4) for best overall flatness. (BP1 and SL1 are interdependent adjustments, as are BP2 and SL2, etc.).

## NOTE

If flatness does not meet specification and some or all of the breakpoint and slope adjustments are ineffective, center all nine potentiometers and repeat the procedure.

## ADJUSTMENTS

## 5-24. POWER CALIBRATION

## NOTE

Complete adjustment of the leveling loop requires several procedures to be performed in the order prescribed, from Paragraph 5-21 through 5-25. Deviation from this routine may cause improper leveling and/or flatness problems.

## REFERENCE:

Performance Test: 8350A Paragraph 4-14.  
Service Sheet: A4

## DESCRIPTION:

Band 0 power is calibrated on a power meter at three breakpoints over the leveled power range: 0, 9, and 13 dBm. Power is then calibrated over the full band frequency range while observing output flatness at the bandswitch point.

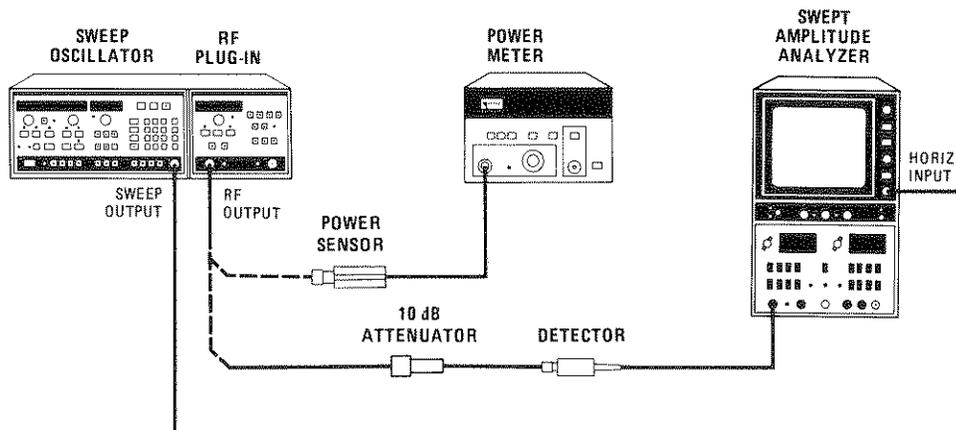


Figure 5-25. Power Calibration Test Setup

## EQUIPMENT

Swept Amplitude Analyzer .....	HP 8755C
Detector .....	HP 11664A
Power Meter .....	HP 436A
Power Sensor .....	HP 8481A

## ADJUSTMENTS

## 5-24. POWER CALIBRATION (Cont'd)

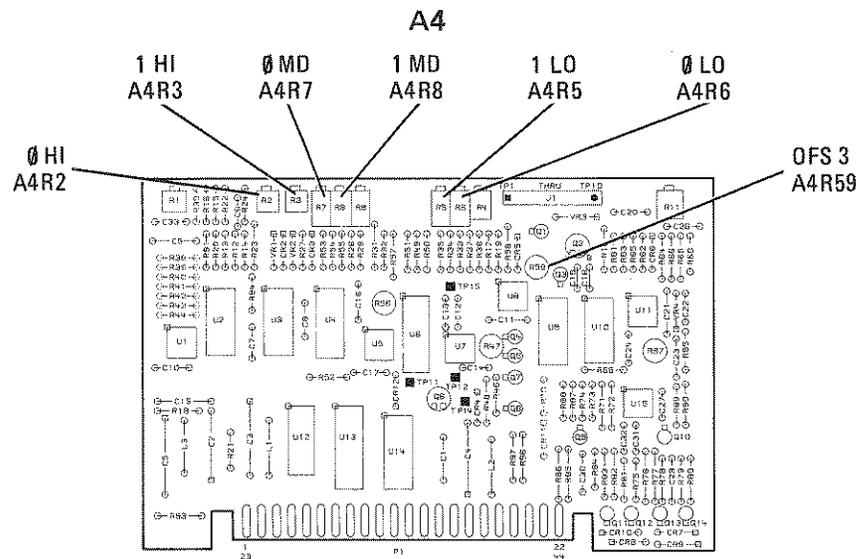


Figure 5-26. Power Calibration Adjustment Location

## PROCEDURE

## NOTE

This procedure assumes that A3S1 is set to the factory-set position (Table 5-6), and at the 8350A Sweep Oscillator, 27.8 kHz square-wave modulation is selected.

1. Connect equipment as shown in Figure 5-25, with the 8755C monitoring the RF output. Select 8350A  $\square$  MOD. Observe the full band (0.01 to 8.4 GHz) trace and select a Band 0 frequency (0.01 to 2.0 GHz) where the power level is approximately in the center of the power variation range. Select CW mode at that frequency. Set POWER for a front panel indication of +0 dBm.

## NOTE

If the following steps result in A4R6 and A4R7 being adjusted near the stops, connect DVM low to A4TP15 (floating ground) and connect DVM high to A4TP12. Adjust A4R59 for  $-2 \text{ mV} \pm 0.1 \text{ mV}$ .

2. Remove detector and connector power meter to RF OUTPUT. On 8350A, press  $\square$  MOD to turn off modulation (annunciator off). Adjust A4R6 (0 LO) for RF OUTPUT power at the 83525A connector of  $+0 \text{ dBm} \pm 0.1 \text{ dBm}$ . Set POWER first to  $-2 \text{ dBm}$ , note power meter reading, then set POWER to  $+2 \text{ dBm}$  and note power meter reading. The deviation from 0 dBm should be equal and opposite. If not, readjust A4R6 (0 LO).
3. Set power for front panel indication of +9 dBm. Adjust A4R7 (0 MD) for RF OUTPUT power at the 83525A connector of  $+9 \text{ dBm} \pm 0.1 \text{ dBm}$ .

## ADJUSTMENTS

**5-24. POWER CALIBRATION (Cont'd)**

4. Iterate steps 2 and 3 until low and midpower ranges are calibrated.
5. Set power for front panel indication of +13 dBm. Adjust A4R2 (0 HI) for RF OUTPUT power at the 83525A connector of +13 dBm  $\pm$ 0.1 dBm.
6. Step the RF power in 1 dB intervals from +0 to +13 dBm. RF OUTPUT power at the 83525A connector should be the indicated front panel setting  $\pm$ 0.1 dBm. If necessary, readjust 0 LO, 0 MD, and 0 HI to calibrate power.
7. Disconnect power meter from RF OUTPUT connector and connect detector to monitor RF OUTPUT on the 8755C. Press 8350A INSTR PRESET to sweep the full range of the plug-in. Select 8350A  $\square$  MOD .Set RF power to +0 dBm. Adjust A4R5 (1 LO) for best trace continuity at the bandswitch point.
8. Set power for front panel indication of +9 dBm. Adjust A4R8 (1 MD) for best trace continuity at the bandswitch point.
9. Set power for front panel indication of +13 dBm. Adjust A4R3 (1 HI) for best trace continuity at the band switch point.
10. Step the power in 2 dB intervals from +0 to +13 dBm, observing trace continuity. If necessary, iterate steps 2 through 9.

**5-25. ALC GAIN ADJUSTMENT****NOTE**

Complete adjustment of the leveling loop requires several procedures to be performed in the order prescribed, from Paragraph 5-21 through 5-25. Deviation from this routine may cause improper leveling and/or flatness problems.

**REFERENCE:**

Performance test: 8350A Paragraph 4-14.  
Service Sheet: A4

**DESCRIPTION:**

A4R11 in the input leg of A4U11 adjusts the gain of the Main ALC Amplifier. A4R11 is adjusted for maximum possible gain without producing oscillations.

**EQUIPMENT**

Swept Amplitude Analyzer .....	HP 8755C
Detector .....	HP 11664A
10 dB Attenuator .....	HP 8491A Option 010

ADJUSTMENTS

5-25. ALC GAIN ADJUSTMENT (Cont'd)

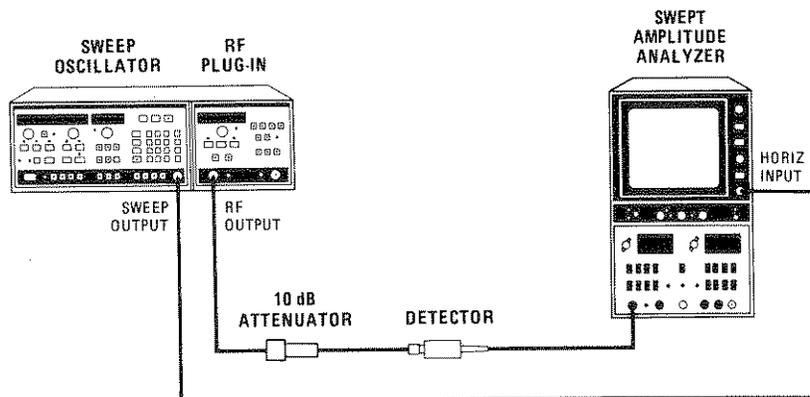


Figure 5-27. ALC Gain Adjustment Test Setup

PROCEDURE:

NOTE

This procedure assumes that A3S1 is set to the factory-set position (Table 5-6), and at the 8350A Sweep Oscillator, 27.8 kHz square wave modulation is selected.

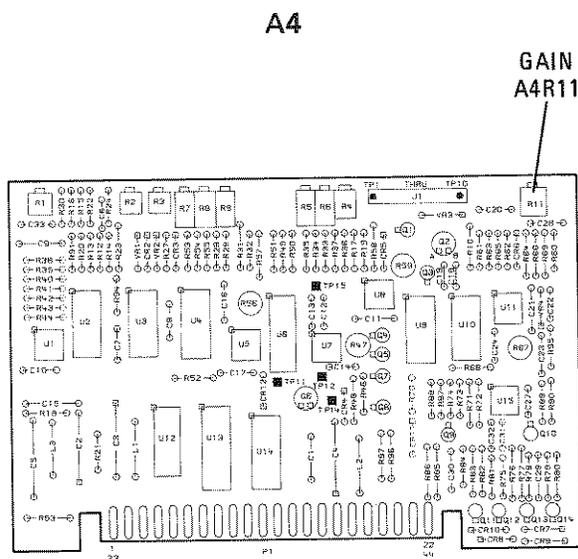


Figure 5-28. ALC Gain Adjustment Location

## ADJUSTMENTS

**5-25. ALC GAIN ADJUSTMENTS (Cont'd)**

1. Connect equipment as shown in Figure 5-27. Select 8350A  $\square$  MOD. Sweep the full range of the plug-in at minimum leveled power. Observe the RF signal on the 8755C display. Adjust A4R11 (GAIN) (Figure 5-28) to increase the gain of the Main ALC amplifier until oscillations begin to occur. (See Figure 5-29.) Then, reduce gain just enough to eliminate oscillations.
2. Observe the trace while adjusting the RF power over the entire leveled range. Further reduce the gain if loop oscillations are observed.

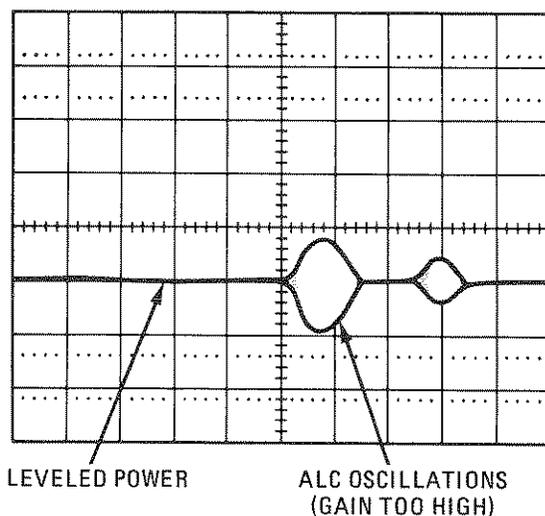


Figure 5-29. Leveled Power Trace Showing ALC Oscillations

**5-26. POWER SWEEP**

## REFERENCE:

Performance Test: 8350A Paragraph 4-14.  
Service Sheet: A5

## DESCRIPTION:

A 10 dB/sweep power sweep mode is selected and the resultant is displayed on the 8755C Swept Amplitude Analyzer. Output of the power sweep circuit is adjusted for the correct sweep.

## EQUIPMENT:

Swept Amplitude Analyzer .....	HP 8755C
Detector .....	HP 11664A
10 dB Attenuator .....	HP 8491A Option 010

ADJUSTMENTS

5-26. POWER SWEEP (Cont'd)

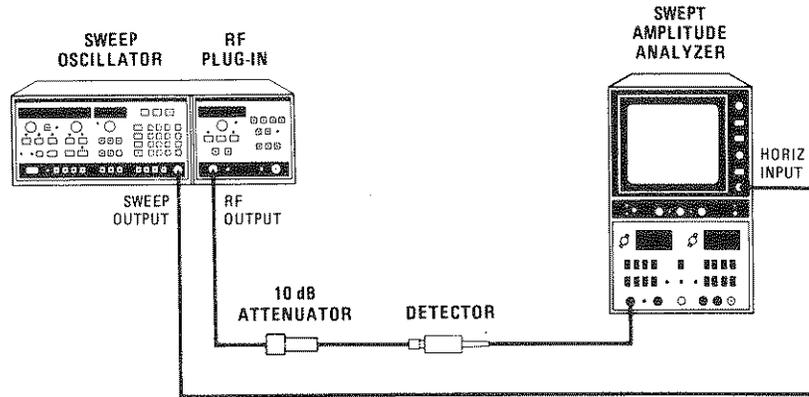


Figure 5-30. Power Sweep Test Setup

PROCEDURE:

NOTE

ALC gain adjustments (paragraph 5-25) must be checked before power sweep adjustments are made.

NOTE

This procedure assumes that A3S1 is set to the factory-set position (Table 5-6), and at the 8350A Sweep Oscillator, 27.8 KHz square wave modulation is selected.

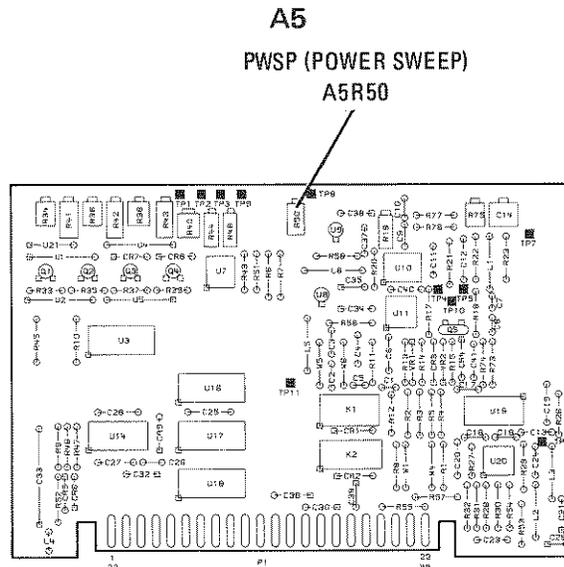


Figure 5-31. Power Sweep Adjustment Location

## ADJUSTMENTS

**5-26. POWER SWEEP (Cont'd)**

1. Connect equipment as shown in Figure 5-30. Select 8350A  $\square$  MOD.
2. Select SHIFT CW mode and set power level to 0 dBm.
3. Press POWER SWEEP and at DATA ENTRY select 10 dB/sweep.
4. While observing 8755C display of RF output, adjust A5R50 PWSP (power sweep) (Figure 5-31) for 10 dB/sweep.

**5-27. POWER METER LEVELING CALIBRATION****NOTE**

Complete adjustment of the leveling loop for Power Meter leveling requires several procedures to be performed in the order prescribed from Paragraph 5-21 through 5-25, then 5-27. Deviation from this routine may cause improper leveling and/or flatness problems.

**REFERENCE:**

Performance Test: 8350A Paragraph 4-14.  
Service Sheet: A4

**DESCRIPTION:**

Power Meter leveling gain potentiometer A4R9 (PM) calibrates loop gain to full-scale deflection of the leveling meter.

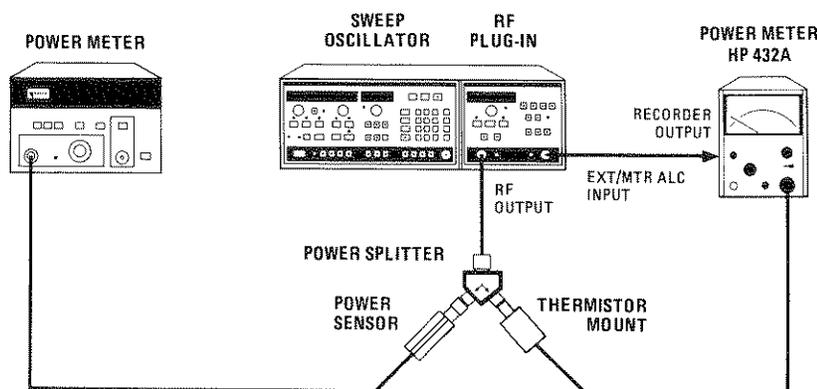


Figure 5-32. Power Meter Leveling Calibration

ADJUSTMENTS

5-27. POWER METER LEVELING CALIBRATION (Cont'd)

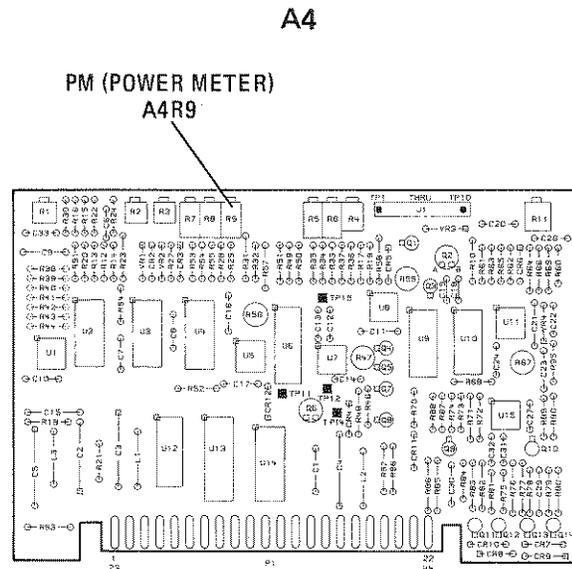


Figure 5-33. Power Meter Adjustment Location

EQUIPMENT:

- Power Meters ..... HP 432A and HP 436A
- Thermistor Mount ..... HP 478A (for 432A)
- Power Sensor ..... HP 8481A (for 436A)
- Power Splitter ..... HP 11667A

PROCEDURE:

1. Connect equipment as shown in Figure 5-32. Press **CW** and select a frequency at midband. Set the RF power level to  $-2$  dBm, as indicated on the plug-in Front Panel display. Select the 0 dB range on the HP 432A Power Meter. Both meters should read approximately  $-8$  dBm. Note the insertion loss through the Power Splitter.
2. On the plug-in Front Panel, press **MTR LEVELING** and adjust **CAL** potentiometer for the same power measured in step 1.
3. Increase the 83525A power level until the 432A power meter reaches full scale deflection (approximately  $+6$  dBm). Adjust **A4R9 (PM)** (Figure 5-33) until the 436A Power Meter indication is equal to the plug-in front panel readout minus the power splitter insertion loss noted in step 1 (approximately 6 dB).

## ADJUSTMENTS

**5-27. POWER METER LEVELING CALIBRATION (Cont'd)**

4. Alternately set POWER to  $-2$  dBm (and adjust front panel CAL control) then to  $+6$  dBm (and adjust A4R9 PM control) to obtain best compromise adjustment.

**5-28. FM DRIVER**

## REFERENCE:

Performance Test: 8350A Paragraph 4-21.  
Service Sheet: A5

## DESCRIPTION:

The FM Driver high frequency offset is adjusted for zero volt drive with no FM modulation applied. A delay-line discriminator is used to detect and display FM modulation on an oscilloscope. Adjustments are for best overall frequency response from DC to 10 MHz. Compliance to a specification of  $\pm 3$  dB is checked between DC and 2 MHz.

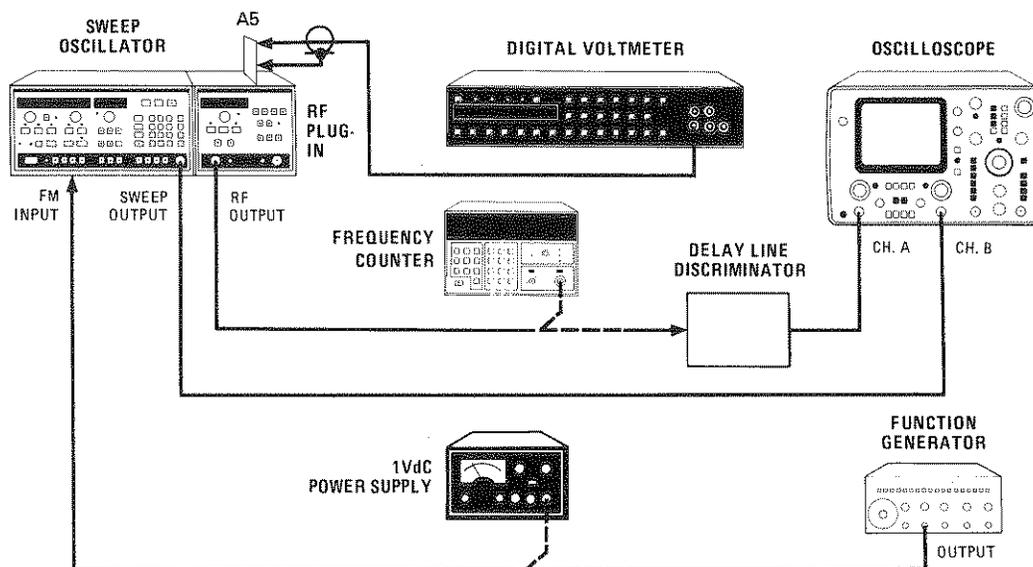


Figure 5-34. Test Setup for FM Driver Adjustments

ADJUSTMENTS

5-28. FM DRIVER (Cont'd)

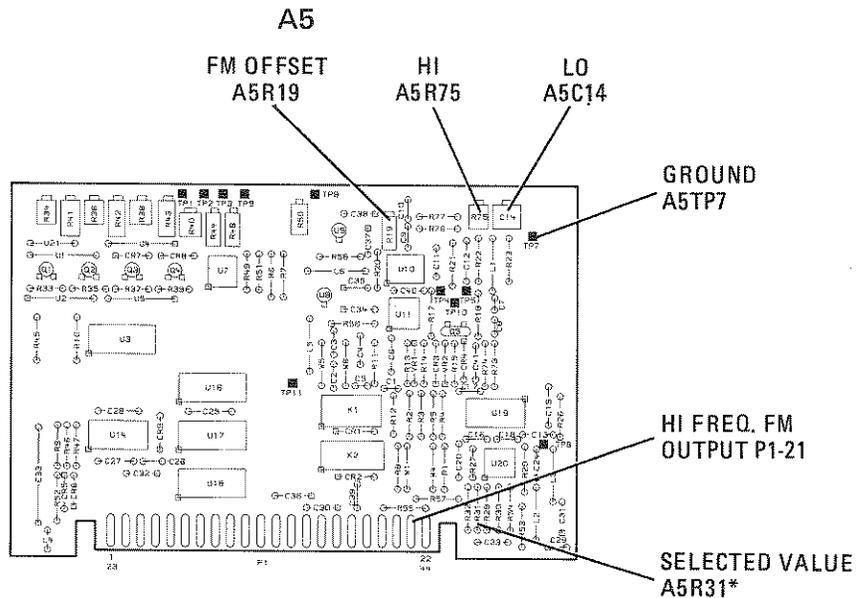


Figure 5-35. Location of A5 FM Driver Adjustments

EQUIPMENT:

Digital Voltmeter.....	HP3455A
Oscilloscope.....	HP 1740A
Function Generator.....	HP 3312A
Delay Line Discriminator.....	See Figure 1-3
Frequency Counter.....	HP 5343A
DC Power Supply.....	HP 6213A

PROCEDURE:

NOTE

Turn AC power OFF when removing or installing PC boards.

NOTE

This procedure assumes that A3S1 is set to the factory-set position (Table 5-6).

FM Offset

1. Connect equipment as shown in Figure 5-34 except disconnect function generator from rear panel FM INPUT connector.
2. Place A5 FM Driver on extender board.

## ADJUSTMENTS

**5-28. FM DRIVER (Cont'd)**

3. Connect DVM between A5 board connector pin 21 and A5TP7 (ground). (See Figure 5-35.) Adjust A5R19 "FM OFFSET" control for zero Vdc  $\pm$ 1 mVdc.
4. Disconnect DVM from test points, remove extender board, and reinstall A5 FM Driver in instrument.
5. Set instrument controls as follows:

**8350A SWEEP OSCILLATOR**

CW FREQUENCY..... 4 GHz  
 FREQUENCY Sweep Mode ..... Press SHIFT then CW (swept CW)  
 CW VERNIER..... On  
 SWEEP TRIGGER..... INT  
 RF BLANK ..... OFF

**83525A RF PLUG-IN**

POWER LEVEL ..... +13 dBm  
 CW FILTER ..... OFF  
 ALC MODE ..... INT  
 Configuration switch A3S1 on Digital Interface board (Table 5-6) set as follows:

Switch No.	1	2	3	4	5	6	7	8
Position	1	0	0	0	0	0	*	X

Positions: 1=Open; 0=Closed; X=Don't care  
 \*"0" if no Option 002; "1" if Option 002 installed.

**NOTE**

The A3S1 switch positions select the 83525A code, maximum RF power at power-up, -20 MHz/V FM sensitivity, cross-over coupled FM modulation (AC coupled), and Option 002 code if installed.

**3312A FUNCTION GENERATOR**

RANGE ..... 1 MHz  
 FREQUENCY ..... 10 (10MHz)  
 FUNCTION ..... Sine Wave  
 Amplitude ..... Set output for 100 mV p-p  
 as displayed on Oscilloscope  
 with 50 Ohm input

ADJUSTMENTS

5-28. FM DRIVER (Cont'd)

1740A OSCILLOSCOPE

MODE .....	A vs. B
CHANNEL A .....	50 Ohms
CHANNEL A V/DIV .....	0.005V
CHANNEL B INPUT .....	DC
CHANNEL B V/DIV .....	1

Flatness

6. Connect Frequency Counter to 83525A RF OUTPUT. Connect a +1 Vdc power supply to rear panel FM INPUT. A shift in frequency of approximately -20 MHz should occur on the Frequency Counter when +1 Vdc is applied. (This shows correct FM modulation sensitivity.) Reconnect Delay Line Discriminator to RF OUTPUT and connect function generator to rear panel FM INPUT connector.
7. Adjust CW FREQUENCY and CW VERNIER for waveform at the center of oscilloscope CRT. Adjust oscilloscope Channel A "CAL" control for a trace 4 cm high centered on CRT. (This sets up amplitude reference.)
8. Manually sweep function generator frequency from DC to 100 kHz. Select resistor A5R31 (Figure 5-35) so amplitude at 100 Hz and at 100 kHz are the same ±0.2 cm on CRT.
9. Manually sweep function generator frequency from DC to 10 MHz. Adjust A5C14 "LO" and A5R75 "HI" controls several times (Figure 5-35) to obtain the most constant overall response from DC to 10 MHz.
10. Check that ±3 dB flatness specification is met between DC and 2 MHz as follows. Manually sweep the function generator frequency between DC and 2 MHz. On the oscilloscope, note maximum and minimum response points (Figure 5-36). Maximum point (+3dB) can be up to 5.6 divisions, and minimum point (-3 dB) can be down to 2.8 divisions.
11. If the flatness specification in step 10 above is not met, repeat step 8 and 9 above and make compromise adjustments in the DC to 2 MHz range to meet flatness requirements.

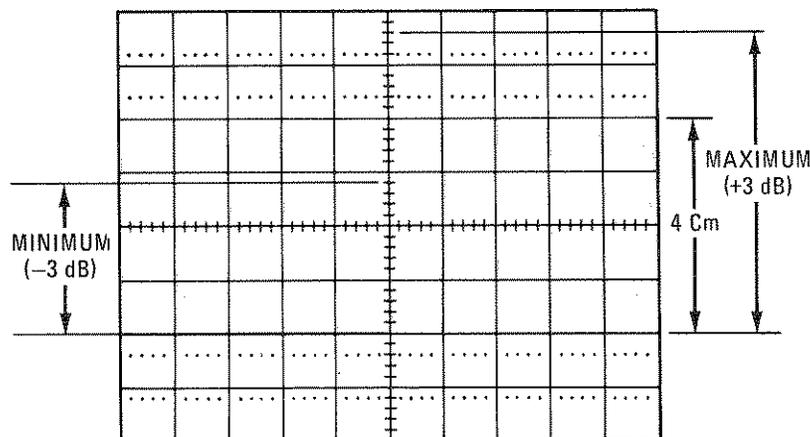


Figure 5-36. FM Flatness Tolerance, DC to 2 MHz

ADJUSTMENTS

5-29. MARKER AND SAMPLER ADJUSTMENTS

REFERENCE:

Performance Test: Paragraph 4-16  
 Service Sheets: A7 and A8.

DESCRIPTION:

Internal crystal markers are generated by mixing derivatives of a 50 MHz crystal oscillator with the low band sweep. Proper marker functioning requires adjustment of the crystal oscillator, the internal mixer, and IF gain for each marker frequency.

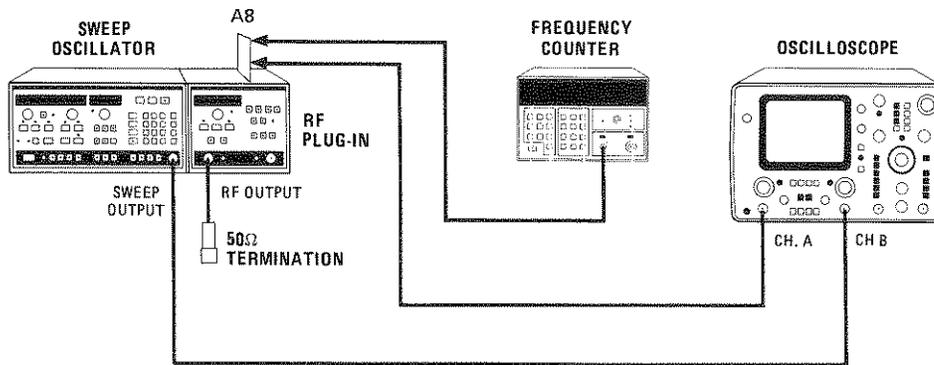


Figure 5-37. Marker Adjustments Test Setup

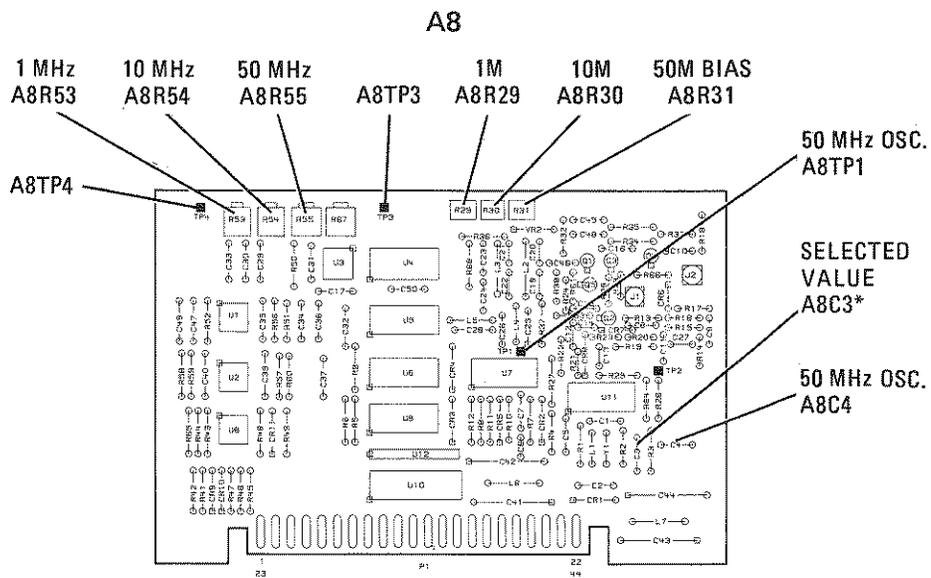


Figure 5-38. Marker Adjustments on A8

## ADJUSTMENTS

**5-29. MARKER AND SAMPLER ADJUSTMENTS (Cont'd)**

## EQUIPMENT:

Power Meters .....	HP 432A and HP 436A
Thermistor Mount .....	HP 478A (for 432A)
Power Sensor.....	HP 8481A (for 436A)
Power Splitter.....	HP 11667A

## PROCEDURE:

**NOTE**

Turn ac power off when removing or installing PC boards.

**NOTE**

This procedure assumes that A3S1 is set to the factory-set position (Table 5-6).

1. Place A8 assembly on extender board. Connect equipment as shown in Figure 5-37. Terminate 83525A RF output in 50 Ohms. Set 1740A Oscilloscope to A vs B sweep mode to obtain horizontal deflection as a function of the 8350A SWEEP OUT.
2. Set 8350A start/stop sweep for 10 MHz to 2.0 GHz. Select 83525A AMPTD MARKERS. Connect counter with 1 : 1 capacitive probe to A8TP1. Adjust A8C4 (Figure 5-38) for frequency counter indication of 50 MHz  $\pm$ 250 Hz. If A8C4 does not have the range required to adjust the 50 MHz crystal oscillator, select a new value for A8C3. (An increase in capacitance will decrease frequency.)
3. Select 100 ms Sweep Time. Connect oscilloscope with 1:1 probe to A8TP3 (Figure 5-38). Set 8350A power to +13 dBm and select 1 MHz Markers. Adjust A8R29 (1M) for the flattest envelope height. (See Figure 5-39.) Select 10 MHz Markers. Adjust A8R30 (10M) for the flattest envelope height (Figure 5-38). Select 50 MHz markers. Adjust A8R31 (50M) for the flattest envelope height. (Optimum setting for these adjustments will be ones that provide the most uniform birdie height across the band with the adjustments nearest the center of their range. Especially note birdie height at the high-frequency end and set the adjustment just before the marker amplitude drops off.
4. Connect oscilloscope to A8TP4 (Figure 5-38). Set RF POWER to 0 dBm. Adjust IF gain potentiometers A8R53 (1 MHz), A8R54 (10 MHz), and A8R55 (50 MHz) for each marker frequency to an average envelope height of 1.0 V p-p.
5. Adjust oscilloscope Channel B vernier for a horizontal deflection of exactly 10 divisions. Set 8350A CF = 1 GHz,  $\Delta F = 10$  MHz. Select 50 MHz Markers. Center the birdie envelope on the screen with plug-in front panel FREQ CAL control. (See Figure 5-40.) Then select 10 MHz Markers. Change  $\Delta F$  to 1 MHz. Recenter birdie. Display is now calibrated for 100 kHz/Division.
6. Connect scope probe to A7TP1 (Figure 5-41). Adjust A7 Marker Threshold potentiometers for the proper pulse width of each marker as follows:

ADJUSTMENTS

5-29. MARKER AND SAMPLER ADJUSTMENTS (Cont'd)

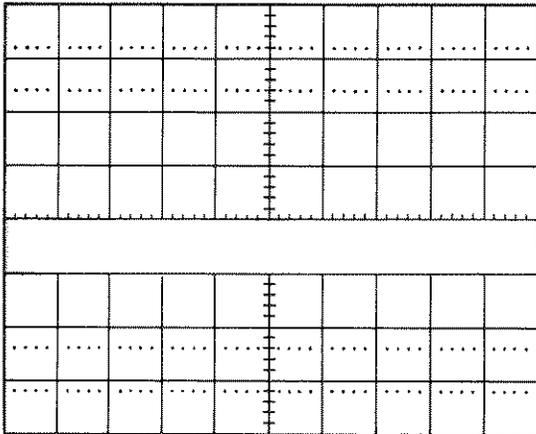


Figure 5-39. Marker Envelope

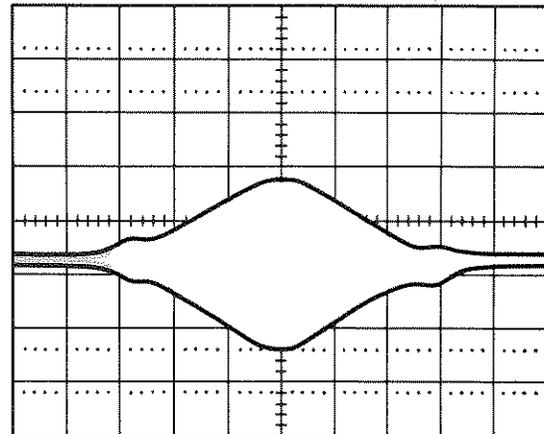


Figure 5-40. 50 MHz Birdie

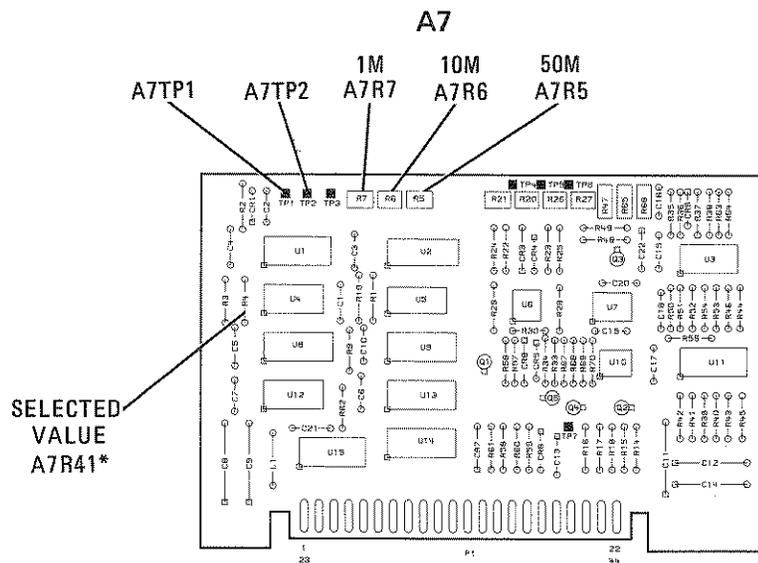


Figure 5-41. Marker Adjustments on A7

## ADJUSTMENTS

## 5-29. MARKER AND SAMPLER ADJUSTMENTS (Cont'd)

## NOTE

The previous step calibrates the oscilloscope display to 100 kHz/Division.

50 MHz: Adjust A7R5 (50M) for 600 kHz p-p (6 divisions)  
 10 MHz: Adjust A7R6 (10M) for 400 kHz p-p (4 divisions)  
 1 MHz: Adjust A7R7 (1M) for 200 kHz p-p (2 divisions)

7. Press **INTENS MKR**. Connect the oscilloscope probe to A7TP2. First, ensure that marker OFF pulses exist on both sides of the marker ON pulse. (Decreasing the oscilloscope **BEAM INTENSITY** will expose the marker ON pulses.) (See Figure 5-42.) While the crystal markers may function properly without them, the marker-off pulses provide a safeguard against false markers appearing on the display.
8. Secondly, ensure that the marker OFF pulse does not overlap the marker ON pulse. Figure 5-43 illustrates an improper marker OFF pulse. When this occurs, change the value of A7R4 to eliminate overlap. The optimum value for A7R4 allows the maximum number of marker OFF pulses without overlapping the ON pulse. The typical value for A7R4 is 1200 Ohms and the minimum value is 1000 Ohms. (To observe marker OFF pulses, vary RF OUTPUT power between +3 dBm and +13 dBm.)

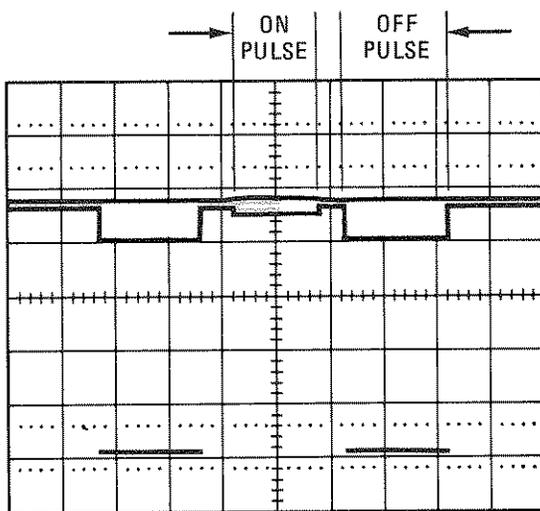


Figure 5-42. On/Off Pulse of Correctly Adjusted Circuit

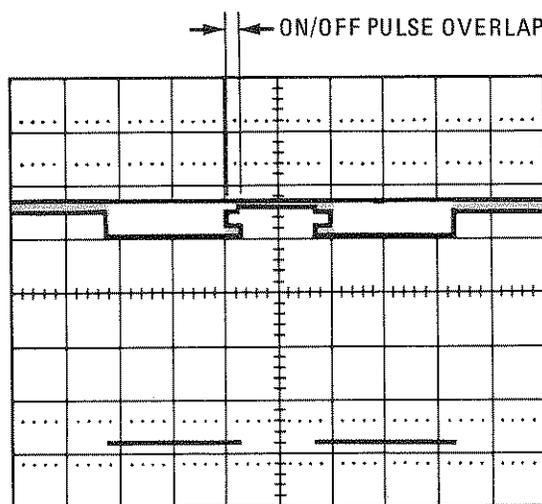


Figure 5-43. On/Off Pulse of Misadjusted Circuit Showing Overlap

## ADJUSTMENTS

## 5-30. EXTERNAL MARKER ADJUSTMENT

## REFERENCE:

Service Sheet: A8.

## DESCRIPTION:

A rear panel BNC jack is available for external marker sources. A8R67 provides gain adjustment to the video amplifier for marker presence.

When using the 8755C with external markers, factory select resistor A8R28 prevents the feedthrough of 27.8 kHz square wave onto the marker birdie. Increasing the value of A8R28 reduces the feedthrough problem, but degrades internal markers.

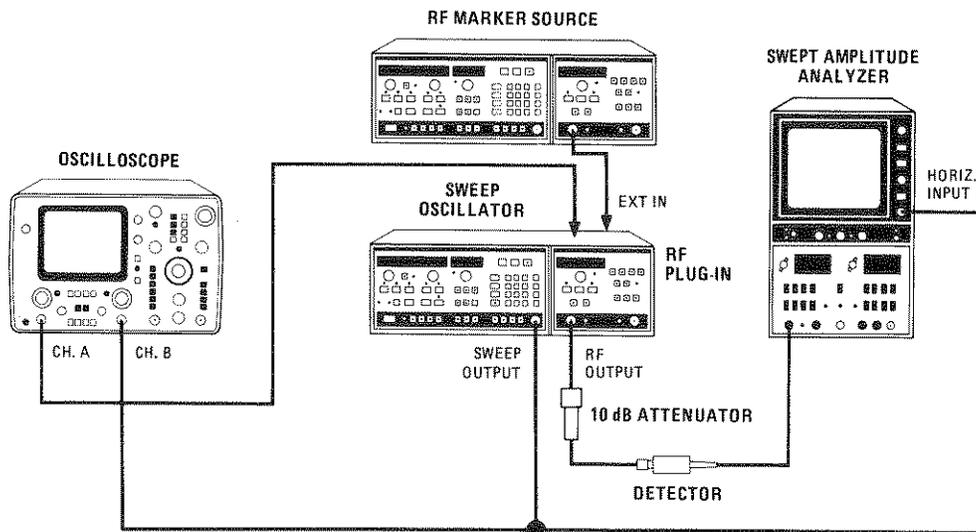


Figure 5-44. External Marker Adjustments Test Setup

## EQUIPMENT:

RF Marker Source .....	HP 8350A/83522A
Swept Amplitude Analyzer .....	HP 8755C
Detector .....	HP 11664A
Oscilloscope .....	HP 1740A
10 dB Attenuator .....	HP 8491A Option 010

## PROCEDURE:

## NOTE

This procedure assumes that A3S1 is set to the factory-set position (Table 5-6), and at the 8350A Swept Oscillator, 27.8 kHz square wave modulation is selected.

## ADJUSTMENTS

## 5-30. EXTERNAL MARKER ADJUSTMENT (Cont'd)

1. Connect equipment as shown in Figure 5-44. Set external marker source to a selected marker frequency. Set power level between  $-10$  and  $+10$  dBm.
2. For best external marker operation, set the 8350A to the minimum required sweep width and sweep speed. Select 8350A  $\square$  MOD.
3. If no marker is observed on the 8755C, adjust A8R67 (EXT) control (Figure 5-45) until a marker appears on the screen. If the marker does not appear, go to step 4.
4. Verify that the external marker signal (1 to 1.5 V p-p) is present at A8TP3. If not, increase the power level of the external source to  $+10$  dBm. If the marker still does not appear, go to step 5.
5. The 27.8 kHz feedthrough signal at the output of A8Q2 may be obscuring the marker birdie. Connect oscilloscope probe to A8TP4. Observe the birdie amplitude while turning the 8350A  $\square$  MOD on and off. If the modulation feedthrough obscures more than half of the birdie (peak value), reduce 83525A output power. The feedthrough level should decrease while the birdie amplitude should remain relatively constant. The marker should appear on the 8755C. If it does not, go to step 6.
6. Increase the value of resistor A8R28 until the marker appears on the screen. However, be aware that larger values of A8R28 will degrade the performance of the 8350A internal crystal markers. Check the internal markers before permanently selecting a value for A8R28. Typical value is 3160 Ohms; suggested maximum value is 5110 Ohms.

## NOTE

If external marker harmonics interfere with the measurement, reduce the marker source output power.

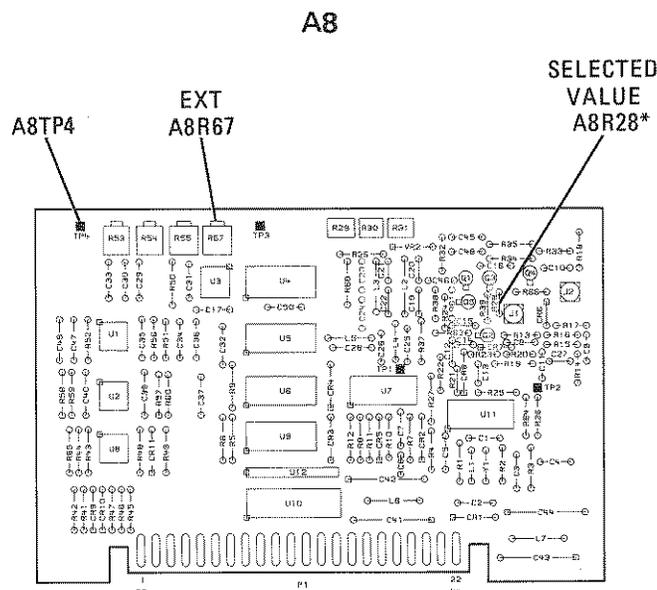


Figure 5-45. External Marker Adjustments Location



## SECTION VI REPLACEABLE PARTS

### 6-1. INTRODUCTION

6-2. This section contains information for ordering parts. Table 6-2 lists abbreviations used in the parts list and the names and addresses that correspond to the manufacturer's code numbers. Table 6-3 lists all replaceable parts in reference designator order.

**WARNING**

Any services or adjustment performed with the covers removed should only be performed by qualified service personnel. A shock hazard exists with the covers removed.

### 6-3. EXCHANGE ASSEMBLIES

6-4. Table 6-1 lists assemblies within the instrument that may be replaced on an exchange basis, thus affording a considerable cost saving. Exchange, factory-repaired and tested assemblies are available only on a trade-in basis; therefore, the defective assemblies must be returned for credit. For this reason, assemblies required for spare parts stock must be ordered by the new assembly part number.

### 6-5. ABBREVIATIONS

6-6. Table 6-2 lists abbreviations used in the parts list and schematics. In some cases, two forms of the abbreviation are used, one all in capital letters, and one partial or no capitals. This occurs because the abbreviations in the parts list are always all capitals. However, in the schematics, other abbreviation forms are used with both lower case and upper case letters.

### 6-7. REPLACEABLE PARTS LIST

6-8. Table 6-3 is the list of replaceable parts and is organized as follows:

- a. Electrical assemblies and their components in alpha-numerical order by reference designation.

- b. Chassis-mounted parts in alpha-numerical order by reference designation.

- c. Miscellaneous parts.

6-9. The information given for each part consists of the following:

- a. The Hewlett-Packard part number.
- b. Part number check digit (CD)
- c. The total quantity (Qty) in the major assembly (A1, A2, or A3).
- d. The description of the part.
- e. A typical manufacturer of the part in a five-digit code.
- f. The manufacturer's number for the part.

6-10. The total quantity for each part is given only once – at the first appearance of the part number in the list for each major assembly.

### NOTE

Total quantities for optional assemblies are totaled by assembly and not integrated into the standard list.

6-11. The mechanical parts are shown in Figure 6-1, and the attaching hardware is given in Figure 6-2.

### 6-12. ORDERING INFORMATION

6-13. To order a part listed in the replaceable parts table, quote the Hewlett-Packard Part Number (with the check digit) indicate the quantity required, and address the order to the nearest Hewlett-Packard office. The check digit will ensure accurate and timely processing of your order.

6-14. To order a part that is not listed in the Replaceable Parts Table, include the instrument model number, instrument serial number, description and function of the part, and the number of parts required. Address the order to the nearest Hewlett-Packard office.

**6-15. SPARE PARTS KIT**

6-16. Stocking spare parts for an instrument is often done to ensure quick return to service after a malfunction occurs. Hewlett-Packard has a

“Spare Parts Kit” available for this purpose. The kit consists of selected replaceable assemblies and components for this instrument. The contents of the kit and the “Recommended Spares” list are based on failure reports and repair data, and provides parts support for one year. A complimentary “Recommended Spares” list for this instrument may be obtained on request and the “Spare Parts Kit” may be ordered through your nearest Hewlett-Packard office.

Table 6-1. Exchange Parts

Reference Designation	New Part Number	Rebuilt-Exchange Part Number	Description
A12	5086-7332	5086-6332	YO 2.0-8.4 GHz
A13	5086-7249	5086-6249	MODULATOR/AMPL.
A14	5086-7354	5086-6354	AMPLIFIER 0.01-2.0 GHz
A17	5086-7219	5086-6219	MODULATOR/MIXER

**NOTE**

For module exchange procedure, see Paragraph 8-29.

Table 6-2. Manufacturers Code List, Reference Designations, and Abbreviations (1 of 3)

MANUFACTURERS CODE LIST				
MFR NO.	MANUFACTURER NAME	ADDRESS		ZIP CODE
00000	ANY SATISFACTORY SUPPLIER			
0003J	NIPPON ELECTRIC CO			
004G	UNITRODE COMPUTER PRODUCTS CORP	METHUEN	MA	53204
01121	ALLEN-BRADLEY CO	MILWAUKEE	WI	53204
01295	TEXAS INSTR INC SEMICOND CMPNT DIV	DALLAS	TX	75222
01928	RCA CORP SOLID STATE DIV	SOMERVILLE	NJ	08876
02111	SPECTROL ELECTRONICS CORP	CITY OF IND	CA	91745
03888	KDI PYROFILM CORP	WHIPPANY	NJ	07981
04713	MOTOROLA SEMICONDUCTOR PRODUCTS	PHOENIX	AZ	85062
06001	GE CO ELEK CAP & BAT PROD DEPT	IRMO	SC	29063
06665	PRECISION MONOLITHICS INC	SANTA CLARA	CA	95050
07263	FAIRCHILD SEMICONDUCTOR DIV	MOUNTAIN VIEW	CA	94042
11236	CTS OF BERNE INC	BERNE	IN	46711
13606	SPRAGUE ELECT CO SEMICONDUCTOR DIV	CONCORD	NH	03301
16179	OMNI SPECTRA INC	FARMINGTON	MI	03054
17856	SILICONIX INC	SANTA CLARA	CA	95054
18324	SIGNETICS CORP	SUNNYVALE	CA	94086
19701	MEPCO/ELECTRA CORP	MINERAL WELLS	TX	76067
20932	EMCON DIV ITW	SAN DIEGO	CA	92129
24355	ANALOG DEVICES INC	NORWOOD	MA	02062
24546	CORNING GLASS WORKS (BRADFORD)	BRADFORD	PA	16701
25088	SIEMENS CORP	ISELIN	NJ	08830
27014	NATIONAL SEMICONDUCTOR CORP	SANTA CLARA	CA	95051
28480	HEWLETT-PACKARD CO CORPORATE HQ	PALO ALTO	CA	94304
30983	MEPCO/ELECTRA CORP	SAN DIEGO	CA	92121
32997	BOURNS INC TRIMPOT PROD DIV	RIVERSIDE	CA	92507
34371	HARRIS SEMICON DIV HARRIS-INTERTYPE	MELBOURNE	FL	32901
34649	INTEL CORP	MOUNTAIN VIEW	CA	95051
51642	CENTRE ENGINEERING INC	STATE COLLEGE	PA	16801
36289	SPRAGUE ELECTRIC CO	NORTH ADAMS	MA	01247
72116	ELECTRO MOTIVE CORP SUB IEC	WILLIMANTIC	CT	06226
73138	BECKMAN INSTRUMENTS INC HELIPOT DIV	FULLERTON	CA	92634
74970	JOHNSON E F CO	WASECA	MN	56093

Table 6-2. Manufacturers Code List, Reference Designations, and Abbreviations (2 of 3)

REFERENCE DESIGNATIONS		
A..... Assembly	FL..... Filter	RT..... Thermistor
AT..... Attenuator, Isolator, Limiter, Termination	H..... Hardware	S..... Switch
B..... Fan, Motor	HY..... Circulator	T..... Transformer
BT..... Battery	J..... Electrical Connector (Stationary Portion), Jack	TB..... Terminal Board
C..... Capacitor	K..... Relay	TC..... Thermocouple
CP..... Coupler	L..... Coil, Inductor	TP..... Test Point
CR... Diode, Diode Thyristor, Step Recovery Diode (SCR), Varactor	M..... Meter	U..... Integrated Circuit, Microcircuit
DC..... Directional Coupler	MP..... Miscellaneous Mechanical Part	V..... Electron Tube
DL..... Delay Line	P..... Electrical Connector (Movable Portion), Plug	VR... Breakdown Diode (Zener), Voltage Regulator
DS... Annunciator, Lamp, Light Emitting Diode (LED), Signaling Device (Audible or Visible)	Q... Silicon Controlled Rectifier (SCR), Transistor,	W..... Cable, Transmission Path, Wire
E..... Miscellaneous Electrical Part	Triode Thyristor	X..... Socket
F..... Fuse	R..... Resistor	Y..... Crystal Unit (Piezoelectric, Quartz)
		Z... Tuned Cavity, Tuned Circuit
ABBREVIATIONS		
A		
A..... Across Flats, Acrylic, Air (Dry Method), Ampere	COM .... Commercial, Common	EXT ..... Extended, Extension, External, Extinguish
ADJ..... Adjust, Adjustment	CONN .... Connect, Connection, Connector	F
ALC..... Alcohol, Automatic Level Control	CONT..... Contact, Continuous, Control, Controller	F..... Fahrenheit, Farad, Female, Film (Resistor), Fixed, Flange, Flint, Fluorine, Frequency
AM..... Amplitude Modulation	CONV ..... Converter	FEM..... Female
AMP..... Amperage	CP..... Cadmium Plate, Candle Power, Centipoise, Conductive Plastic, Cone Point	FF ... Flange, Female Connection; Flip Flop
AMPL..... Amplifier	CRP..... Crepe, Crimp	FL..... Flash, Flat, Fluid
ANLG..... Analog	CS .... Case, Centistoke, Cesium, Cross Section	FM ... Flange, Male Connection; Foam, Frequency Modulation
ASSY..... Assembly	D	FR..... Folder
ASTBL..... Astable	D..... Deep, Depletion, Depth, Diameter, Direct Current	FT..... Current Gain Bandwidth Product (Transition Frequency); Feet, Foot
ATTEN... Attenuation, Attenuator	DB..... Decibel, Double Break	FXD..... Fixed
B	DBL..... Double	G
BCD..... Binary Coded Decimal	DCCR..... Decoder	GE..... Germanium
BFR..... Before, Buffer	DEG..... Degree	GEN..... General, Generator
BNC..... Type of Connector	DIFF..... Differential	GHZ..... Gigahertz
BSC..... Basic	DO... Package Type Designation	GL..... Glass
C	DRVR..... Driver	GP..... General Purpose, Group
C..... Capacitance, Capacitor, Center Tapped, Centistoke, Ceramic, Cermet, Circular Mil Foot, Closed Cup, Cold, Compression	DX..... Duplex	H
CER..... Ceramic	E	HD..... Hand, Hard, Head, Heavy Duty
CH..... Center Hole	E-MODE... Enhancement Mode	HEX..... Hexadecimal, Hexagon, Hexagonal
CHAM..... Chamfer	ECL..... Emitter-Coupled Logic	
CNTR..... Container, Counter	EPROM..... Erasable Programmable Read Only Memory	
COAX..... Coaxial	EXCL..... Excluding, Exclusive	

Table 6-2. Manufacturers Code List, Reference Designations, and Abbreviations (3 of 3)

HI..... High	MOSFET..... Metal Oxide	RES..... Research, Resistance,
HS.... Heat Sealed, Heat Shrink,	Semiconductor Field	Resistor, Resolution
High Speed	Effect Transistor	RETRIG..... Retriggerable
I	MTG..... Mounting	RGLTR..... Regulator
IC..... Collector Current,	MV..... Millivolt, Multivibrator	RKR..... Rocker
Integrated Circuit	MW..... Milliwatt	RND..... Round
ID..... Identification,	N	RPG.... Rotary Pulse Generator
Inside Diameter	N-CHAN..... N-Channel	RT..... Real Time, Right
IF..... Forward Current,	NAND..... Logic Not-AND	S
Intermediate Frequency	NM.... Nanometer, Nonmetallic	SCR..... Screw, Scrub, Silicon
IN..... Inch, Indium	NMOS..... N-Channel Metal	Controlled Rectifier
IN..... Inch, Indium	Oxide Semiconductor	SEC..... Second, Secondary
INP..... Input	NO.... Normally Open, Number	SGL..... Single
INT..... Integral, Intensity,	NPN... Negative Positive Negative	SHFT..... Shaft
Internal	(Transistor)	SI..... Silicon, Square Inch
INTL..... Internal, International	NS..... Nanosecond,	SLDR..... Solder
INV..... Invert, Inverter	Non-Shorting, Nose	SM..... Samarium, Seam,
J	O	Small, Square Meter,
J-FET..... Junction Field	OCTL..... Octal	Sub Modular, Subminiature
Effect Transistor	OD..... Olive Drab,	SMB..... Subminiature, B Type
JFET..... Junction Field	Outside Diameter	(Snap-On Connector)
Effect Transistor	OP..... Operational	SNP..... Snap
JGK..... Jade Gray Knob	OPT... Optical, Option, Optional	STAT..... Status
(HP 6009-0021)	P	STL..... Steel
K	PAN-HD..... Pan Head	SW..... Single Wall, Switch
KB..... Knob	PC..... Picocoulomb, Piece,	SZ..... Size
L	Printed Circuit	T
LED..... Light Emitting Diode	PCB..... Printed Circuit Board	TA..... Ambient Temperature,
LG..... Length, Long	PD..... Pad, Palladium, Pitch	Tantalum
LKG..... Leakage, Locking	Diameter, Power Dissipation	TC..... Thermoplastic
LKWR..... Lockwasher	PF..... Picofarad; Pipe, Female	THD..... Thread, Threaded
LO..... Local Oscillator, Low	Connection; Power Factor	THK..... Thick
LS.... Loudspeaker, Low Power	PL..... Phase Lock, Plain,	TPG..... Tapping
Schottky, Series Inductance	Plate, Plug	TPL..... Triple
LT..... Left, Light, Liter	PLSTC..... Plastic	TRIG..... Trigger, Triggerable,
M	Position, Positive	Triggering, Trigonometry
MA..... Milliampere	POZI..... Pozidriv Recess	TRMR..... Trimmer
MACH..... Machined	PRCN..... Precision	TRN..... Turn, Turns
MCD..... Millicandela	PRP..... Purple, Purpose	TTL..... Tan Translucent,
MISC..... Miscellaneous	PVC..... Polyvinyl Chloride	Transistor Transistor Logic
MLD..... Mold, Molded	Q	U
MOD..... Model, Modified,	QUAD..... Set of Four	U/W..... Used With
Modular, Modulated, Modulator	R	UF..... Microfarad
MONO/ASTBL..... Monostable/ Astable	RCVR..... Receiver	V
MONOSTBL..... Monostable	RCVY..... Recovery	V..... Vanadium, Variable,
	REF..... Reference	Violet, Volt, Voltage
		VAR..... Variable
		VDC..... Volts, Direct Current
		VID..... Video

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
<b>A1</b>	<b>83525-80008</b>	<b>8</b>	<b>1</b>	<b>BOARD ASSEMBLY-FRONT PANEL</b> (DOES NOT INCLUDE A1RPG1 ROTARY PULSE GENERATOR)	<b>28480</b>	<b>83525-80008</b>
A1C1	0160-4084	8	49	CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A1C2	0180-2811	7	1	CAPACITOR-FXD 10UF±20% 35VDC TA	28480	0180-2811
A1C3	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A1C4	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A1C5	0180-0552	9	1	CAPACITOR-FXD 220UF±20% 10VDC TA	28480	0180-0552
A1CR1	1901-0033	2	21	DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A1CR2	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A1DS2	1990-0487	7	14	LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	01542	5082-4584
A1DS3	1990-0487	7		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	01542	5082-4584
A1DS4	1990-0487	7		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	01542	5082-4584
A1DS5	1990-0487	7		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	01542	5082-4584
A1DS6	1990-0486	6	1	LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	01542	5082-4684
A1DS7	1990-0487	7		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	01542	5082-4584
A1DS8	1990-0487	7		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	01542	5082-4584
A1DS9	1990-0487	7		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	01542	5082-4584
A1DS10	1990-0487	7		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	01542	5082-4584
A1DS11	1990-0487	7		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	01542	5082-4584
A1DS12	1990-0487	7		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	01542	5082-4584
A1DS13	1990-0487	7		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	01542	5082-4584
A1DS14	1990-0487	7		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	01542	5082-4584
A1DS15	1990-0487	7		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	01542	5082-4584
A1DS16	1990-0487	7		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	01542	5082-4584
A1DS17	1990-0699	3	3	LED-VISIBLE LUM-INT=7MCD IF=30MA-MAX	01542	1LM1-2350
A1DS18	1990-0699	3		LED-VISIBLE LUM-INT=7MCD IF=30MA-MAX	01542	1LM1-2350
A1DS19	1990-0699	3		LED-VISIBLE LUM-INT=7MCD IF=30MA-MAX	01542	1LM1-2350
A1MP1	2950-0006	3	2	NUT-HEX-DBL-CHAM 1/4-32-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
A1MP2	2950-0006	3		NUT-HEX-DBL-CHAM 1/4-32-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
A1MP3	2190-0067	4	2	WASHER-LK INTL T 1/4 IN .256-IN-ID	28480	2190-0067
A1MP4	2190-0067	4		WASHER-LK INTL T 1/4 IN .256-IN-ID	28480	2190-0067
A1MP5—MP8	0380-1233	9	4	SPACER-SPECIALTY .460 IN LG; .175 IN OD	28480	0380-1233
A1J1	1251-4827	1	3	CONNECTOR 50-PIN M POST TYPE	28480	1251-4827
A1R1	0698-3444	1	2	RESISTOR 316 1% .125W F TC=0±100	24546	C4-1/8-TO-316R-F
A1R2	0698-3444	1		RESISTOR 316 1% .125W F TC=0±100	24546	C4-1/8-TO-316R-F
A1R3	2100-3766	7	2	RESISTOR-VAR CONTROL CP 10K 10% LIN	28480	2100-3766
A1R4	2100-3766	7		RESISTOR-VAR CONTROL CP 10K 10% LIN	28480	2100-3766
A1R6	0698-8820	7	1	RESISTOR 4.64 1% .125W F TC=0±100	28480	0698-8820
A1R7	0757-0398	4	4	RESISTOR 75 1% .125W F TC=0±100	24546	C4-1/8-TO-75RO-F
A1R8	0757-0398	4		RESISTOR 75 1% .125W F TC=0±100	24546	C4-1/8-TO-75RO-F
A1R9	0757-0398	4		RESISTOR 75 1% .125W F TC=0±100	24546	C4-1/8-TO-75RO-F
A1RPG1	5060-9444	7	1	ROTARY PULSE GENERATOR	28480	5060-9444
A1S1	5060-9436	7	14	PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
A1S2	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
A1S3	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
A1S4	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
A1S5	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
A1S6	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
A1S7	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
A1S8	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
A1S9	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
A1S10	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
A1S11	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
A1S12	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
A1S13	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
A1S14	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
A1U1	1810-0124	9	1	NETWORK-RES 16-DIP200.0 OHM X 8	11236	761-3-R200
A1U2	1990-0738	1	1	NUMERIC DISPLAY .15 HI	28480	1990-0738
A1U3	1810-0403	7	1	NETWORK-RESISTOR R1-R15: 330 OHM±2%	01121	316A331
A1XDS17	1200-0554	6	3	SOCKET-STRP 25-CONT DIP-SLDR	28480	1200-0554
A1XDS18	1200-0554	6		SOCKET-STRP 25-CONT DIP-SLDR	28480	1200-0554
A1XDS19	1200-0554	6		SOCKET-STRP 25-CONT DIP-SLDR	28480	1200-0554
A1XU2	1251-5928	5	1	CONNECTOR 15-PIN M POST TYPE	28480	1251-5928
<b>A2</b>	<b>83525-80009</b>	<b>9</b>	<b>1</b>	<b>BOARD ASSEMBLY-SUB-PANEL</b>	<b>28480</b>	<b>83525-80009</b>
A2C1	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A2C2	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A2C3	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A2C4	0160-0174	9	2	CAPACITOR-FXD .47UF +80-20% 25VDC CER	28480	0160-0174
A2C5	0160-0174	9		CAPACITOR-FXD .47UF +80-20% 25VDC CER	28480	0160-0174
A2C6	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A2C7	0160-3879	7	30	CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A2CR1				NOT ASSIGNED		
A2CR2				NOT ASSIGNED		
A2CR3	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A2CR4	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A2CR5	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A2CR6	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A2CR7	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A2J1	1251-4827	1		CONNECTOR 50-PIN M POST TYPE	28480	1251-4827

See introduction to this section for ordering information  
\* Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2J2 A2J3	1200-0508	0	1	NOT ASSIGNED SOCKET-IC 14-CONT DIP-SLDR	28480	1200-0508
A2P1	1251-5491	7	2	CONNECTOR 25-PIN F POST TYPE	28480	1251-5491
A2K1	0490-0916	6	3	RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
A2L1	9100-1618	1	4	INDUCTORRF-CH-MLD 5.6UH 10%	28480	9100-1618
A2Q1 A2Q2 A2Q3	1854-0474	4	1	NOT ASSIGNED NOT ASSIGNED TRANSISTOR NPN SI PD=310MW FT=100MHZ	04713	2N5551
A2R1	2100-3056	8	1	RESISTOR-TRMR 5K 10% C SIDE-ADJ 17-TRN	02111	43P502
A2R2	0698-3161	9	1	RESISTOR 38.3K 1% .125W F TC=0±100	24546	C4-1/8-TO-3832-F
A2R3	0757-0289	2	3	RESISTOR 13.3K 1% .125W F TC=0±100	19701	MF4C1/8-TO-1332-F
A2R4	2100-3103	6	2	RESISTOR-TRMR 10K 10% C SIDE-ADJ 17-TRN	02111	43P103
A2R5	0698-3159	5	1	RESISTOR 26.1K 1% .125W F TC=0±100	24546	C4-1/8-TO-2612-F
A2R6	2100-3103	6		RESISTOR-TRMR 10K 10% C SIDE-ADJ 17-TRN	02111	43P103
A2R7	0757-0442	9	27	RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-1002-F
A2R8				NOT ASSIGNED		
A2R9	0698-3150	6	2	RESISTOR 2.37K 1% .125W F TC=0±100	24546	C4-1/8-TO-2371-F
A2R10	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-1002-F
A2R11	0757-0437	2	1	RESISTOR 4.75K 1% .125W F TC=0±100	24546	C4-1/8-TO-4751-F
A2R12				NOT ASSIGNED		
A2R13				NOT ASSIGNED		
A2R14				NOT ASSIGNED		
A2R15				NOT ASSIGNED		
A2R16	0757-0465	6	4	RESISTOR 100K 1% .125W F TC=0±100	24546	C4-1/8-TO-1003-F
A2R17	0757-0465	6		RESISTOR 100K 1% .125W F TC=0±100	24546	C4-1/8-TO-1003-F
A2R18	0698-4008	5	1	RESISTOR 40K 1% .125W F TC=0±100	24546	C4-1/8-TO-4002-F
A2R19	0757-0465	6		RESISTOR 100K 1% .125W F TC=0±100	24546	C4-1/8-TO-1003-F
A2R20	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-1002-F
A2R21	0757-0465	6		RESISTOR 100K 1% .125W F TC=0±100	24546	C4-1/8-TO-1003-F
A2R22				NOT ASSIGNED		
A2R23				NOT ASSIGNED		
A2R24	0698-7260	7	9	RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-TO-1002-G
A2R25	0698-7260	7		RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-TO-1002-G
A2TP1	0360-0124	3	7	CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
A2TP2	0360-0124	3		CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
A2TP3	0360-0124	3		CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
A2U1	1826-0092	3	4	IC OP AMP GP DUAL TO-99	28480	1826-0092
A2U2	1858-0047	5	3	TRANSISTOR ARRAY 16-PIN PLSTC DIP	13606	ULN-2003A
A2U3	1858-0047	5		TRANSISTOR ARRAY 16-PIN PLSTC DIP	13606	ULN-2003A
A2U4	1820-1416	5	5	IC SCHMITT-TRIG TTL LS INV HEX 1-INP	01295	SN74LS14N
A2U5	1820-1730	6	8	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A2U6	1820-2150	6	1	IC MICPROC-ACCESS NMOS	34649	D8279-5
A2U7	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A2U8	1820-1196	8	4	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS174N
A2U9	1826-0417	6	3	IC SWITCH ANLG QUAD 16-DIP-C	27014	LF13333D
A2U10	1858-0047	5		TRANSISTOR ARRAY 16-PIN PLSTC DIP	13606	ULN-2003A
A2U11	1810-0368	3	1	NETWORK-RES 6-SIP10.0K OHM X 5	01121	206A103
A2U12	1826-0205	0	1	IC TIMER TTL	18324	NE556A
A2W1	8159-0005	0	6	WIRE 22AWG W PVC 1X22 80C	28480	8159-0005
A2XU6	1200-0552	4	1	SOCKET-IC 40-CONT DIP-SLDR	28480	1200-0552
	0380-0773	0	4	SPACER-RVT-ON .5-IN-LG .152-IN-ID	00000	ORDER BY DESCRIPTION
<b>A3</b>	<b>83525-80007</b>	<b>7</b>	<b>1</b>	<b>BOARD ASSEMBLY-DIGITAL INT</b>	<b>28480</b>	<b>83525-80007</b>
A3C1	0160-0127	2	12	CAPACITOR-FXD 1UF ±20% 25VDC CER	28480	0160-0127
A3C2	0160-0127	2		CAPACITOR-FXD 1UF ±20% 25VDC CER	28480	0160-0127
A3C3	0160-0127	2		CAPACITOR-FXD 1UF ±20% 25VDC CER	28480	0160-0127
A3C4	0160-0127	2		CAPACITOR-FXD 1UF ±20% 25VDC CER	28480	0160-0127
A3C5	0160-3537	4	1	CAPACITOR-FXD 680PF ±5% 100VDC MICA	28480	0160-3537
A3C6	0180-0500	7	1	CAPACITOR-FXD 47UF±20% 20VDC TA	28480	0180-0500
A3J1	1251-4827	1		CONNECTOR 50-PIN M POST TYPE	28480	1251-4827
A3MP1	5040-6852	3	2	BOARD EXTRACTOR-ORANGE	28480	5040-6852
A3MP2	5000-9145	9	1	EXTRACTOR PIN-.031 BOARD	28480	5000-9145
A3R1	0757-0428	1	1	RESISTOR 1.62K 1% .125W F TC=0±100	24546	C4-1/8-TO-1621-F
A3R2	0698-3153	9	2	RESISTOR 3.83K 1% .125W F TC=0±100	24546	C4-1/8-TO-3831-F
A3R3	0698-3153	9		RESISTOR 3.83K 1% .125W F TC=0±100	24546	C4-1/8-TO-3831-F
A3R4	0698-7212	9	7	RESISTOR 100 1% .05W F TC=0±100	24546	C3-1/8-TO-100R-G
A3S1	3101-2243	6	1	SWITCH-RKR DIP-RKR-ASSY 8-1A .05A 30VDC	28480	3101-2243
A3U1	5081-8166	2	1	IC NMOS 32K EPROM PROGRAMMED	28480	5081-8166
A3U2	5081-8167	3	1	IC NMOS 32K EPROM PROGRAMMED	28480	5081-8167
A3U3	1826-0180	0	1	IC TIMER TTL MONO/ASTBL	04713	MC1455P1
A3U4	1820-2081	2	1	IC NMOS	04713	MC68A21P
A3U5	1820-2005	0	1	IC TIMER NMOS	0003J	UPD8253D
A3U6	1820-1202	7	1	IC GATE TTL LS NAND TPL 3-INP	01295	SN74LS10N
A3U7	1820-1197	9	4	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A3U8	1820-1416	5		IC SCHMITT-TRIG TTL LS INV HEX 1-INP	01295	SN74LS14N
A3U9	1820-1216	3	7	IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A3U10	1820-1416	5		IC SCHMITT-TRIG TTL LS INV HEX 1-INP	01295	SN74LS14N

See introduction to this section for ordering information  
 \* Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number	
A3U11	1820-1416	5	3	IC SCHMITT-TRIG TTL LS INV HEX 1-INP	01295	SN74LS14N	
A3U12	1810-0338	7		NETWORK-RES 16-DIP100.0 OHM X 8	11236	761-3-R100	
A3U13	1820-1216	3		IC DCCR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N	
A3U14	1820-1491	6		IC BFR TTL LS NON-INV HEX 1-INP	01295	SN74LS367AN	
A3U15	1820-1416	5		IC SCHMITT-TRIG TTL LS INV HEX 1-INP	01295	SN74LS14N	
A3U16	1810-0338	7	2	NETWORK-RES 16-DIP100.0 OHM X 8	11236	761-3-R100	
A3U17	1820-2075	4		IC MISC TTL LS	01295	SN74LS245N	
A3U18	1820-2075	4		IC MISC TTL LS	01295	SN74LS245N	
A3U19	1810-0338	7		NETWORK-RES 16-DIP100.0 OHM X 8	11236	761-3-R100	
A3XU1	1200-0565	9		2	SOCKET-IC 24-CONT DIP-SLDR	28480	1200-0565
A3XU2	1200-0565	9	SOCKET-IC 24-CONT DIP-SLDR		28480	1200-0565	
<b>A4</b>	<b>83525-60008</b>	<b>6</b>	<b>1</b>	<b>BOARD ASSEMBLY-ALC</b>	<b>28480</b>	<b>83525-60008</b>	
A4C1	0160-0127	2	5	CAPACITOR-FXD .1UF ±20% 25VDC CER	28480	0160-0127	
A4C2	0180-0374	3		CAPACITOR-FXD 10UF±10% 20VDC TA	56289	150D106X9020B2	
A4C3	0180-0374	3		CAPACITOR-FXD 10UF±10% 20VDC TA	56289	150D106X9020B2	
A4C4	0180-0374	3		CAPACITOR-FXD 10UF±10% 20VDC TA	56289	150D106X9020B2	
A4C5	0180-0374	3		CAPACITOR-FXD 10UF±10% 20VDC TA	56289	150D106X9020B2	
A4C6	0160-3879	7	29	CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879	
A4C7	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084	
A4C8	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084	
A4C9	0160-3821	9		CAPACITOR-FXD .33UF ±20% 50VDC CER	28480	0160-3821	
A4C10	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879	
A4C11	0160-3879	7	3	CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879	
A4C12	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084	
A4C13	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084	
A4C14	0160-3874	2		CAPACITOR-FXD 10PF ±.5PF 200VDC CER	28480	0160-3874	
A4C15	0160-0127	2		CAPACITOR-FXD 1UF ±20% 25VDC CER	28480	0160-0127	
A4C16	0160-4084	8	2	CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084	
A4C17	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084	
A4C18	0160-0570	9		CAPACITOR-FXD 220PF ±20% 100VDC CER	20932	5024EM100RD221M	
A4C19	0160-0572	1		CAPACITOR-FXD 2200PF ±20% 100VDC CER	28480	0160-0572	
A4C20				NOT ASSIGNED			
A4C21	0160-0128	3	1	CAPACITOR-FXD 2.2UF ±20% 50VDC CER	28480	0160-0128	
A4C22	0160-3534	1		CAPACITOR-FXD 510PF ±5% 100VDC MICA	28480	0160-3534	
A4C23	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084	
A4C24	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084	
A4C25				NOT ASSIGNED			
A4C26	0160-3875	3	8	CAPACITOR-FXD 22PF ±5% 200VDC CER 0±30	28480	0160-3875	
A4C27	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084	
A4C28				NOT ASSIGNED			
A4C29	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084	
A4C30	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084	
A4C31	0160-0572	1	2	CAPACITOR-FXD 2200PF ±20% 100VDC CER	28480	0160-0572	
A4C32	0160-0573	2		CAPACITOR-FXD 4700PF ±20% 100VDC CER	28480	0160-0573	
A4C33	0160-0570	9		CAPACITOR-FXD 220PF ±20% 100VDC CER	20932	5024EM100RD221M	
A4CR1			15	NOT ASSIGNED			
A4CR2	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	0004G	1N4150	
A4CR3	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	0004G	1N4150	
A4CR4	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	0004G	1N4150	
A4CR5	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	0004G	1N4150	
A4CR6	1901-1098	1	1	DIODE-SWITCHING 1N4150 50V 200MA 4NS	0004G	1N4150	
A4CR7	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	0004G	1N4150	
A4CR8	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	0004G	1N4150	
A4CR9	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	0004G	1N4150	
A4CR10	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	0004G	1N4150	
A4CR11	1901-1098	1		8	DIODE-SWITCHING 1N4150 50V 200MA 4NS	0004G	1N4150
A4CR12	1901-0535	9			DIODE-SCHOTTKY	28480	1901-0535
A4J1	1251-4672	4	1	CONNECTOR 10-PIN M POST TYPE	28480	1251-4672	
A4L1	9140-0210	1		INDUCTORRRF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210	
A4L2	9140-0210	1		INDUCTORRRF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210	
A4L3	9140-0210	1		INDUCTORRRF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210	
A4MP1	5040-6848	7	1	EXTRACTOR-YELLOW	28480	5040-6848	
A4MP2	5000-9043	6		PIN:P.C. BOARD EXTRACTOR	28480	5000-9043	
A4Q1	1855-0420	2	1	TRANSISTOR J-FET 2N4391 N-CHAN D-MODE	01295	2N4391	
A4Q2	1854-0295	7		TRANSISTOR-DUAL NPN PD=400MW	28480	1854-0295	
A4Q3	1855-0414	4		TRANSISTOR J-FET 2N4393 N-CHAN D-MODE	04713	2N4393	
A4Q4	1855-0423	5		TRANSISTOR MOSFET P-CHAN E-MODE	17856	VN10KM	
A4Q5	1855-0423	5		TRANSISTOR MOSFET P-CHAN E-MODE	17856	VN10KM	
A4Q6	1854-0295	7	2	TRANSISTOR-DUAL NPN PD=400MW	28480	1854-0295	
A4Q7	1855-0423	5		TRANSISTOR MOSFET P-CHAN E-MODE	17856	VN10KM	
A4Q8	1855-0423	5		TRANSISTOR MOSFET P-CHAN E-MODE	17856	VN10KM	
A4Q9	1853-0451	6		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799	
A4Q10	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799	
A4Q11	1853-0007	7	3	TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251	
A4Q12	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404	
A4Q13	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404	
A4Q14	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251	
A4R1	2100-2633	5	2	RESISTOR-TRMR 1K 10% C SIDE-ADJ 1-TRN	30983	ET50X102	
A4R2	2100-2516	3		RESISTOR-TRMR 100K 10% C SIDE-ADJ 1-TRN	32997	3329W-1-104	
A4R3	2100-2515	2		RESISTOR-TRMR 200K 10% C SIDE-ADJ 1-TRN	30983	ET50W204	

See introduction to this section for ordering information  
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Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A4R4	2100-2514	1	5	RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	30983	ET50W203
A4R5	2100-3611	1	7	RESISTOR-TRMR 50K 10% C SIDE-ADJ 17-TRN	32997	3292X-1-503
A4R6	2100-3611	1	1	RESISTOR-TRMR 50K 10% C SIDE-ADJ 17-TRN	32997	3292X-1-503
A4R7	2100-0670	6	3	RESISTOR-TRMR 10K 10% C SIDE-ADJ 17-TRN	32997	3292X-1-103
A4R8	2100-0670	6	6	RESISTOR-TRMR 10K 10% C SIDE-ADJ 17-TRN	32997	3292X-1-103
A4R9	2100-3749	6	2	RESISTOR-TRMR 5K 10% C SIDE-ADJ 17-TRN	28480	2100-3749
A4R10	0757-0416	7	5	RESISTOR 511 1% .125W F TC=0±100	24546	C4-1/8-T0-511R-F
A4R11	2100-2522	1	5	RESISTOR-TRMR 10K 10% C SIDE-ADJ 1-TRN	30983	ET50X103
A4R12	0698-7257	2	2	RESISTOR 7.5K 1% .05W F TC=0±100	24546	C3-1/8-T0-7501-G
A4R13	0698-7258	3	1	RESISTOR 8.25K 1% .06W F TC=0±100	24546	C3-1/8-T0-8251-G
A4R14	0698-7251	6	2	RESISTOR 4.22K 1% .05W F TC=0±100	24546	C3-1/8-T0-4221-G
A4R15	0698-7236	7	3	RESISTOR 1K 1% .05W F TC=0±100	24546	C3-1/8-T0-1001-G
A4R16	0698-7268	5	2	RESISTOR 21.5K 1% .05W F TC=0±100	24546	C3-1/8-T0-2152-G
A4R17	0698-7253	8	4	RESISTOR 5.11K 1% .05W F TC=0±100	24546	C3-1/8-T0-5111-G
A4R18	0698-7268	5	2	RESISTOR 21.5K 1% .05W F TC=0±100	24546	C3-1/8-T0-2152-G
A4R19	0698-7260	7	8	RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-T0-1002-G
A4R20	0698-7263	0	1	RESISTOR 13.3K 1% .05W F TC=0±100	24546	C3-1/8-T0-1332-G
A4R21	0698-7274	3	1	RESISTOR 38.3K 1% .05W F TC=0±100	24546	C3-1/8-T0-3832-G
A4R22	0698-7261	8	1	RESISTOR 11K 1% .05W F TC=0±100	24546	C3-1/8-T0-1102-G
A4R23	0757-0466	7	2	RESISTOR 110K 1% .125W F TC=0±100	24546	C4-1/8-T0-1103-F
A4R24	0698-7269	6	3	RESISTOR 23.7K 1% .05W F TC=0±100	24546	C3-1/8-T0-2372-G
A4R25				NOT ASSIGNED		
A4R26			N	OT ASSIGNED		
A4R27	0698-7260	7	1	RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-T0-1002-G
A4R28	0698-7227	6	1	RESISTOR 422 1% .05W F TC=0±100	24546	C3-1/8-T0-422R-G
A4R29	0698-6846	3	1	RESISTOR 5.42K .5% .125W F TC=0±50	24546	NC55-1/8-T2-5421-D
A4R30	0698-7260	7	1	RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-T0-1002-G
A4R31	0837-0119	7	1	THERMISTOR ROD 5K-OHM TC=+1.7%/C-DEG	28480	0837-0119
A4R32	0698-7259	4	3	RESISTOR 9.09K 1% .05W F TC=0±100	24546	C3-1/8-T0-9091-G
A4R33	0698-7269	6	1	RESISTOR 23.7K 1% .05W F TC=0±100	24546	C3-1/8-T0-2372-G
A4R34	0698-7240	3	1	RESISTOR 1.47K 1% .05W F TC=0±100	24546	C3-1/8-T0-1471-G
A4R35	0698-7237	8	1	RESISTOR 1.1K 1% .05W F TC=0±100	24546	C3-1/8-T0-1101-G
A4R36	0698-7212	9		RESISTOR 100 1% .05W F TC=0±100	24546	C3-1/8-T0-100R-G
A4R37	0698-7243	6	3	RESISTOR 1.96K 1% .05W F TC=0±100	24546	C3-1/8-T0-1961-G
A4R38	0698-7212	9		RESISTOR 100 1% .05W F TC=0±100	24546	C3-1/8-T0-100R-G
A4R39	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0±100	24546	C3-1/8-T0-1961-G
A4R40	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0±100	24546	C3-1/8-T0-1961-G
A4R41	0698-7283	4	1	RESISTOR 90.9K 1% .05W F TC=0±100	24546	C3-1/8-T0-9092-G
A4R42	0698-7267	4	1	RESISTOR 19.6K 1% .05W F TC=0±100	24546	C3-1/8-T0-1962-G
A4R43	0698-7272	1	1	RESISTOR 31.6K 1% .05W F TC=0±100	24546	C3-1/8-T0-3162-G
A4R44	0698-7275	4	1	RESISTOR 42.2K 1% .05W F TC=0±100	24546	C3-1/8-T0-4222-G
A4R45				NOT ASSIGNED		
A4R46*	0698-7197	9	1	RESISTOR 23.7 1% .05W F TC=0±100	24546	C3-1/8-T00-23R7-G
A4R47	2100-2030	6	3	RESISTOR-TRMR 20K 10% C TOP-ADJ 1-TRN	73138	82PR20K
A4R48	0757-0421	4	5	RESISTOR 825 1% .125W F TC=0±100	24546	C4-1/8-T0-825R-F
A4R49	0698-7271	0	2	RESISTOR 28 ..... 7 1% .05W F TC=0±100	24546	C3-1/8-T0-2872-G
A4R50	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0±100	24546	C3-1/8-T0-2152-G
A4R51	0698-7282	3	1	RESISTOR 82.5K 1% .05W F TC=0±100	24546	C4-1/8-T0-8252-G
A4R52	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0±100	24546	C3-1/8-T0-1961-G
A4R53	0698-7260	7		RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-T0-1002-G
A4R54	0698-7259	4		RESISTOR 9.09K 1% .05W F TC=0±100	24546	C3-1/8-T0-9091-G
A4R55	0698-7254	9	2	RESISTOR 5.62 1% .05W F TC=0±100	24546	C3-1/8-T0-5621-G
A4R56	2100-2030	6		RESISTOR-TRMR 20K 10% C TOP-ADJ 1-TRN	73138	82PR20K
A4R57	0757-0280	3	25	RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A4R58	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A4R59	2100-1986	9	1	RESISTOR-TRMR 1K 10% C TOP-ADJ 1-TRN	73138	82PR1K
A4R60	0698-7250	5	1	RESISTOR 3.83K 1% .05W F TC=0±100	24546	C3-1/8-T0-3831-G
A4R61	0698-7259	4		RESISTOR 9.09K 1% .05W F TC=0±100	24546	C3-1/8-T0-9091-G
A4R62	0698-7270	9	1	RESISTOR 26.1K 1% .05W F TC=0±100	24546	C3-1/8-T0-2612-G
A4R63	0757-0447	4	3	RESISTOR 16.2K 1% .125W F TC=0±100	24546	C4-1/8-T0-1622-F
A4R64	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A4R65	0698-7260	7		RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-T0-1002-G
A4R66	0757-0438	3	4	RESISTOR 5.11K 1% .125W F TC=0±100	24546	C4-1/8-T0-5111-F
A4R67	2100-2030	6		RESISTOR-TRMR 20K 10% C TOP-ADJ 1-TRN	73138	82PR20K
A4R68	0698-7236	7		RESISTOR 1K 1% .05W F TC=0±100	24546	C3-1/8-T0-1001-G
A4R69	0698-3440	7	3	RESISTOR 196 1% .125W F TC=0±100	24546	C4-1/8-T0-196R-F
A4R70	0698-7269	6		RESISTOR 23.7K 1% .05W F TC=0±100	24546	C3-1/8-T0-2372-G
A4R71	0757-0418	9	2	RESISTOR 619 1% .125W F TC=0±100	24546	C4-1/8-T0-619R-F
A4R72	0698-3447	4	4	RESISTOR 422 1% .125W F TC=0±100	24546	C4-1/8-T0-422R-F
A4R73	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0±100	24546	C3-1/8-T0-5112-G
A4R74	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0±100	24546	C3-1/8-T0-4221-G
A4R75	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0±100	24546	C3-1/8-T0-5111-G
A4R76	0698-3440	7		RESISTOR 196 1% .125W F TC=0±100	24546	C4-1/8-T0-1960-F
A4R77	0757-1094	9	6	RESISTOR 1.47K 1% .125W F TC=0±100	24546	C4-1/8-T0-1471-F
A4R78	0698-7229	8	3	RESISTOR 511 1% .05W F TC=0±100	24546	C3-1/8-T0-511R-G
A4R79	0757-0394	0	6	RESISTOR 51.1 1% .125W F TC=0±100	24546	C4-1/8-T0-51R1-F
A4R80	0698-3440	7		RESISTOR 196 1% .125W F TC=0±100	24546	C4-1/8-T0-196R-F
A4R81	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0±100	24546	C3-1/8-T0-5111-G
A4R82	0698-3132	4		RESISTOR 261 1% .125W F TC=0±100	24546	C4-1/8-T0-2610-F
A4R83	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0±100	24546	C4-1/8-T0-1471-F
A4R84	0698-7229	8		RESISTOR 511 1% .05W F TC=0±100	24546	C3-1/8-T0-511R-G
A4R85	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0±100	24546	C4-1/8-T0-51R1-F
A4R86	0698-3440	7		RESISTOR 196 1% .125W F TC=0±100	24546	C4-1/8-T0-196R-F
A4R87	0698-7256	1	2	RESISTOR 6.81K 1% .05W F TC=0±100	24546	C3-1/8-T0-6811-G
A4R88	0698-7262	9	2	RESISTOR 12.1K 1% .05W F TC=0±100	24546	C3-1/8-T0-1212-G

See introduction to this section for ordering information  
\* indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A4R89	0698-7256	1		RESISTOR 6.81K 1% .05W F TC=0±100	24546	C3-1/8-T0-6811-G
A4R90	0698-7262	9		RESISTOR 12.1K 1% .05W F TC=0±100	24546	C3-1/8-T0-1212-G
A4R91	0698-7276	5	1	RESISTOR 46.4K 1% .05W F TC=0±100	24546	C3-1/8-T0-4642-G
A4R92				NOT ASSIGNED		
A4R93	0698-7212	9		RESISTOR 100 1% .05W F TC=0±100	24546	C3-1/8-T0-100R-G
A4R94	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0±100	24546	C3-1/8-T0-5111-G
A4R95	0698-7222	1	1	RESISTOR 261 1% .05W F TC=0±100	24546	C3-1/8-T0-261R-G
A4R96	0698-3157	3	4	RESISTOR 19.6K 1% .125W F TC=0±100	24546	C4-1/8-T0-1962-F
A4R97	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0±100	24546	C4-1/8-T0-1962-F
A4TP1-TP10	1251-4672	4	10	CONNECTOR 10-PIN M POST TYPE	28480	1251-4672
A4TP11	0360-0535	0	22	TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A4TP12	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A4TP13				NOT ASSIGNED		
A4TP14	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A4TP15	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A4U1	1826-0261	8	1	IC OP AMP LOW-NOISE TO-99	28480	1826-0261
A4U2	1826-0417	6		IC SWITCH ANLG QUAD 16-DIP-C	27014	LF13333D
A4U3	1826-0616	7	1	IC OP AMP PRCN QUAD 14-DIP-C	06665	OP-11EY
A4U4	1826-0610	1	3	IC MULTIPLXR 4-CHAN-ANLG DUAL 16-DIP-C	02180	MUX24FQ
A4U5	1826-0319	7	3	IC OP AMP TO-99	27014	LF356H
A4U6	1826-0610	1		IC MULTIPLXR 4-CHAN-ANLG DUAL 16-DIP-C	02180	MUX24FQ
A4U7	1826-0319	7		IC OP AMP TO-99	27014	LF356H
A4U8	1826-0021	8	1	IC OP AMP GP TO-99	27014	LM310H
A4U9	1826-0417	6		IC SWITCH ANLG QUAD 16-DIP-C	27014	LF13333D
A4U10	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A4U11	1826-0319	7		IC OP AMP TO-99	27014	LF356H
A4U12	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A4U13	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A4U14	1826-0752	2	1	IC CONV 12-B-D/A 16-DIP-C	24355	AD7542BD
A4U15	1826-0026	3	2	IC COMPARATOR PRCN TO-99	01295	LM311L
A4VR1	1902-0049	2	2	DIODE-ZNR 6.19V 5% DO-35 PD=.4W	28480	1902-0049
A4VR2	1902-0049	2		DIODE-ZNR 6.19V 5% DO-35 PD=.4W	28480	1902-0049
A4VR3	1902-0041	4	1	DIODE-ZNR 5.11V 5% DO-35 PD=.4W	28480	1902-0041
A4VR4	1902-0064	1	1	DIODE-ZNR 7.5V 5% DO-35 PD=.4W	28480	1902-0064
<b>A5</b>	<b>83525-80005</b>	<b>5</b>	<b>1</b>	<b>BOARD ASSEMBLY-FM</b>	<b>28480</b>	<b>83525-80005</b>
A5C1	0160-0575	4	2	CAPACITOR-FXD .047UF ±20% 50VDC CER	28480	0160-0575
A5C2	0160-0572	1		CAPACITOR-FXD 2200PF ±20% 100VDC CER	28480	0160-0572
A5C3	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A5C4	0160-0945	2	1	CAPACITOR-FXD 910PF ±5% 100VDC MICA	28480	0160-0945
A5C5	0160-0575	4		CAPACITOR-FXD .047UF ±20% 50VDC CER	28480	0160-0575
A5C6	0160-2247	1	1	CAPACITOR-FXD 3.9PF ±.25PF 500VDC CER	28480	0160-2247
A5C7	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A5C8	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A5C9	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A5C10	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A5C11	0140-0198	5		CAPACITOR-FXD 200PF ±5% 300VDC MICA	72136	DM15F201J0300VW1CR
A5C12	0160-2199	2	1	CAPACITOR-FXD 30PF ±5% 300VDC MICA	28480	0160-2199
A5C13				NOT ASSIGNED		
A5C14	0121-0446	6	1	CAPACITOR-V TRMR-CER 4.5-20PF 160V	28480	0121-0446
A5C15	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A5C16	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A5C17	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A5C18	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A5C19				NOT ASSIGNED		
A5C20	0160-2249	3	2	CAPACITOR-FXD 4.7PF ±.25PF 500VDC CER	28480	0160-2249
A5C21				NOT ASSIGNED		
A5C22				NOT ASSIGNED		
A5C23	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A5C24	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A5C25	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A5C26	0160-3874	2		CAPACITOR-FXD 10PF ±.5PF 200VDC CER	28480	0160-3874
A5C27	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A5C28	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A5C29	0180-2617	1	4	CAPACITOR-FXD 6.8UF±10% 35VDC TA	25088	D6R8GS1B35K
A5C30	0180-2617	1		CAPACITOR-FXD 6.8UF±10% 35VDC TA	25088	D6R8GS1B35K
A5C31	0180-2617	1		CAPACITOR-FXD 6.8UF±10% 35VDC TA	25088	D6R8GS1B35K
A5C32	0180-2617	1		CAPACITOR-FXD 6.8UF±10% 35VDC TA	25088	D6R8GS1B35K
A5C33	0180-2207	5	2	CAPACITOR-FXD 100UF±10% 10VDC TA	56289	150D107X9010R2
A5C34	0180-0474	4	7	CAPACITOR-FXD 15UF±10% 20VDC TA	28480	0180-0474
A5C35	0180-0474	4		CAPACITOR-FXD 15UF±10% 20VDC TA	28480	0180-0474
A5C36	0180-0474	4		CAPACITOR-FXD 15UF±10% 20VDC TA	28480	0180-0474
A5C37	0180-0474	4		CAPACITOR-FXD 15UF±10% 20VDC TA	28480	0180-0474
A5C38	0180-0474	4		CAPACITOR-FXD 15UF±10% 20VDC TA	28480	0180-0474
A5C39	0180-0474	4		CAPACITOR-FXD 15UF±10% 20VDC TA	28480	0180-0474
A5C40	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A5C41	0160-2249	3		CAPACITOR-FXD 4.7PF ±.25PF 500VDC CER	28480	0160-2249
A5CR1	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A5CR2	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A5CR3	1901-0047	8	2	DIODE-SWITCHING 20V 75MA 10NS	28480	1901-0047
A5CR4	1901-0047	8		DIODE-SWITCHING 20V 75MA 10NS	28480	1901-0047
A5CR5	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	0004G	1N4150

See introduction to this section for ordering information  
 \* Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C	D	Qty	Description	Mfr Code	Mfr Part Number
A5CR6	1901-1098	1			DIODE-SWITCHING 1N4150 50V 200MA 4NS	0004G	1N4150
A5CR7	1901-1098	1			DIODE-SWITCHING 1N4150 50V 200MA 4NS	0004G	1N4150
A5CR8	1901-1098	1			DIODE-SWITCHING 1N4150 50V 200MA 4NS	0004G	1N4150
A5CR9	1901-0535	9			DIODE-SCHOTTKY	28480	1901-0535
A5K1	0490-0916	6			RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
A5K2	0490-1063	6		1	RELAY-REED 2A 500MA 50VDC 5VDC-COIL 10VA	28480	0490-1063
A5L1	9100-1625	0		1	INDUCTOR RF-CH-MLD 33UH 5% .166DX.385LG	28480	9100-1625
A5L2	9100-1619	2		4	INDUCTOR RF-CH-MLD 6.8UH 10%	28480	9100-1619
A5L3	9100-1619	2			INDUCTOR RF-CH-MLD 6.8UH 10%	28480	9100-1619
A5L4	08503-80001	9		2	COIL-TOROID	28480	08503-80001
A5L5	9100-1619	2			INDUCTOR RF-CH-MLD 6.8UH 10%	28480	9100-1619
A5L6	9100-1619	2			INDUCTOR RF-CH-MLD 6.8UH 10%	28480	9100-1619
A5MP1	5040-6851	2		1	EXTRACTOR	28480	5040-6851
A5MP2	5000-9043	6			PIN:P.C. BOARD EXTRACTOR	28480	5000-9043
A5MP3	4330-0145	9		6	INSULATOR-BEAD GLASS	28480	4330-0145
A5MP4	4330-0145	9			INSULATOR-BEAD GLASS	28480	4330-0145
A5MP5	4330-0145	9			INSULATOR-BEAD GLASS	28480	4330-0145
A5MP6	4330-0145	9			INSULATOR-BEAD GLASS	28480	4330-0145
A5MP7	4330-0145	9			INSULATOR-BEAD GLASS	28480	4330-0145
A5MP8	4330-0145	9			INSULATOR-BEAD GLASS	28480	4330-0145
A5Q1	1854-0529	0		4	TRANSISTOR-DUAL NPN PD=750MW	28480	1854-0529
A5Q2	1854-0529	0			TRANSISTOR-DUAL NPN PD=750MW	28480	1854-0529
A5Q3	1854-0529	0			TRANSISTOR-DUAL NPN PD=750MW	28480	1854-0529
A5Q4	1854-0529	0			TRANSISTOR-DUAL NPN PD=750MW	28480	1854-0529
A5Q5	1854-0475	5		1	TRANSISTOR-DUAL NPN PD=750MW	28480	1854-0475
A5R1	0698-0083	8		12	RESISTOR 1.96K 1% .125W F TC=0±100	24546	C4-1/8-TO-1961-F
A5R2	0698-3154	0		4	RESISTOR 4.22K 1% .125W F TC=0±100	24546	C4-1/8-TO-4221-F
A5R3	0698-3154	0			RESISTOR 4.22K 1% .125W F TC=0±100	24546	C4-1/8-TO-4221-F
A5R4	0698-3154	0			RESISTOR 4.22K 1% .125W F TC=0±100	24546	C4-1/8-TO-4221-F
A5R5	0698-3154	0			RESISTOR 4.22K 1% .125W F TC=0±100	24546	C4-1/8-TO-4221-F
A5R6	0757-0439	4		2	RESISTOR 6.81K 1% .125W F TC=0±100	24546	C4-1/8-TO-6811-F
A5R7	0757-0439	4			RESISTOR 6.81K 1% .125W F TC=0±100	24546	C4-1/8-TO-6811-F
A5R8	0698-3158	4		1	RESISTOR 23.7K 1% .125W F TC=0±100	24546	C4-1/8-TO-2372-F
A5R9	0698-6360	6		3	RESISTOR 10K .1% .125W F TC=0±25	28480	0698-6360
A5R10	0698-6360	6			RESISTOR 10K .1% .125W F TC=0±25	28480	0698-6360
A5R11	0698-3155	1		2	RESISTOR 4.64K 1% .125W F TC=0±100	24546	C4-1/8-TO-4641-F
A5R12	0698-0083	8			RESISTOR 1.96K 1% .125W F TC=0±100	24546	C4-1/8-TO-1961-F
A5R13	0698-3446	3		1	RESISTOR 383 1% .125W F TC=0±100	24546	C4-1/8-TO-383R-F
A5R14	0757-0394	0			RESISTOR 51.1 1% .125W F TC=0±100	24546	C4-1/8-TO-51R1-F
A5R15	0757-0394	0			RESISTOR 51.1 1% .125W F TC=0±100	24546	C4-1/8-TO-51R1-F
A5R16					NOT ASSIGNED		
A5R17	0757-0442	9			RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-1002-F
A5R18	0757-0442	9			RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-1002-F
A5R19	2100-3749	6			RESISTOR-TRMR 5K 10% C SIDE-ADJ 17-TRN	28480	2100-3749
A5R20	0757-0458	7		6	RESISTOR 51.1K 1% .125W F TC=0±100	24546	C4-1/8-TO-5112-F
A5R21	0698-3136	8		2	RESISTOR 17.8K 1% .125W F TC=0±100	24546	C4-1/8-TO-1782-F
A5R22	0698-6360	6			RESISTOR 10K .1% .125W F TC=0±25	28480	0698-6360
A5R23	0698-3151	7		1	RESISTOR 2.87K 1% .125W F TC=0±100	24546	C4-1/8-TO-2871-F
A5R24					NOT ASSIGNED		
A5R25					NOT ASSIGNED		
A5R26	0698-0083	8			RESISTOR 1.96K 1% .125W F TC=0±100	24546	C4-1/8-TO-1961-F
A5R27	0698-0083	8			RESISTOR 1.96K 1% .125W F TC=0±100	24546	C4-1/8-TO-1961-F
A5R28	0757-0382	6		2	RESISTOR 16.2 1% .125W F TC=0±100	19701	MF4C1/8-TO-16R2-F
A5R29	0757-0382	6			RESISTOR 16.2 1% .125W F TC=0±100	19701	MF4C1/8-TO-16R2-F
A5R30	0757-0398	4			RESISTOR 75 1% .125W F TC=0±100	24546	C4-1/8-TO-75R0-F
A5R31*	0757-0401	0		7	RESISTOR 100 1% .125W F TC=0±100	24546	C4-1/8-TO-101-F
A5R32	0757-0403	2		1	RESISTOR 121 1% .125W F TC=0±100	24546	C4-1/8-TO-121R-F
A5R33	0698-7280	1		6	RESISTOR 68.1K 1% .05W F TC=0±100	24546	C3-1/8-TO-6812-G
A5R34	2100-2574	3		5	RESISTOR-TRMR 500 10% C SIDE-ADJ 1-TRN	30983	ET50X501
A5R35	0698-7280	1			RESISTOR 68.1K 1% .05W F TC=0±100	24546	C3-1/8-TO-6812-G
A5R36	2100-2574	3			RESISTOR-TRMR 500 10% C SIDE-ADJ 1-TRN	30983	ET50X501
A5R37	0698-7280	1			RESISTOR 68.1K 1% .05W F TC=0±100	24546	C3-1/8-TO-6812-G
A5R38	2100-2574	3			RESISTOR-TRMR 500 10% C SIDE-ADJ 1-TRN	30983	ET50X501
A5R39	0698-7280	1			RESISTOR 68.1K 1% .05W F TC=0±100	24546	C3-1/8-TO-6812-G
A5R40	2100-2574	3			RESISTOR-TRMR 500 10% C SIDE-ADJ 1-TRN	30983	ET50X501
A5R41	2100-3611	1			RESISTOR-TRMR 50K 10% C SIDE-ADJ 17-TRN	32997	3292X-1-503
A5R42	2100-3611	1			RESISTOR-TRMR 50K 10% C SIDE-ADJ 17-TRN	32997	3292X-1-503
A5R43	2100-3611	1			RESISTOR-TRMR 50K 10% C SIDE-ADJ 17-TRN	32997	3292X-1-503
A5R44	2100-3611	1			RESISTOR-TRMR 50K 10% C SIDE-ADJ 17-TRN	32997	3292X-1-503
A5R45	0757-0442	9			RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-1002-F
A5R46	0757-0420	3		2	RESISTOR 750 1% .125W F TC=0±100	24546	C4-1/8-TO-751-F
A5R47	0757-0420	3			RESISTOR 750 1% .125W F TC=0±100	24546	C4-1/8-TO-751-F
A5R48	2100-3759	8			RESISTOR-TRMR 2K 10% C SIDE-ADJ 17-TRN	28480	2100-3759
A5R49	0698-7280	1		3	RESISTOR 68.1K 1% .05W F TC=0±100	24546	C3-1/8-TO-6812-G
A5R50	2100-3749	6			RESISTOR-TRMR 5K 10% C SIDE-ADJ 17-TRN	28480	2100-3749
A5R51	0698-7264	1			RESISTOR 14.7K 1% .05W F TC=0±100	24546	C3-1/8-TO-1472-G
A5R52	0698-3156	2		1	RESISTOR 14.7K 1% .125W F TC=0±100	24546	C4-1/8-TO-1472-F
A5R53	0757-0346	2		8	RESISTOR 10 1% .125W F TC=0±100	24546	C4-1/8-TO-10R0-F
A5R54	0757-0346	2			RESISTOR 10 1% .125W F TC=0±100	24546	C4-1/8-TO-10R0-F
A5R55	0757-0346	2			RESISTOR 10 1% .125W F TC=0±100	24546	C4-1/8-TO-10R0-F
A5R56	0757-0346	2			RESISTOR 10 1% .125W F TC=0±100	24546	C4-1/8-TO-10R0-F
A5R57	0757-0346	2			RESISTOR 10 1% .125W F TC=0±100	24546	C4-1/8-TO-10R0-F
A5R58	0757-0346	2			RESISTOR 10 1% .125W F TC=0±100	24546	C4-1/8-TO-10R0-F

See introduction to this section for ordering information

\* Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A5R59- A5R72				NOT ASSIGNED		
A5R73	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-TO-1001-F
A5R74	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-TO-1001-F
A5R75	2100-2522	1		RESISTOR-TRMR 10K 10% C SIDE-ADJ 1-TRN	30983	ET50X103
A5R76	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-TO-1001-F
A5R77	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-TO-1001-F
A5TP1	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A5TP2	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A5TP3	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A5TP4	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A5TP5	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A5TP6	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A5TP7	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A5TP8	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A5TP9	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A5TP10	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A5TP11	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A5U1	1810-0206	8	1	NETWORK-RES 8-SIP10.0K OHM X 7	01121	208A103
A5U2	1810-0208	0	1	NETWORK-RES 8-SIP68.0K OHM X 7	01121	208A683
A5U3	1826-0416	5	1	IC SWITCH ANLG QUAD 16-DIP-C	27014	LF13331D
A5U4	1810-0205	7	1	NETWORK-RES 8-SIP4.7K OHM X 7	01121	208A472
A5U5	1810-0321	8	1	NETWORK-RES 8-SIP220.0K OHM X 7	01121	208A224
A5U6				NOT ASSIGNED		
A5U7	1826-0092	3		IC OP AMP GP DUAL TO-99	28480	1826-0092
A5U8	1826-0349	3	1	IC V RGLTR TO-39	07263	UA78M06HL
A5U9	1826-0811	4	1	IC V RGLTR BV	28480	1826-0811
A5U10	1826-0546	2	1	IC WIDEBAND AMPL VID TO-100	18324	NE592K
A5U11	1826-0476	7	1	IC SWITCH ANLG 8-DIP-P	01295	TL601CP
A5U12				NOT ASSIGNED		
A5U13				NOT ASSIGNED		
A5U14	1826-0557	5	1	IC OP AMP GP QUAD 14-DIP-C	27014	LM348J
A5U15				NOT ASSIGNED		
A5U16	1820-1196	8		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS174N
A5U17	1826-0899	6	1	IC CONV 8-B-D/A 16-DIP-C	24355	AD7524AD
A5U18	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A5U19	1826-0700	0	1	IC OP AMP VBI 14-DIP-C	34371	HA1-5195-3
A5U20	1820-0224	1	1	IC OP AMP SPCL TO-99	27014	LH0002CH
A5U21	1810-0366	1	1	NETWORK-RES 6-SIP220.0 OHM X 5	01121	206A221
A5VR1	1902-3002	3	2	DIODE-ZNR 2.37V 5% DO-7 PD=.4W TC=-.074%	28480	1902-3002
A5VR2	1902-3002	3		DIODE-ZNR 2.37V 5% DO-7 PD=.4W TC=-.074%	28480	1902-3002
A5W1	8159-0005	0		WIRE 22AWG W PVC 1X22 80C	28480	8159-0005
A5W2				NOT ASSIGNED		
A5W3				NOT ASSIGNED		
A5W4	8159-0005	0		WIRE 22AWG W PVC 1X22 80C	28480	8159-0005
A5W5	8159-0005	0		WIRE 22AWG W PVC 1X22 80C	28480	8159-0005
A5W6	8159-0005	0		WIRE 22AWG W PVC 1X22 80C	28480	8159-0005
<b>A6</b>	<b>83525-60002</b>	<b>2</b>	<b>1</b>	<b>BOARD ASSEMBLY-YO DRIVER</b> (DOES NOT INCLUDE R1,3,38,39,40,& 41)	<b>28480</b>	<b>83525-60002</b>
A6C1	0160-3874	2		CAPACITOR-FXD 10PF ±.5PF 200VDC CER	28480	0160-3874
A6C2				NOT ASSIGNED		
A6C3				NOT ASSIGNED		
A6C4	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A6C5				NOT ASSIGNED		
A6C6				NOT ASSIGNED		
A6C7	0180-3020	2	1	CAPACITOR-FXD 120UF±10% 50VDC TA	28480	0180-3020
A6C8	0180-2206	4	1	CAPACITOR-FXD 60UF±10% 6VDC TA	56289	150D606X9006B2
A6C9	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A6C10				NOT ASSIGNED		
A6C11	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A6C12				NOT ASSIGNED		
A6C13				NOT ASSIGNED		
A6C14	0180-2186	9	1	CAPACITOR-FXD 300UF±20% 30VDC TA	06001	69F455G7
A6C15	0160-3878	6	6	CAPACITOR-FXD 1000PF ±20% 100VDC CER	28480	0160-3878
A6C16	0160-3878	6		CAPACITOR-FXD 1000PF ±20% 100VDC CER	28480	0160-3878
A6C17	0180-0116	1	7	CAPACITOR-FXD 6.8UF±10% 35VDC TA	56289	150D685X9035B2
A6C18	0180-0116	1		CAPACITOR-FXD 6.8UF±10% 35VDC TA	56289	150D685X9035B2
A6C19	0180-2207	5		CAPACITOR-FXD 100UF±10% 10VDC TA	56289	150D107X9010R2
A6C20	0180-0116	1		CAPACITOR-FXD 6.8UF±10% 35VDC TA	56289	150D685X9035B2
A6C21	0180-0228	6	1	CAPACITOR-FXD 22UF±10% 15VDC TA	56289	150D226X9015B2
A6C22	0160-0574	3	1	CAPACITOR-FXD .022UF ±20% 100VDC CER	28480	0160-0574
A6C23	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A6CR1	1901-0535	9		DIODE-SCHOTTKY	28480	1901-0535
A6CR2	1901-0535	9		DIODE-SCHOTTKY	28480	1901-0535
A6CR3	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A6CR4	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A6CR5	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A6CR6	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A6CR7	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A6K1	0490-0916	6		RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916

See introduction to this section for ordering information  
\* Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A6L1	9100-1666	9	2	INDUCTORRF-CH-MLD 3.6MH 5% .23DX.57LG	28480	9100-1666
A6L2	9100-1666	9		INDUCTORRF-CH-MLD 3.6MH 5% .23DX.57LG	28480	9100-1666
A6L3	08503-80001	9		COIL-TOROID	28480	08503-80001
A6MP1	5040-6849	8		EXTRACTOR—BLUE	28480	5040-6849
A6MP2	5000-9043	6		PIN-P.C. BOARD EXTRACTOR	28480	5000-9043
A6Q1	1853-0044	2	2	TRANSISTOR PNP SI TO-39 PD=1W FT=200MHZ	28480	1853-0044
A6Q2	1853-0044	2		TRANSISTOR PNP SI TO-39 PD=1W FT=200MHZ	28480	1853-0044
A6Q3	1854-0477	7	1	TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A6R1*						
A6R2	0698-8484	9	4	RESISTOR 6.44K .1% .1W F TC=0+4	28480	0698-8484
A6R3*						
A6R4	0698-8484	9		RESISTOR 6.44K .1% .1W F TC=0+4	28480	0698-8484
A6R5	0698-8484	9		RESISTOR 6.44K .1% .1W F TC=0+4	28480	0698-8484
A6R6	0698-8484	9		RESISTOR 6.44K .1% .1W F TC=0+4	28480	0698-8484
A6R7	0698-6217	2	1	RESISTOR 200K .5% .125W F TC=0±100	28480	0698-6217
A6R8	0698-6358	2	1	RESISTOR 100K .1% .125W F TC=0±25	28480	0698-6358
A6R9	0698-3274	5	1	RESISTOR 10K 1% .125W F TC=0±25	28480	0698-3274
A6R10	0698-3219	8	1	RESISTOR 300K .25% .125W F TC=0±50	28480	0698-3219
A6R11	2100-3757	6	2	RESISTOR-TRMR 100 10% C SIDE-ADJ 17-TRN	28480	2100-3757
A6R12	0699-0517	6	1	RESISTOR 5.621K .1% .1W F TC=0+4	28480	0699-0517
A6R13	0698-3457	5	1	RESISTOR 316K 1% .125W F TC=0±100	28480	0698-3457
A6R14	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A6R15	0757-0401	0		RESISTOR 100 1% .125W F TC=0±100	24546	C4-1/8-T0-101-F
A6R16	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0±100	24546	C4-1/8-T0-1961-F
A6R17	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0±100	24546	C4-1/8-T0-1961-F
A6R18	0698-6317	3	1	RESISTOR 500 .1% .125W F TC=0±25	03888	PME55-1/8-T9-500R-B
A6R19	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A6R20	0698-8486	1	1	RESISTOR 9.84K .1% .1W F TC=0+4	28480	0698-8486
A6R21	2100-3750	9	1	RESISTOR-TRMR 20K 10% C SIDE-ADJ 17-TRN	28480	2100-3750
A6R22	0698-8479	2	1	RESISTOR 4.16K .1% .1W F TC=0+4	28480	0698-8479
A6R23	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A6R24	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0±100	24546	C4-1/8-T0-1471-F
A6R25	2100-3753	2	1	RESISTOR-TRMR 200K 10% C SIDE-ADJ 17-TRN	28480	2100-3753
A6R26	0698-6384	4	1	RESISTOR 330K 1% .125W F TC=0±25	28480	0698-6384
A6R27	0698-8489	1	2	RESISTOR 15K .1% .1W F TC=0+4	28480	0698-8489
A6R28	0698-6406	4	2	RESISTOR 8.54K .1% .1W F TC=0+4	28480	0698-6406
A6R29	0698-6406	1		RESISTOR 8.54K .1% .1W F TC=0+4	28480	0698-6406
A6R30	2100-3757	6		RESISTOR-TRMR 100 10% C SIDE-ADJ 17-TRN	28480	2100-3757
A6R31	0699-0518	6	1	RESISTOR 11.489K .1% .1W F TC=0+4	28480	0699-0518
A6R32	0698-8489	4		RESISTOR 15K .1% .1W F TC=0+4	28480	0698-8489
A6R33				NOT ASSIGNED		
A6R34	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A6R35	0757-0470	3	1	RESISTOR 162K 1% .125W F TC=0±100	24546	C4-1/8-T0-1623-F
A6R36	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A6R37	0757-0274	5	1	RESISTOR 1.21K 1% .125W F TC=0±100	24546	C4-1/8-T0-1213-F
A6R38*						
A6R39*						
A6R40*						
A6R41*						
A6R42	0698-3453	2	1	RESISTOR 196K 1% .125W F TC=0±100	24546	C4-1/8-T0-1963-F
A6R43	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0±100	24546	C4-1/8-T0-1961-F
A6R44	0757-0447	4		RESISTOR 16.2K 1% .125W F TC=0±100	24546	C4-1/8-T0-1622-F
A6R45	2100-3732	7	1	RESISTOR-TRMR 500 10% C SIDE-ADJ 17-TRN	28480	2100-3732
A6R46	0757-0438	3	4	RESISTOR 5.11K 1% .125W F TC=0±100	24546	C4-1/8-T0-5111-F
A6R47	0698-8825	2	1	RESISTOR 681K 1% .125W F TC=0±100	28480	0698-8825
A6R48	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0±100	24546	C4-1/8-T0-1961-F
A6R49	0757-0421	4		RESISTOR 825 1% .125W F TC=0±100	24546	C4-1/8-T0-825R-F
A6R50	0757-0421	4		RESISTOR 825 1% .125W F TC=0±100	24546	C4-1/8-T0-825R-F
A6R51	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0±100	24546	C4-1/8-T0-1961-F
A6R52	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A6R53	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	28546	C4-1/8-T0-1001-F
A6SW1	3101-0471	8	2	SWITCH-RKR DIP-RKR-ASSY 10-1A .05A 30VDC	28480	3101-0471
A6SW2	3101-0471	8		SWITCH-RKR DIP-RKR-ASSY 10-1A .05A 30VDC	28480	3101-0471
A6TP1-16	1251-5924	1	16	CONNECTOR 16-PIN M POST TYPE	28480	1251-5924
A6U1	1810-0277	3	2	NETWORK-RES 10-SIP2.2K OHM X 9	01121	210A222
A6U2	1810-0277	3		NETWORK-RES 10-SIP2.2K OHM X 9	01121	210A222
A6U3	1820-2024	3	3	IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A6U4	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A6U5	1826-0026	3		IC COMPARATOR PRCN TO-99	01295	LM311L
A6U6	1826-0477	8	2	IC SWITCH ANLG 8-DIP-P	01295	TL610CP
A6U7	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A6U8	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A6U9	1826-0684	9	2	IC CONV 12-B-D/A 18-DIP-C	28480	1826-0684
A6U10	1826-0471	2	7	IC OP AMP LOW-DRIFT TO-99	28480	1826-0471
A6U11	1826-0471	2		IC OP AMP LOW-DRIFT TO-99	28480	1826-0471
A6U12	1820-1272	1	1	IC BFR TTL LS NOR QUAD 2-INP	01295	SN74LS33N
A6U13	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A6U14	1826-0471	2		IC OP AMP LOW-DRIFT TO-99	28480	1826-0471
A6U15	1826-0471	2		IC OP AMP LOW-DRIFT TO-99	28480	1826-0471
A6U16	1826-0471	2		IC OP AMP LOW-DRIFT TO-99	28480	1826-0471
A6U17	1820-1112	8	1	IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A6U18	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A6U19	1826-0684	9		IC CONV 12-B-D/A 18-DIP-C	28480	1826-0684

See introduction to this section for ordering information

\* Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A6U20	1826-0471	2		IC OP AMP LOW-DRIFT TO-99	28480	1826-0471
A6U21	1820-1211	8	1	IC GATE TTL LS EXCL-OR QUAD 2-INP	01295	SN74LS86N
A6U22	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A6U23	1826-0330	2	1	V REF PRNC TO-46	27014	LM299H
A6U24	1826-0471	2		IC OP AMP LOW-DRIFT TO-99	28480	1826-0471
A6U25	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A6U26	1826-0477	8		IC SWITCH ANLG 8-DIP-P	01295	TL610CP
A6U27	1826-0512	2	1	IC 78M15C V RGLTR TO-39	04713	MC78M15CG
A6VR1	1902-0197	1	2	DIODE-ZNR 82.5V 5% DO-15 PD=1W TC=+.082%	28480	1902-0197
<b>A7</b>	<b>83525-60004</b>	<b>4</b>	<b>1</b>	<b>BOARD ASSEMBLY-MARKER</b>	<b>28480</b>	<b>83525-60004</b>
A7C1	0160-4811	9	1	CAPACITOR-FXD 270PF ±5% 100VDC CER	28480	0160-4811
A7C2	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A7C3	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A7C4	0160-4824	4	1	CAPACITOR-FXD 680PF ±5% 100VDC CER	28480	0160-4824
A7C5	0160-4824	4	3	CAPACITOR-FXD 680PF ±5% 100VDC CER	28480	0160-4824
A7C6	0160-4786	7	1	CAPACITOR-FXD 27PF ±5% 100VDC CER 0±30	28480	0160-4786
A7C7	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A7C8	0180-0229	7	4	CAPACITOR-FXD 33UF±10% 10VDC TA	56289	150D336X9010B2
A7C9	0180-0229	7		CAPACITOR-FXD 33UF±10% 10VDC TA	56289	150D336X9010B2
A7C10	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A7C11	0180-0116	1		CAPACITOR-FXD 6.8UF±10% 35VDC TA	56289	150D685X9035B2
A7C12	0180-0116	1		CAPACITOR-FXD 6.8UF±10% 35VDC TA	56289	150D685X9035B2
A7C13	0180-0474	4		CAPACITOR-FXD 15UF±10% 20VDC TA	28480	0180-0474
A7C14	0180-1746	5	1	CAPACITOR-FXD 15UF±10% 20VDC TA	56289	150D156X9020B2
A7C15	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A7C16	0160-3878	6		CAPACITOR-FXD 1000PF ±20% 100VDC CER	28480	0160-3878
A7C17	0160-3878	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3878
A7C18	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A7C19	0160-4389	6	2	CAPACITOR-FXD 100PF ±5PF 200VDC CER	51642	200-200-NP0-101J
A7C20	0160-4389	6		CAPACITOR-FXD 100PF ±5PF 200VDC CER	51642	200-200-NP0-101J
A7C21	0160-4832	4	1	CAPACITOR-FXD .01UF ±10% 100VDC CER	28480	0160-4832
A7C22	0180-2820	8	1	CAPACITOR-FXD .22UF±20% 35VDC TA	28480	0180-2820
A7CR1	1901-0040	1	3	DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A7CR3	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A7CR4	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A7CR5	1901-0539	3	5	DIODE-SCHOTTKY	28480	1901-0539
A7CR6	1901-0539	3		DIODE-SCHOTTKY	28480	1901-0539
A7CR7	1901-0539	3		DIODE-SCHOTTKY	28480	1901-0539
A7CR8	1901-0539	3		DIODE-SCHOTTKY	28480	1901-0539
A7CR9	1901-0539	3		DIODE-SCHOTTKY	28480	1901-0539
A7L1	9100-1618	1		INDUCTOR RF-CH-MLD 5.6UH 10%	28480	9100-1618
A7MP1	5040-6850	1	1	BOARD EXTRACTOR	28480	5040-6850
A7MP2	5000-9043	6		PIN:P.C. BOARD EXTRACTOR	28480	5000-9043
A7Q1	1853-0314	9	1	TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A7Q2	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A7Q3	1855-0423	5		TRANSISTOR MOSFET P-CHAN E-MODE	17856	VN10KM
A7Q4	1853-0281	9	1	TRANSISTOR PNP 2N2907A SI TO-18 PD=400MW	04713	2N2907A
A7Q5	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18	04713	2N2222A
A7R1	0757-0416	7		RESISTOR 511 1% .125W F TC=0±100	24546	C4-1/8-T0-511R-F
A7R2	0757-0290	5	3	RESISTOR 6.19K 1% .125W F TC=0±100	19701	MF4C1/8-T0-6191-F
A7R3	0698-3152	8	2	RESISTOR 3.48K 1% .125W F TC=0±100	24546	C4-1/8-T0-3481-F
A7R4	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0±100	24546	C4-1/8-T0-3481-F
A7R5	2100-2489	9	2	RESISTOR-TRMR 5K 10% C SIDE-ADJ 1-TRN	30983	ET50X502
A7R6	2100-2489	9		RESISTOR-TRMR 5K 10% C SIDE-ADJ 1-TRN	30983	ET50X502
A7R7	2100-2522	1		RESISTOR-TRMR 10K 10% C SIDE-ADJ 1-TRN	30983	ET50X103
A7R8				NOT ASSIGNED		
A7R9	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0±100	19701	MF4C1/8-T0-6191-F
A7R10				NOT ASSIGNED		
A7R11				NOT ASSIGNED		
A7R12				NOT ASSIGNED		
A7R13				NOT ASSIGNED		
A7R14	0698-3447	4		RESISTOR 422 1% .125W F TC=0±100	24546	C4-1/8-T0-422R-F
A7R15	0698-3442	9		RESISTOR 237 1% .125W F TC=0±100	24546	C4-1/8-T0-237R-F
A7R16	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A7R17	0757-0346	2		RESISTOR 10 1% .125W F TC=0±100	24546	C4-1/8-T0-10R0-F
A7R18	0757-0346	2		RESISTOR 10 1% .125W F TC=0±100	24546	C4-1/8-T0-10R0-F
A7R19	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A7R20	2100-2522	1		RESISTOR-TRMR 10K 10% C SIDE-ADJ 1-TRN	30983	ET50X103
A7R21	2100-2515	2	5	RESISTOR-TRMR 200K 10% C SIDE-ADJ 1-TRN	30983	ET50W204
A7R22	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A7R23	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A7R24	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A7R25	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A7R26	2100-2515	2		RESISTOR-TRMR 200K 10% C SIDE-ADJ 1-TRN	30983	ET50W204
A7R27	2100-2522	1		RESISTOR-TRMR 10K 10% C SIDE-ADJ 1-TRN	30983	ET50X103
A7R28	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0±100	24546	C4-1/8-T0-5112-F
A7R29	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0±100	24546	C4-1/8-T0-5112-F
A7R30	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A7R31				NOT ASSIGNED		

See introduction to this section for ordering information  
 \* Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A7R32				NOT ASSIGNED		
A7R33	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A7R34	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A7R35	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A7R36	0698-3157	3	2	RESISTOR 19.6K 1% .125W F TC=0±100	24546	C4-1/8-T0-1962-F
A7R37	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A7R38	0757-0462	3	1	RESISTOR 75K 1% .125W F TC=0±100	24546	C4-1/8-T0-7502-F
A7R39	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0±100	24546	C4-1/8-T0-1961-F
A7R40	0699-0071	6	1	RESISTOR 4.64M 1% .125W F TC=0±100	28480	0699-0071
A7R41	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A7R42	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A7R43	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0±100	24546	C4-1/8-T0-1961-F
A7R44	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0±100	24546	C4-1/8-T0-4641-F
A7R45	0698-3449	6	1	RESISTOR 28.7K 1% .125W F TC=0±100	24546	C4-1/8-T0-2872-F
A7R46	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A7R47	2100-3611	1		RESISTOR-TRMR 50K 10% C SIDE-ADJ 17-TRN	32997	3292X-1-503
A7R48	0698-3260	9	1	RESISTOR 464K 1% .125W F TC=0±100	28480	0698-3260
A7R49	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A7R50	0757-0443	0	1	RESISTOR 11K 1% .125W F TC=0±100	24546	C4-1/8-T0-1102-F
A7R51	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A7R52	0757-0123	3	2	RESISTOR 34.8K 1% .125W F TC=0±100	28480	0757-0123
A7R53	0757-0419	0	2	RESISTOR 681K 1% .125W F TC=0±100	24546	C4-1/8-T0-681R-F
A7R54	0757-0279	0	3	RESISTOR 3.16K 1% .125W F TC=0±100	24546	C4-1/8-T0-3161-F
A7R55	0757-0289	2		RESISTOR 13.3K 1% .125W F TC=0±100	19701	MF4C1/8-T0-1332-F
A7R56	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A7R57	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A7R58	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A7R59	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0±100	24546	C4-1/8-T0-1471-F
A7R60	0698-3446	3		RESISTOR 383 1% .125W F TC=0±100	24546	C4-1/8-T0-383R-F
A7R61	0757-0401	0		RESISTOR 100 1% .125W F TC=0±100	24546	C4-1/8-T0-101-F
A7R62	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0±100	24546	C4-1/8-T0-1962-F
A7R63	0757-0200	7	1	RESISTOR 5.62K 1% .125W F TC=0±100	24546	C4-1/8-T0-5621-F
A7R64	0757-0444	1	1	RESISTOR 12.1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1212-F
A7R65	2100-0544	3	1	RESISTOR-TRMR 100K 10% C SIDE-ADJ 17-TRN	32997	3292X-1-104
A7R66	2100-0670	6		RESISTOR-TRMR 10K 10% C SIDE-ADJ 17-TRN	32997	3292X-1-103
A7R67	0757-0444	1		RESISTOR 12.1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1212-F
A7R68	0698-3153	9		RESISTOR 3.83K 1% .125W F TC=0±100	24546	C4-1/8-T0-3831-F
A7R69	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A7R70	0698-3446	3		RESISTOR 383 1% .125W F TC=0±100	24546	C4-1/8-T0-383R-F
A7TP1	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A7TP2	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A7TP3	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A7TP4	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A7TP5	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A7TP6	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A7TP7	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A7U1	1820-1423	4	3	IC MV TTL LS MONOSTBL RETRIG DUAL	01295	SN74LS123N
A7U2	1826-0720	4	2	IC SWITCH ANLG QUAD 16-DIP-C	06665	SW-02FQ
A7U3	1826-0753	3	1	IC OP AMP LOW-BIAS-H-IMPQD QUAD 14-DIP-C	04713	MC34004BL
A7U4	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A7U5	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A7U6	1826-0092	3		IC OP AMP GP DUAL TO-99	28480	1826-0092
A7U7	1826-0758	8	1		28480	1826-0758
A7U8	1820-1423	4		IC MV TTL LS MONOSTBL RETRIG DUAL	01295	SN74LS123N
A7U9	1820-1196	8		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS174N
A7U10	1826-0458	5	1	IC OP AMP TO-99	27014	LF255H
A7U11	1826-0720	4		IC SWITCH ANLG QUAD 16-DIP-C	06665	SW-02FQ
A7U12	1820-1144	6	1	IC GATE TTL LS NOR QUAD 2-INP	01295	SN74LS02N
A7U13	1820-1196	8		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS174N
A7U14	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A7U15	1820-1423	4		IC MV TTL LS MONOSTBL RETRIG DUAL	01295	SN74LS123N
<b>A8</b>	<b>83825-60003</b>	<b>3</b>	<b>1</b>	<b>BOARD ASSEMBLY-SAMPLER</b>	<b>28480</b>	<b>83525-60003</b>
A8C1	0160-3877	5	2	CAPACITOR-FXD 100PF ±20% 200VDC CER	28480	0160-3877
A8C2	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A8C3	0160-4794	7	1	CAPACITOR-FXD 5.6PF ±.5PF 100VDC CER	28480	0160-4794
A8C4	0121-0493	3	1	CAPACITOR-V TRMR-AIR 1.7-11 PF 175V	74970	187-0306-125
A8C5	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A8C6	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A8C7	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A8C8	0160-3872	0	4	CAPACITOR-FXD 2.2PF ±.25PF 200VDC CER	28480	0160-3872
A8C9	0160-0572	1		CAPACITOR-FXD 2200PF ±20% 100VDC CER	28480	0160-0572
A8C10	0160-3877	5		CAPACITOR-FXD 100PF ±20% 200VDC CER	28480	0160-3877
A8C11	0160-3872	0		CAPACITOR-FXD 2.2PF ±.25PF 200VDC CER	28480	0160-3872
A8C12	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A8C13	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A8C14	0160-3872	0		CAPACITOR-FXD 2.2PF ±.25PF 200VDC CER	28480	0160-3872
A8C15	0160-3872	0		CAPACITOR-FXD 2.2PF ±.25PF 200VDC CER	28480	0160-3872
A8C16	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A8C17	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A8C18				NOT ASSIGNED		
A8C19	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A8C20	0160-0573	2		CAPACITOR-FXD 4700PF ±20% 100VDC CER	28480	0160-0573
A8C21	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A8C22	0160-0572	1		CAPACITOR-FXD 2200PF ±20% 100VDC CER	28480	0160-0572

See introduction to this section for ordering information  
 \* indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A8C23	0160-3878	6		CAPACITOR-FXD 1000PF ±20% 100VDC CER	28480	0160-3878
A8C24	0160-4808	4		CAPACITOR-FXD 470PF ±5% 100VDC CER	28480	0160-4808
A8C25	0160-3878	6		CAPACITOR-FXD 1000PF ±20% 100VDC CER	28480	0160-3878
A8C26	0160-3878	6		CAPACITOR-FXD 1000PF ±20% 100VDC CER	28480	0160-3878
A8C27	0160-4399	8	1	CAPACITOR-FXD .66PF ±.33PF 50VDC CER	28480	0160-4399
A8C28	0160-4800	6	1	CAPACITOR-FXD 120PF ±5% 100VDC CER	28480	0160-4800
A8C29	0160-4805	1	2	CAPACITOR-FXD 47PF ±5% 100VDC CER 0±30	28480	0160-4805
A8C30	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A8C31	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A8C32	0160-4808	4		CAPACITOR-FXD 470PF ±5% 100VDC CER	28480	0160-4808
A8C33	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A8C34	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A8C35	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A8C36	0160-4805	1		CAPACITOR-FXD 47PF ±5% 100VDC CER 0±30	28480	0160-4805
A8C37	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A8C38				NOT ASSIGNED		
A8C39	0160-0127	2		CAPACITOR-FXD 1UF ±20% 25VDC CER	28480	0160-0127
A8C40	0160-0127	2		CAPACITOR-FXD 1UF ±20% 25VDC CER	28480	0160-0127
A8C41	0180-0116	1		CAPACITOR-FXD 6.8UF±10% 35VDC TA	56289	150D685X9035B2
A8C42	0180-0116	1		CAPACITOR-FXD 6.8UF±10% 35VDC TA	56289	150D685X9035B2
A8C43	0180-0229	7		CAPACITOR-FXD 33UF±10% 10VDC TA	56289	150D336X9010B2
A8C44	0180-0229	7		CAPACITOR-FXD 33UF±10% 10VDC TA	56289	150D336X9010B2
A8C45	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A8C46	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A8C47	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A8C48	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A8C49	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A8C50	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A8CR1	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A8CR2	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A8CR3	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A8CR4	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A8CR5	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A8CR6	1901-0535	9		DIODE-SCHOTTKY	28480	1901-0535
A8CR7	1901-0535	9		DIODE-SCHOTTKY	28480	1901-0535
A8CR8	1901-0457	4	1	DIODE-STEP RCVY 30V DO-7	28480	1901-0457
A8CR9	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A8CR10	1901-0535	9		DIODE-SCHOTTKY	28480	1901-0535
A8CR11	1901-0535	9		DIODE-SCHOTTKY	28480	1901-0535
A8J1	1250-0543	8	2	CONNECTOR-RF SM-SNP M PC 50-OHM	28480	1250-0543
A8J2	1250-0543	8		CONNECTOR-RF SM-SNP M PC 50-OHM	28480	1250-0543
A8L1	9100-2247	4	1	INDUCTORRRF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A8L2	9100-1626	1	1	INDUCTORRRF-CH-MLD 36UH 5% .166DX.385LG	28480	9100-1626
A8L3	9100-1693	2	1	INDUCTORRRF-CH-MLD 360UH 5% .2DX.45LG	28480	9100-1693
A8L4	9100-2261	2	1	INDUCTORRRF-CH-MLD 2.7UH 10% .105DX.26LG	28480	9100-2261
A8L5	9100-1623	8	1	INDUCTORRRF-CH-MLD 27UH 5% .166DX.385LG	28480	9100-1623
A8L6	9100-1618	1		INDUCTORRRF-CH-MLD 5.6UH 10%	28480	9100-1618
A8L7	9100-1618	1		INDUCTORRRF-CH-MLD 5.6UH 10%	28480	9100-1618
A8MP1	5040-6846	5	1	P.C. BOARD EXTRACTOR	28480	5040-6846
A8MP2	5000-9043	6		PIN:P.C. BOARD EXTRACTOR	28480	5000-9043
A8Q1	1854-0019	3	1	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0019
A8Q2	1855-0049	1	2	TRANSISTOR-JFET DUAL N-CHAN D-MODE SI	28480	1855-0049
A8Q3	1855-0020	8	1	TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A8Q4	1855-0049	1		TRANSISTOR-JFET DUAL N-CHAN D-MODE SI	28480	1855-0049
A8Q5	1854-0345	8	1	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A8R1	0698-3435	0	1	RESISTOR 38.3 1% .125W F TC=0±100	24546	C4-1/8-T0-38R3-F
A8R2	0757-0416	7		RESISTOR 511 1% .125W F TC=0±100	24546	C4-1/8-T0-511R-F
A8R3	0757-0416	7		RESISTOR 511 1% .125W F TC=0±100	24546	C4-1/8-T0-511R-F
A8R4	0757-0416	7		RESISTOR 511 1% .125W F TC=0±100	24546	C4-1/8-T0-511R-F
A8R5	0698-3447	4		RESISTOR 422 1% .125W F TC=0±100	24546	C4-1/8-T0-422R-F
A8R6	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A8R7	0698-0084	9	2	RESISTOR 2.15K 1% .125W F TC=0±100	24546	C4-1/8-T0-2151-F
A8R8	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A8R9	0698-3447	4		RESISTOR 422 1% .125W F TC=0±100	24546	C4-1/8-T0-422R-F
A8R10	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0±100	24546	C4-1/8-T0-2151-F
A8R11	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A8R12	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A8R13	0698-7202	7	3	RESISTOR 38.3 1% .05W F TC=0±100	24546	C3-1/8-T00-38R3-G
A8R14	0698-7205	0	4	RESISTOR 51.1 1% .05W F TC=0±100	24546	C3-1/8-T00-51R1-G
A8R15	0698-7202	7		RESISTOR 38.3 1% .05W F TC=0±100	24546	C3-1/8-T00-38R3-G
A8R16	0698-7209	4	1	RESISTOR 75 1% .05W F TC=0±100	24546	C3-1/8-T00-75R0-G
A8R17	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0±100	24546	C3-1/8-T0-2152-G
A8R18	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0±100	24546	C3-1/8-T00-51R1-G
A8R19	0698-7188	8	1	RESISTOR 10 1% .05W F TC=0±100	24546	C3-1/8-T00-10R-G
A8R20	0698-7202	7		RESISTOR 38.3 1% .05W F TC=0±100	24546	C3-1/8-T00-38R3-G
A8R21	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0±100	24546	C3-1/8-T00-51R1-G
A8R22	0757-0401	0		RESISTOR 100 1% .125W F TC=0±100	24546	C4-1/8-T0-101-F
A8R23	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0±100	24546	C3-1/8-T00-51R1-G
A8R24	0698-7212	9		RESISTOR 100 1% .05W F TC=0±100	24546	C3-1/8-T0-100R-G
A8R25	0757-0401	0		RESISTOR 100 1% .125W F TC=0±100	24546	C4-1/8-T0-101-F
A8R26	0698-7229	8		RESISTOR 511 1% .05W F TC=0±100	24546	C3-1/8-T0-511R-G
A8R27	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A8R28*	0698-7248	1	2	RESISTOR 3.16K 1% .05W F TC=0±100	24546	C3-1/8-T0-3161-G

See introduction to this section for ordering information  
 \* Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A8R29	2100-2515	2		RESISTOR-TRMR 200K 10% C SIDE-ADJ 1-TRN	30983	ET50W204
A8R30	2100-2515	2		RESISTOR-TRMR 200K 10% C SIDE-ADJ 1-TRN	30983	ET50W204
A8R31	2100-2515	2		RESISTOR-TRMR 200K 10% C SIDE-ADJ 1-TRN	30983	ET50W204
A8R32	0698-7260	7		RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-T0-1002-G
A8R33	0698-7249	2	1	RESISTOR 3.48K 1% .05W F TC=0±100	24546	C3-1/8-T0-3481-G
A8R34	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0±100	24546	C4-1/8-T0-5112-F
A8R35	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A8R36	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0±100	24546	C4-1/8-T0-51R1-F
A8R37	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0±100	24546	C4-1/8-T0-51R1-F
A8R38	0698-7280	1		RESISTOR 68.1K 1% .05W F TC=0±100	24546	C3-1/8-T0-6812-G
A8R39	0698-7254	9	1	RESISTOR 5.62K 1% .05W F TC=0±100	24546	C3-1/8-T0-5621-G
A8R40				NOT ASSIGNED		
A8R41	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A8R42	0757-0288	1	1	RESISTOR 9.09K 1% .125W F TC=0±100	19701	MF4C1/8-T0-9091-F
A8R43	0757-0289	2		RESISTOR 13.3K 1% .125W F TC=0±100	19701	MF4C1/8-T0-1332-F
A8R44	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A8R45	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0±100	24546	C4-1/8-T0-2371-F
A8R46	0757-0447	4		RESISTOR 16.2K 1% .125W F TC=0±100	24546	C4-1/8-T0-1622-F
A8R47	0698-3136	8		RESISTOR 17.8K 1% .125W F TC=0±100	24546	C4-1/8-T0-1782-F
A8R48	0757-0459	8	1	RESISTOR 56.2K 1% .125W F TC=0±100	24546	C4-1/8-T0-5622-F
A8R49	0757-0401	0		RESISTOR 100 1% .125W F TC=0±100	24546	C4-1/8-T0-101-F
A8R50	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0±100	24546	C4-1/8-T0-1471-F
A8R51	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0±100	24546	C4-1/8-T0-5112-F
A8R52	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0±100	24546	C4-1/8-T0-5112-F
A8R53	2100-2514	1		RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	30983	ET50W203
A8R54	2100-2514	1		RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	30983	ET50W203
A8R55	2100-2514	1		RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	30983	ET50W203
A8R56	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0±100	24546	C4-1/8-T0-1471-F
A8R57	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0±100	24546	C4-1/8-T0-5111-F
A8R58	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0±100	24546	C4-1/8-T0-5111-F
A8R59	0698-3260	9		RESISTOR 464K 1% .125W F TC=0±100	28480	0698-3260
A8R60	0757-0466	7		RESISTOR 110K 1% .125W F TC=0±100	24546	C4-1/8-T0-1103-F
A8R61	0698-7260	7		RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-T0-1002-G
A8R62				NOT ASSIGNED		
A8R63	0698-7248	1	1	RESISTOR 3.16K 1% .05W F TC=0±100	24546	C3-1/8-T0-3161-G
A8R64	0698-7212	9		RESISTOR 100 1% .05W F TC=0±100	24546	C3-1/8-T0-100R-G
A8R65	0698-3452	1	1	RESISTOR 147K 1% .125W F TC=0±100	24546	C4-1/8-T0-1473-F
A8R66	0698-7236	7		RESISTOR 1K 1% .05W F TC=0±100	24546	C3-1/8-T0-1001-G
A8R67	2100-2514	1		RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	30983	ET50W203
A8R68	0698-3447	4		RESISTOR 422 1% .125W F TC=0±100	24546	C4-1/8-T0-422R-F
A8TP1-4	1251-0600	0	10	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ	28480	1251-0600
A8U1	1820-0306	0	2	IC DIFF AMPL TO-99	0192B	CA3028A
A8U2	1820-0475	4	1	IC COMPARATOR HS TO-99	27014	LM306H
A8U3	1820-0306	0	1	IC DIFF AMPL TO-99	0192B	CA3028A
A8U4	1826-0811	4	1	IC SWITCH	28480	1826-0811
A8U5	1826-0610	1		IC MULTIPLEX 4-CHAN-ANLG DUAL 16-DIP-C	02180	MUX24FQ
A8U6	1820-1383	5	2	IC CNTR ECL BCD POS-EDGE-TRIG	04713	MC10138L
A8U7	1820-0804	3	1	IC GATE ECL NOR TPL	04713	MC10106P
A8U8	1826-0092	3		IC OP AMP GP DUAL TO-99	28480	1826-0092
A8U9	1820-1383	5		IC CNTR ECL BCD POS-EDGE-TRIG	04713	MC10138L
A8U10	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A8U11	1820-0809	8	1	IC RCVR ECL LINE RCVR QUAD 2-INP	04713	MC10115P
A8U12	1810-0279	5	1	NETWORK-RES 10-SIP4.7K OHM X 9	01121	210A472
A8VR1				NOT ASSIGNED		
A8VR2	1902-0025	4	1	DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+0.06%	28480	1902-0025
A8Y1	0410-0594	8	1	CRYSTAL-QUARTZ 50.000 MHZ	28480	0410-0594
<b>A9</b>	<b>83525-80010</b>	<b>2</b>	<b>1</b>	<b>BOARD ASSEMBLY-TRANSISTOR HEAT SINK</b>	<b>28480</b>	<b>83525-80010</b>
A9C1	0180-0291	3	1	CAPACITOR-FXD 1UF±10% 35VDC TA	56289	150D105X9035A2
A9C2	0180-1735	2	1	CAPACITOR-FXD .22UF±10% 35VDC TA	56289	150D224X9035A2
A9E1	1200-0043	8	2	INSULATOR-XSTR ALUMINUM	28480	1200-0043
A9E2	1200-0043	8		INSULATOR-XSTR ALUMINUM	28480	1200-0043
A9MP1	83525-20036	8	1	HEAT SINK	28480	83525-20036
A9MP2	2360-0115	4	4	SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A9MP3	2360-0115	4		SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A9MP4	2360-0115	4		SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A9MP5	2360-0115	4		SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A9MP6	0520-0128	7	2	SCREW-MACH 2-56 .250-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A9MP7	0520-0128	7		SCREW-MACH 2-56 .250-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A9MP8	2190-0014	1		WASHER-LK INTL T NO.2 .089-IN-ID	28480	2190-0014
A9MP9	2190-0014	1		WASHER-LK INTL T NO.2 .089-IN-ID	28480	2190-0014
A9Q1	1854-0080	8	1	TRANSISTOR NPN SI TO-3 PD=100W FT=3MHZ	28480	1854-0080
A9Q2				NOT ASSIGNED		
A9Q3	1820-0430	1	1	IC 309 V RGLTR TO-3	07263	LM309K
A9R1	0811-1058	1	1	RESISTOR-125 OHM 12W	28480	0811-1058
<b>A10</b>	<b>83525-80001</b>	<b>1</b>	<b>1</b>	<b>BOARD ASSEMBLY-MOTHER</b>	<b>28480</b>	<b>83525-80001</b>
A10C1	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A10C2	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879

See introduction to this section for ordering information  
 \* Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A10C3	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A10C4	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A10C5	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A10C6	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A10C7	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A10J1	1251-5926	3	1	CONNECTOR 50-PIN M POST TYPE	28480	1251-5926
A10J2	1251-5927	4	1	CONNECTOR 26-PIN M POST TYPE	28480	1251-5927
A10J3	1251-4966	9	1	CONNECTOR 8-PIN M POST TYPE	28480	1251-4966
A10J4	1251-5238	0	1	CONNECTOR 10-PIN M POST TYPE	28480	1251-5238
A10J5	1200-0507	9	2	SOCKET-IC 16-CONT DIP-SLDR	28480	1200-0507
A10MP1	1251-1115	4	4	POLARIZING KEY-PC EDGE CONN	28480	1251-1115
A10R1	0757-0123	3		RESISTOR 34.8K 1% .125W F TC=0±100	28480	0757-0123
A10R2	0698-8812	7	1	RESISTOR 1 1% .125W F TC=0±100	28480	0698-8812
A10XA3	1251-1365	6	6	CONNECTOR-PC EDGE 22-CONT/ROW 2-ROWS	28480	1251-1365
A10XA4	1251-1365	6	6	CONNECTOR-PC EDGE 22-CONT/ROW 2-ROWS	28480	1251-1365
A10XA5	1251-1365	6	6	CONNECTOR-PC EDGE 22-CONT/ROW 2-ROWS	28480	1251-1365
A10XA6	1251-1365	6	6	CONNECTOR-PC EDGE 22-CONT/ROW 2-ROWS	28480	1251-1365
A10XA7	1251-1365	6	6	CONNECTOR-PC EDGE 22-CONT/ROW 2-ROWS	28480	1251-1365
A10XA8	1251-1365	6		CONNECTOR-PC EDGE 22-CONT/ROW 2-ROWS	28480	1251-1365
A10XA9	1251-0472	4	1	CONNECTOR-PC EDGE 6-CONT/ROW 2-ROWS	28480	1251-0472
<b>A11</b>	<b>5086-7327</b>	<b>5</b>	<b>2</b>	<b>DIODE-SWITCH</b>	<b>28480</b>	<b>5086-7327</b>
<b>A12</b>	<b>5086-7332</b>	<b>2</b>	<b>1</b>	<b>OSCILLATOR-2.2-8.4 GHZ</b>	<b>28480</b>	<b>5086-7332</b>
A12	5086-6332	0		EXCHANGE 5086-7332 OSCILLATOR	28480	5086-6332
A12A1	5061-1069	8	1	BOARD ASSEMBLY-OSCILLATOR BIAS	28480	5061-1069
A12A1C1	0160-0127	2		CAPACITOR-FXD 1UF ±20% 25VDC CER	28480	0160-0127
A12A1C2	0160-0127	2		CAPACITOR-FXD 1UF ±20% 25VDC CER	28480	0160-0127
A12A1CR1	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A12A1E1	1251-0600	0	6	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A1E2	1251-0600	0	6	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A1E3	1251-0600	0	6	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A1E4	1251-0600	0	6	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A1E5	1251-0600	0	6	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A1E6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A1J1	1200-0507	9		SOCKET-IC 16-CONT DIP-SLDR	28480	1200-0507
A12A1J2	1250-0257	1	1	CONNECTOR-RF SMB M PC 50-OHM	28480	1250-0257
A12A1MP1	1251-3172	7	10	CONNECTOR-SGL CONT SKT .03-IN-BSC-SZ RND	28480	1251-3172
A12A1R1*		0				
A12A1R2*		5				
A12A1R3	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0±100	24546	C4-1/8-T0-3161-F
A12A1R4	2100-2633	5		RESISTOR-TRMR 1K 10% C SIDE-ADJ 1-TRN	30983	ET50X102
A12A1VR1	1902-0579	3	2	DIODE-ZNR 5.11V 5% DO-15 PD=1W TC=-.009%	28480	1902-0579
A12A1VR2	1902-0579	3	2	DIODE-ZNR 5.11V 5% DO-15 PD=1W TC=-.009%	28480	1902-0579
A12A1VR3	1902-0197	1		DIODE-ZNR 82.5V 5% DO-15 PD=1W TC=+.082%	28480	1902-0197
A12E1	5001-1559	5	1	INSULATOR	28480	5001-1559
A12MP1	7121-0554	4	1	LABEL-IDOSC 7332AA	28480	7121-0554
<b>A13</b>	<b>5086-7249</b>	<b>0</b>	<b>1</b>	<b>MODULATOR-AMPLIFIER 2-8.4 GHZ (DOES NOT INCLUDE A13A1)</b>	<b>28480</b>	<b>5086-7249</b>
A13	5086-6249	8		EXCHANGE 5086-7249 MOD-AMPL	28480	5086-6249
A13A1	83525-60011	3	1	BOARD ASSEMBLY-AMPLIFIER, BAND 1	28480	83525-60011
A13A1C1	0160-0127	2		CAPACITOR-FXD 1UF ±20% 25VDC CER	28480	0160-0127
A13A1C2	0180-0374	3		CAPACITOR-FXD 10UF±10% 20VDC TA	56289	150D106X9020B2
A13A1C3	0160-0127	2		CAPACITOR-FXD 1UF ±20% 25VDC CER	28480	0160-0127
A13A1C4	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A13A1C5	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A13A1J1	1200-0487	4	1	SOCKET-IC 16-CONT DIP DIP-SLDR	28480	1200-0487
A13A1J2	1251-4670	2	1	CONNECTOR 3-PIN M POST TYPE	28480	1251-4670
A13A1L1	9140-0114	4	1	INDUCTORRF-CH-MLD 10UH 10% .166DX.385LG	28480	9140-0114
A13A1MP1	1200-0173	5	1	INSULATOR-XSTR DAP-GL	28480	1200-0173
A13A1MP2	1205-0011	0	1	HEAT SINK TO-5/TO-39-CS	28480	1205-0011
A13A1Q1	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A13A1Q2	1855-0251	7	1	TRANSISTOR MOSFET N-CHAN E-MODE TO-39 SI	28480	1855-0251
A13A1R1	0757-0418	9		RESISTOR 619 1% .125W F TC=0±100	24546	C4-1/8-T0-619R-F
A13A1R2	2100-2574	3		RESISTOR-TRMR 500 10% C SIDE-ADJ 1-TRN	30983	ET50X501
A13A1R3	0757-0419	0		RESISTOR 681 1% .125W F TC=0±100	24546	C4-1/8-T0-681R-F
A13A1R4	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A13A1R5	0757-0421	4		RESISTOR 825 1% .125W F TC=0±100	24546	C4-1/8-T0-825R-F
A13A1R6	0757-0421	4		RESISTOR 825 1% .125W F TC=0±100	24546	C4-1/8-T0-825R-F
A13A1R7	0698-0082	7	3	RESISTOR 464 1% .125W F TC=0±100	24546	C4-1/8-T0-4640-F
A13A1R8	2100-2413	9	3	RESISTOR-TRMR 200 10% C SIDE-ADJ 1-TRN	30983	ET50X201
A13A1R9	0698-0082	7		RESISTOR 464 1% .125W F TC=0±100	24546	C4-1/8-T0-4640-F

See introduction to this section for ordering information  
 \* Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C	D	Qty	Description	Mfr Code	Mfr Part Number
A13A1R10	2100-2413	9			RESISTOR-TRMR 200 10% C SIDE-ADJ 1-TRN	30983	ET50X201
A13A1R11	0698-0082	7			RESISTOR 464 1% .125W F TC=0±100	24546	C4-1/8-T0-4640-F
A13A1R12	2100-2413	9			RESISTOR-TRMR 200 10% C SIDE-ADJ 1-TRN	30983	ET50X201
A13A1R13	0757-0279	0			RESISTOR 3.16K 1% .125W F TC=0±100	24546	C4-1/8-T0-3161-F
A13A1R14	0757-0442	9			RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A13A1R15	0757-0280	3			RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A13A1R16	0757-0290	5			RESISTOR 6.19K 1% .125W F TC=0±100	19701	MF4C1/8-T0-6191-F
A13A1R17	0757-0280	3			RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A13A1TP1	0360-0124	3			CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
A13A1TP2	0360-0124	3			CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
A13A1TP3	0360-0124	3			CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
A13A1TP4	0360-0124	3			CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
A13A1U1	1820-1417	6	1		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS26N
A13A1VR1	1902-3104	6	1		DIODE-ZNR 5.62V 5% D0-35 PD=.4W	28480	1902-3104
A13A1VR2	1902-0049	2	1		DIODE-ZNR 6.19V 5% D0-35 PD=.4W	28480	1902-0049
A14	5086-7354	8	1		AMPLIFIER-.01-2.4 GHZ	28480	5086-7354
A14.	5086-6354	6			EXCHANGE 5086-7354 AMPLIFIER	28480	5086-6354
A15	5086-7238	7	1		DC RETURN	28480	5086-7238
A16	86222-60007	7	1		CAVITY OSCILLATOR	28480	86222-60007
A16C1	0180-2216	6	1		CAPACITOR-FXD 350 UF +75-10% 16VDC AL	28480	0180-2216
A16C2	0180-2144	9	1		CAPACITOR-FXD 200 UF +75-10% 25VDC AL	28480	0180-2144
A17	5086-7219	4	1		MODULATOR-MIXER	28480	5086-7219
A17	5086-6219	2			EXCHANGE 5086-7219 MODULATOR-MIXER	28480	5086-6219
A18	5086-7327	5			DIODE-SWITCH	28480	5086-7327
CR1	86290-60045	5	1		LBHCD DETECTOR	28480	86290-60045
CR2	1901-0033	2	2		DIODE-GEN PRP 180V 200MA D0-7	28480	1901-0033
CR3	1901-0033	2	2		DIODE-GEN PRP 180V 200MA D0-7	28480	1901-0033
DC1	5086-7220	7	1		DIRECTIONAL DETECTOR	28480	5086-7220
DC2	0955-0098	1	1		DIRECTIONAL COUPLER	28480	0955-0098
E1	5040-0345	7	2		INSULATOR-CONNECTOR	28480	5040-0345
E2	5040-0345	7	2		INSULATOR-CONNECTOR	28480	5040-0345
E3	0340-0614	4	1		INSULATOR-TRANSISTOR	28480	0340-0614
J1	86290-60005	7	1		CONNECTOR ASSEMBLY-TYPE N (NOTE: SEE FIGURE 6-5 FOR EXPLODED VIEW OF J1)	28480	86290-60005
J2	1250-0212	8	1		CONNECTOR-RF BND FEM SGL-HOLE-FR 50 OHM PART OF W23	28480	1250-0212
J3	1250-0118	3	2		CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM	28480	1250-0118
J4	1250-0118	3	2		CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM	28480	1250-0118
J5	1250-0118	3	2		CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM	28480	1250-0118
					NOTE SEE FIGURE 6-1 FOR MECHANICAL PARTS (MP) LOCATION.		
MP1	83525-00005	9	1		COVER-PC SEC	28480	83525-00005
MP2	4040-1695	1	1		WINDOW-DISPLAY	28480	4040-1695
MP3	0370-3023	8	1		KNOB3/4 JGK .25-IN-ID	28480	0370-3023
MP4 THRU MP8					NOT ASSIGNED		
MP9 THRU MP19	5041-0285	6	11		KEY CAP-QUARTER LITE PIPE	28480	5041-0285
MP20	5040-8823	2	2		KNOB-JADE GRAY	28480	5040-8823
MP21	5040-8823	2	2		KNOB-JADE GRAY	28480	5040-8823
MP22	83525-00001	5	1		PANEL DRESS	28480	83525-00001
MP23	83525-00002	6	1		PANEL DRESS- (OPTION 004 ONLY)	28480	83525-00002
MP24	5041-1924	2	1		KEY CAP-HALF POWER LEVEL	28480	5041-1924
MP25	5041-1925	3	1		KEY CAP-HALF POWER SWEEP	28480	5041-1925
MP26	5041-1926	4	1		KEY CAP-HALF SLOPE	28480	5041-1926
MP27	0050-2032	9	1		CASTING-AL FRAME (RR)	28480	0050-2032
	0360-1190	5	1		TERMINAL-SLDR LUG PL-MTG FOR-#3/8-SCR	28480	0360-1190
MP28	83525-00006	0	1		BRACKET-COUPLER	28480	83525-00006
MP29	83525-00007	1	1		BRACKET-DETECTOR	28480	83525-00007
MP30	83525-20038	0	1		SHIELD-REAR	28480	83525-20038
MP31 THRU MP34	1400-1095	6	4		CLIP FASTENER-SCREEN .3 X .4 INCH	28480	1400-1095
MP35	83525-20037	9	1		SHIELD-FRONT	28480	83525-20037
MP36	83525-20030	2	1		SIDE RAIL- UP RT	28480	83525-20030
MP37	83525-20039	1	1		CASTING-FRONT	28480	83525-20039
MP38 THRU MP42	0510-1148	2	5		RETAINER-PUSH ON KB-TO-SHFT EXT	28480	0510-1148
MP43					NOT ASSIGNED		
MP44	83525-00008	2	1		BRACKET-SW2	28480	83525-00008
MP45	86240-00009	5	1		BRACKET-AMPL	28480	86240-00009
MP46	83525-00009	3	1		REAR CONN BRACKET (OPT. 004 ONLY)	28480	83525-00009
MP47	83525-20031	3	1		SIDE RAIL- UP LT	28480	83525-20031
MP48	1460-1851	8			SPRING LATCH	28480	1460-1851
MP49	1480-0337	5	1		PIN-ROLL	28480	1480-0337
MP50	83525-20033	5	4		LATCH-SCREW	28480	83525-20033

See introduction to this section for ordering information  
\* Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
MP51	3030-0330	7	2	SET SCREW	28480	3030-0330
	83525-20033	5		LATCH-SCREW	28480	83525-20033
	3030-0330	7		SET SCREW	28480	3030-0330
MP52	83525-20040	4	1	LATCH	28480	83525-20040
MP53	83525-00012	8	1	HOLD-DOWN BRACKET	28480	83525-00012
MP54	83525-00011	7	1	BRACKET-ATTEN (OPT. 002 ONLY)	28480	83525-00011
MP55	83525-20029	9	2	SIDE RAIL- LO LT	28480	83525-20029
MP56	83525-00010	6	1	GUARD	28480	83525-00010
MP57	83525-00013	9	1	WIRE HOLDER	28480	83525-00013
MP58	83525-20032	4	1	SIDE RAIL- LR RT	28480	83525-20032
MP59	83525-20022	2	1	CASTING-RF	28480	83525-20022
MP60	83525-00003	7	1	REAR PANEL	28480	83525-00003
MP61	6960-0046	6	1	PLUG-HOLE DOME-HD FOR .688-D-HOLE BRS	28480	6960-0046
MP62	5021-0906	6	3	SLEEVE-RF PIN POS	28480	5021-0906
MP63	5021-0906	6	1	SLEEVE-RF PIN POS	28480	5021-0906
MP64	5021-0906	6	1	SLEEVE-RF PIN POS	28480	5021-0906
MP65	6960-0001	3	1	PLUG-HOLE DOME-HD FOR .375-D-HOLE STL	28480	6960-0001
MP66	4320-0360	9	1	BACKING PAD	28480	4320-0360
MP67	11869-20020	4	1	ALIGNMENT PIN	28480	11869-20020
MP68	0510-0089	8	1	LOCK RING	28480	0510-0089
Q1	1854-0456	2	1	TRANSISTOR NPN SI PD=65W FT=3MHZ	01295	TIP41A
W1	83525-20026	6	1	CABLE-RF COUPLER/OUTPUT NOT ASSIGNED	28480	83525-20026
W2						
W3	83525-60031	7	1	CABLE ASSY-RIBBON, FRONT PANEL	28480	83525-60031
W3	83525-60054	4	1	CABLE ASSY-RIBBON, FRONT PANEL OPT. 004	28480	83525-60054
W4	83525-60013	5	1	WIRE ASSEMBLY-RF PATH NOT ASSIGNED	28480	83525-60013
W5						
W6	83525-60019	1	1	CABLE ASSY-COAX, RED	28480	83525-60019
W7	83525-60018	0	1	CABLE ASSY-COAX, YELLOW	28480	83525-60018
W8	83525-60017	9	1	CABLE ASSY-COAX, RED	28480	83525-60017
W9	83525-20018	6	1	CABLE-DIRECTIONAL COUPLER/SW2	28480	83525-20018
W10	83525-20017	5	1	CABLE-RF DC RETURN/DIRECTIONAL COUPLER	28480	83525-20017
W11	83525-20012	0	1	CABLE-RF (SW2) DIRECTIONAL COUPLER	28480	83525-20012
W12	83525-60028	2	1	CABLE ASSY-COAX, BLUE, FM OUTPUT	28480	83525-60028
W13	83525-20013	1	1	CABLE-RF AMPLIFIER/SW2	28480	83525-20013
W14	83525-60026	0	1	CABLE ASSY-COAX, GRAY, DETECTOR	28480	83525-60026
W15	83525-20016	4	1	CABLE-RF LOW AMPLIFIER/DC RETURN	28480	83525-20016
W16	83525-60022	6	1	CABLE ASSY-RIBBON, RF PATH NOT ASSIGNED	28480	83525-60022
W17						
W18	08750-60013	0	1	CABLE ASSY-REGULATOR	28480	08750-60013
W19	83525-60027	1	1	CABLE ASSY-FM IN, GREEN	28480	83525-60027
W20	83525-60014	6	1	CABLE ASSY-AM, BROWN	28480	83525-60014
W21	83525-60029	3	1	CABLE ASSY-V TUNE, ORANGE	28480	83525-60029
W22	83525-60030	6	1	CABLE ASSY-PULSE IN, PURPLE	28480	83525-60030
W23	83525-60016	8	1	CABLE ASSY-EXT MARKER, YELLOW	28480	83525-60016
W24	83525-20021	1	1	CABLE-RF Y.O./SW1	28480	83525-20021
W25	83525-20015	3	1	CABLE-RF MODULATOR/LOW AMPLIFIER	28480	83525-20015
W26	83525-20020	0	1	CABLE-RF SW1/MODULATOR	28480	83525-20020
W27	83525-20014	2	1	CABLE-RF SW1/AMPLIFIER	28480	83525-20014
W28	83525-20019	7	1	CABLE-RF OSCILLATOR/MODULATOR NOT ASSIGNED	28480	83525-20019
W29						
W30						
W31	83525-60024	8	1	CABLE ASSY-POWER SUPPLY	28480	83525-60024
W32	83525-60025	9	1	CABLE ASSY-REAR CONNECTOR	28480	83525-60025
W33	83525-20027	7	1	CABLE-ATTEN/OUTPUT (OPT. 002 ONLY)	28480	83525-20027
W34	83525-20028	8	1	CABLE/COUPLER-ATTEN (OPT. 002 ONLY)	28480	83525-20028
W35	83525-20024	4	1	CABLE-RF COUPLER-REAR OUTPUT (OPT. 004)	28480	83525-20024
W36	83522-20017	2	1	CABLE-RF ATTEN/REAR OUT (OPT. 002 AND 004)	28480	83522-20017
A19	5086-7370	8	1	ATTENUATOR-70DB (OPT. 002 ONLY)	28480	5086-7370
A19MP1	83525-00011	7	1	BRACKET-ATTENUATOR	28480	83525-00011
W33	83525-20027	7	1	CABLE-ATTENUATOR OUTPUT	28480	83525-20027
W34	83525-20028	8	1	CABLE-COUPLER/ATTENUATOR	28480	83525-20028
				DELETE CABLE W1(83525-20026) FOR OPT. 002		
				<b>OPTION 004</b> PANEL DRESS (OPT. 004 ONLY) REAR CONNECTOR BRACKET CABLE-RF COUPLER/REAR OUTPUT CABLE ASSY-RIBBON, FRONT PANEL	28480 28480 28480 28480	83525-00002 83525-00009 83525-20024 83525-60054
				NOTE DELETE W1 (83525-20026) AND DRESS PANEL (83525-00001) FOR OPT. 004 ONLY.		
				<b>OPTION 002 AND 004</b> ALL OPT. 002 & 004 PARTS + THE FOLLOWING:		
W36	83522-20017	2	1	CABLE-RF ATTENUATOR/REAR OUTPUT DELETE CABLES W1(83525-20026), W33 (83525-20027) AND W35(83525-20024) FOR OPT. 002 AND 004.	28480	83522-20017

See introduction to this section for ordering information  
\* Indicates factory selected value

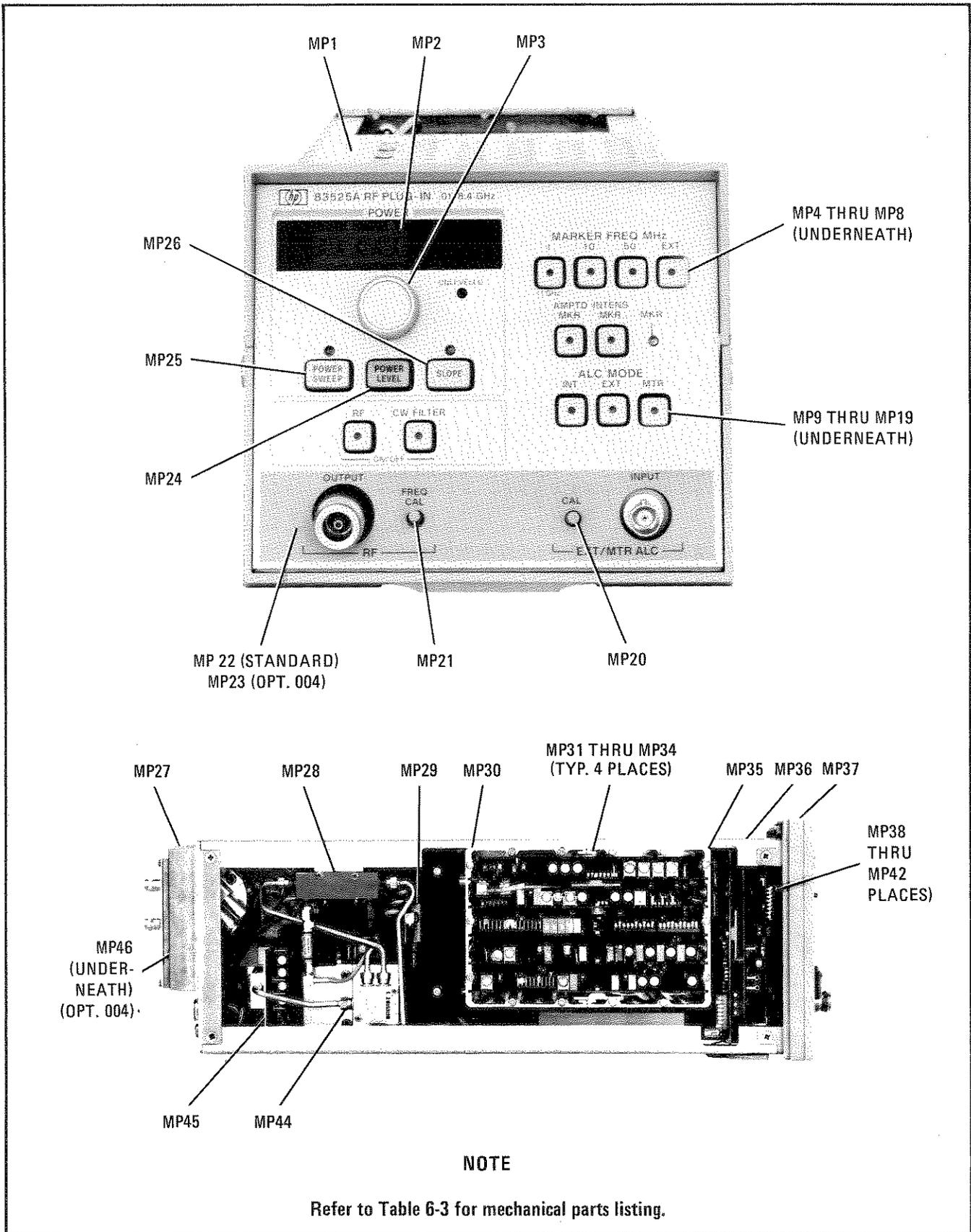
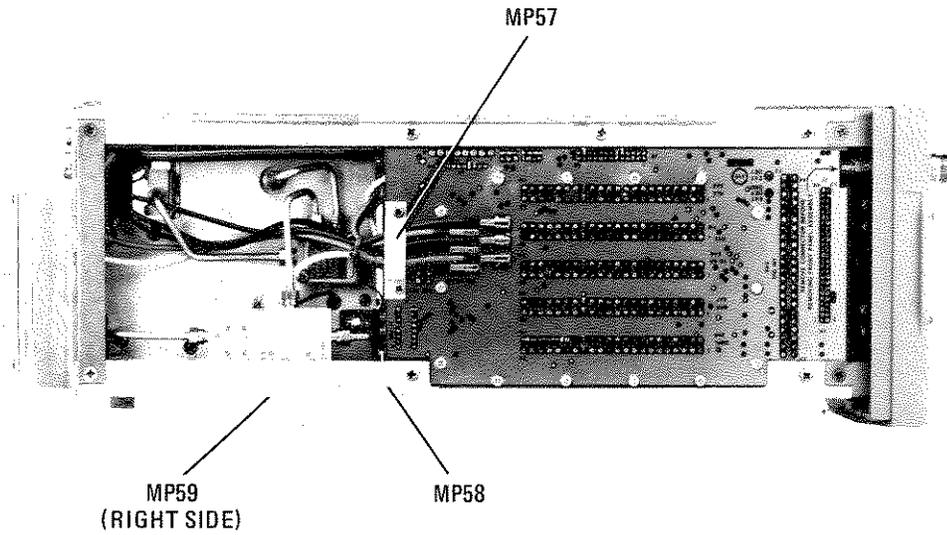
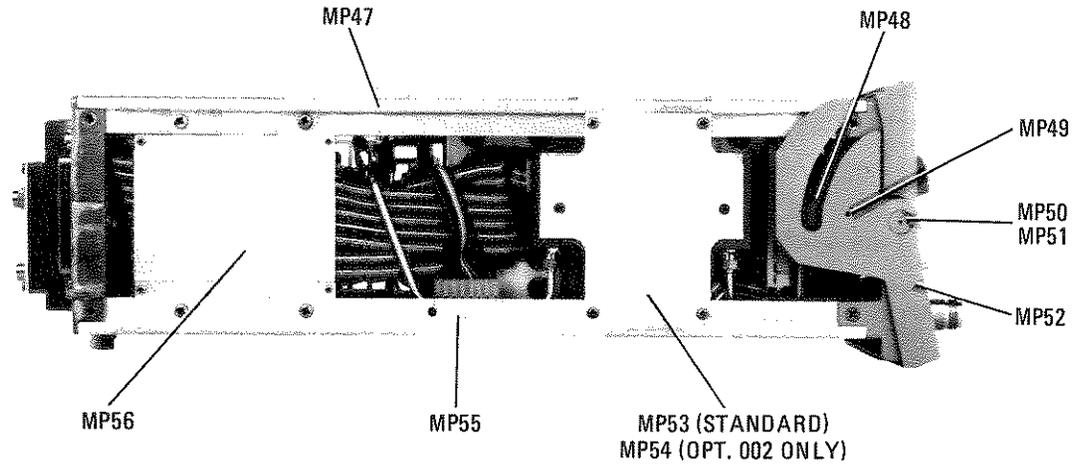


Figure 6-1. Major Mechanical Parts (1 of 3)



**NOTE**

Refer to Table 6-3 for mechanical parts listing.

*Figure 6-1. Major Mechanical Parts (2 of 3)*

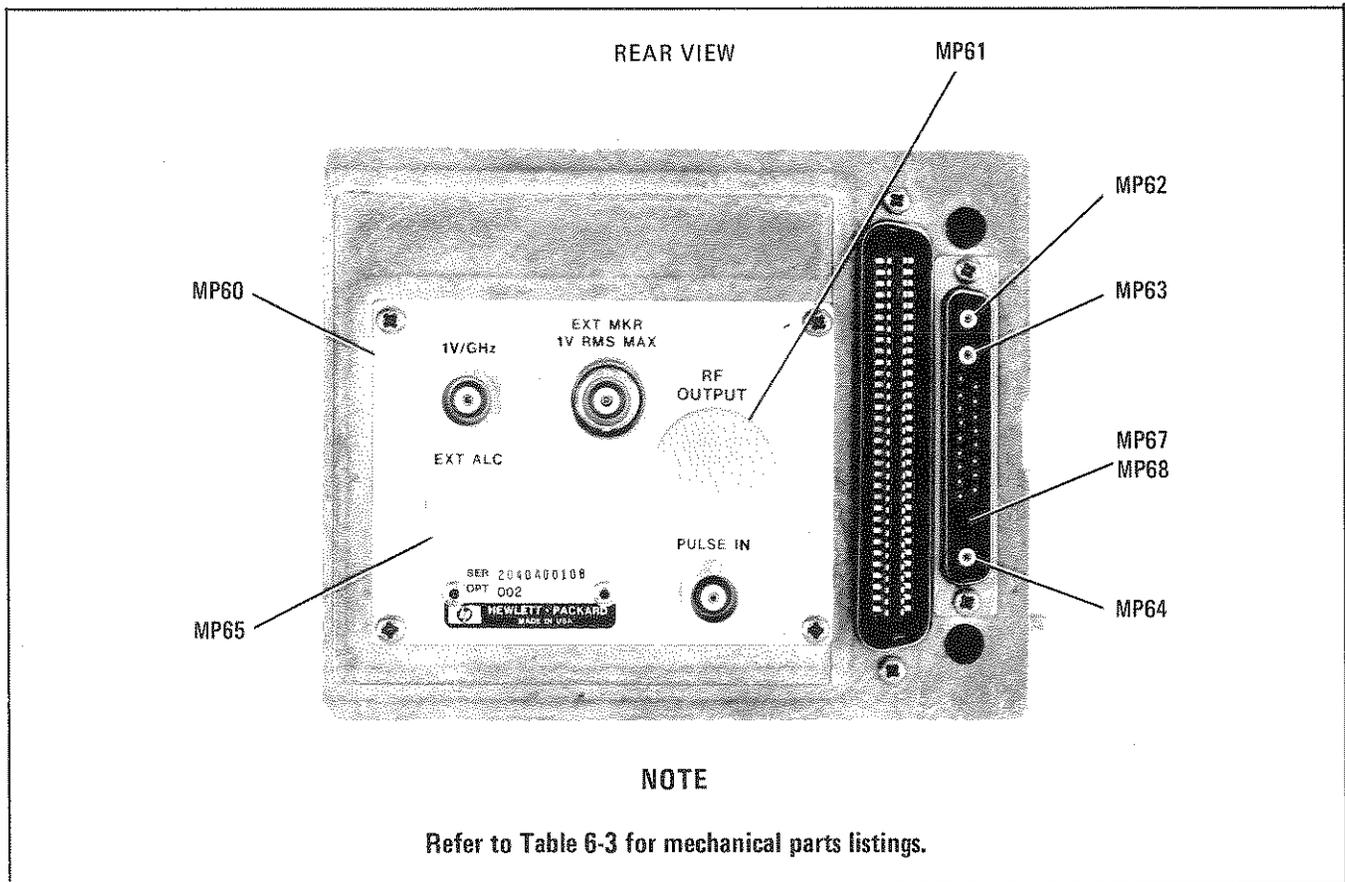


Figure 6-1. Major Mechanical Parts (3 of 3)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
<b>ATTACHING HARDWARE</b>						
NOTE						
SEE FIGURE 6-2 FOR ATTACHING HARDWARE LOCATIONS.						
1	2360-0115	4	12	SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
2	2360-0117	6	4	SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
3	2360-0129	0	6	SCREW-MACH 6-32 1-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
4	2360-0197	2	5	SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
5	2360-0333	8	16	SCREW-MACH 6-32 .25-IN-LG 100 DEG	28480	2360-0333
6	2200-0103	2	2	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
7	2200-0105	4	2	SCREW-MACH 4-40 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
8	2200-0107	6	10	SCREW-MACH 4-40 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
9	2200-0147	4	4	SCREW-MACH 4-40 .5-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
10	2200-0149	6	2	SCREW-MACH 4-40 .625-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
11	2200-0166	7	2	SCREW-MACH 4-40 .312-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
12	0624-0281	3	30	SCREW-TPG 4-20 .5-IN-LG PAN-HD-POZI STL	28480	0624-0281
13	0520-0127	6	4	SCREW-MACH 2-56 .188-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
14	0520-0128	7	4	SCREW-MACH 2-56 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
15	0520-0136	7	4	SCREW-MACH 2-56 .625-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
16	0520-0167	4	2	SCREW-MACH 2-56 .438-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
17	0590-0106	8	4	NUT-HEX-PLSTC LKG 2-56-THD .143-IN-THK	00000	ORDER BY DESCRIPTION
18	0590-1126	4	1	NUT-KNRLD-R 15/32-32-THD .08-IN-THK	00000	ORDER BY DESCRIPTION
19	2260-0009	3	8	NUT-HEX-W/LKWR 4-40-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
20	2420-0001	5	6	NUT-HEX-W/LKWR 6-32-THD .109-IN-THK	00000	ORDER BY DESCRIPTION
21	2950-0001	8	4	NUT-HEX-DBL-CHAM 3/8-32-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
22	2950-0132	6	1	NUT-HEX-DBL-CHAM 7/16-28-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
23	2950-0177	9	1	NUT-HEX-DBL-CHAM 1/4-36-THD .05-IN-THK	28480	2950-0177
24	2190-0016	3	5	WASHER-LK INTL T 3/8 IN .377-IN-ID	28480	2190-0016
25	2190-0068	5	1	WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0068
26	2190-0104	0	1	WASHER-LK INTL T 7/16 IN .439-IN-ID	28480	2190-0104
27	1250-1142	5	1	WASHER	16179	4151
28	3050-0003	3	5	WASHER-FI NM NO 6 .141-IN-ID .375-IN-OD	28480	3050-0003

Figure 6-2. Attaching Hardware (1 of 4)

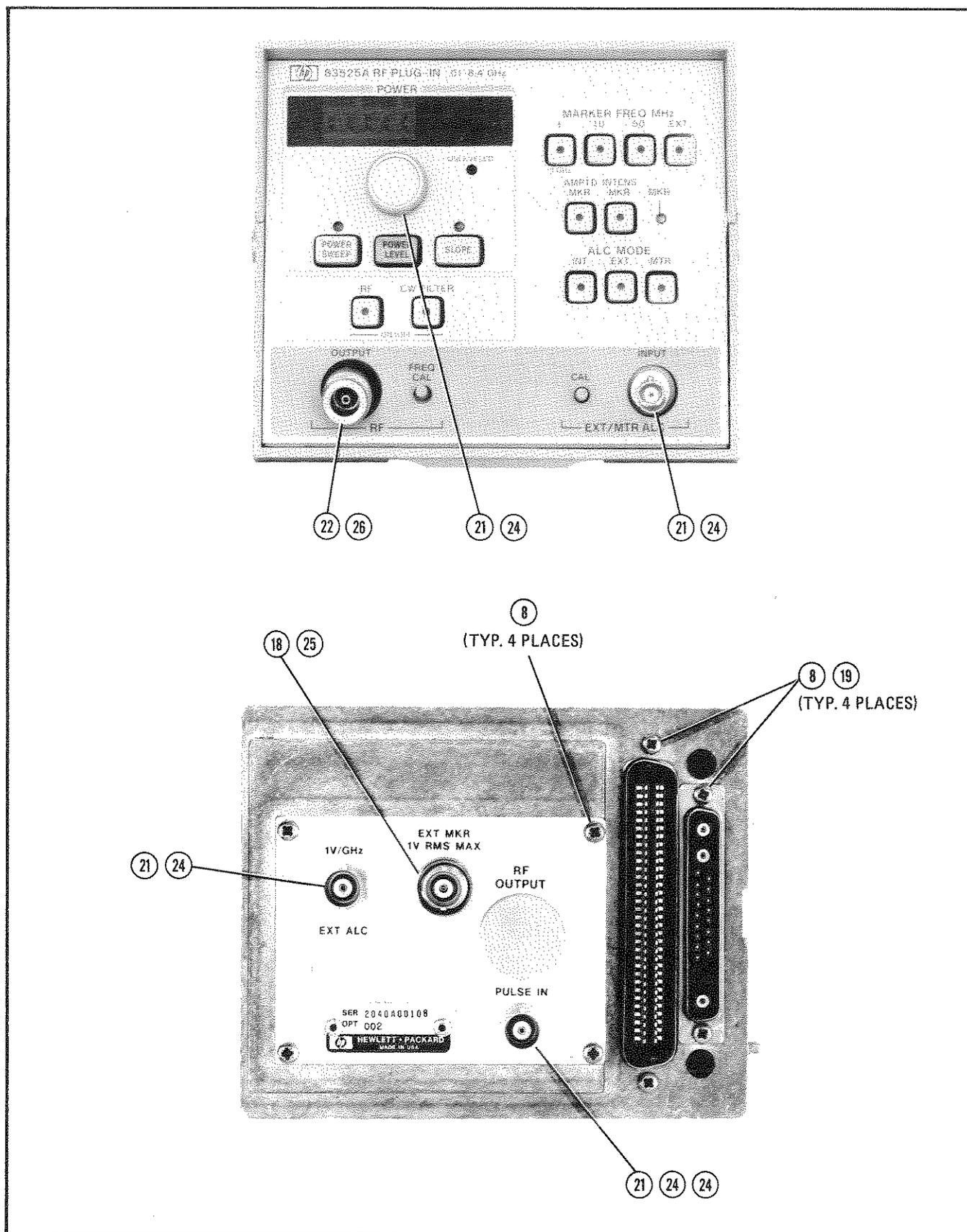


Figure 6-2. Attaching Hardware (2 of 4)

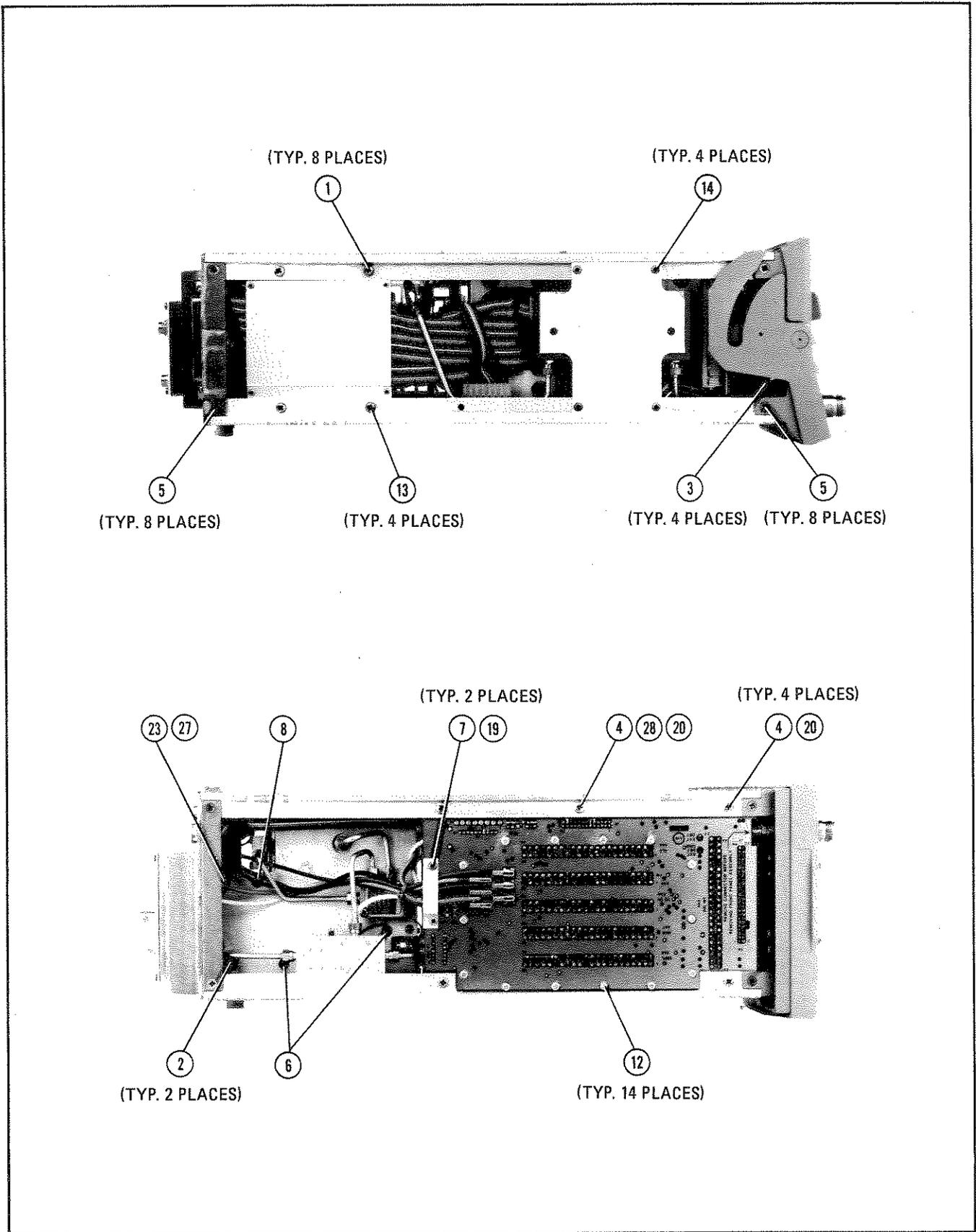


Figure 6-2. Attaching Hardware (3 of 4)

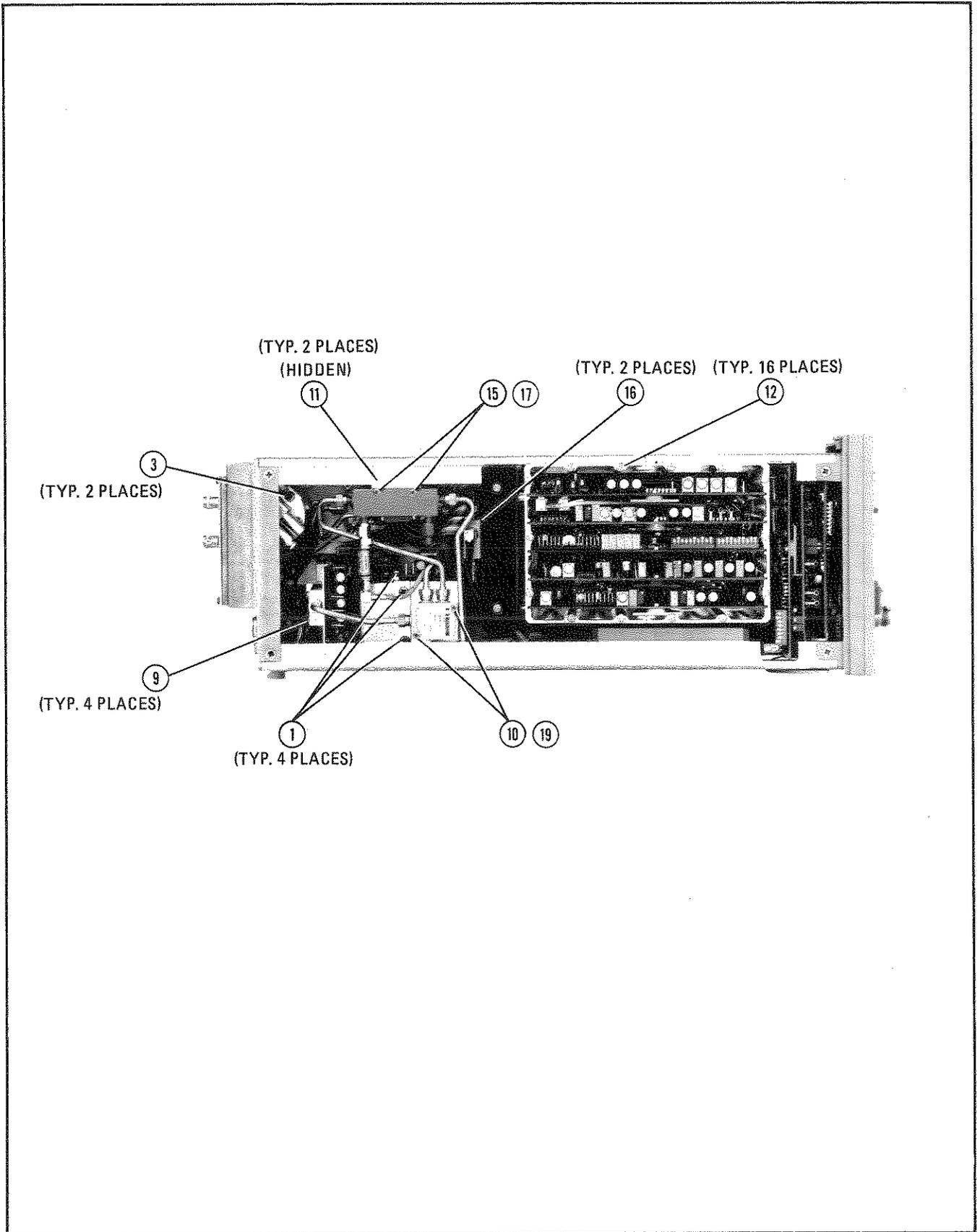


Figure 6-2. Attaching Hardware (4 of 4)

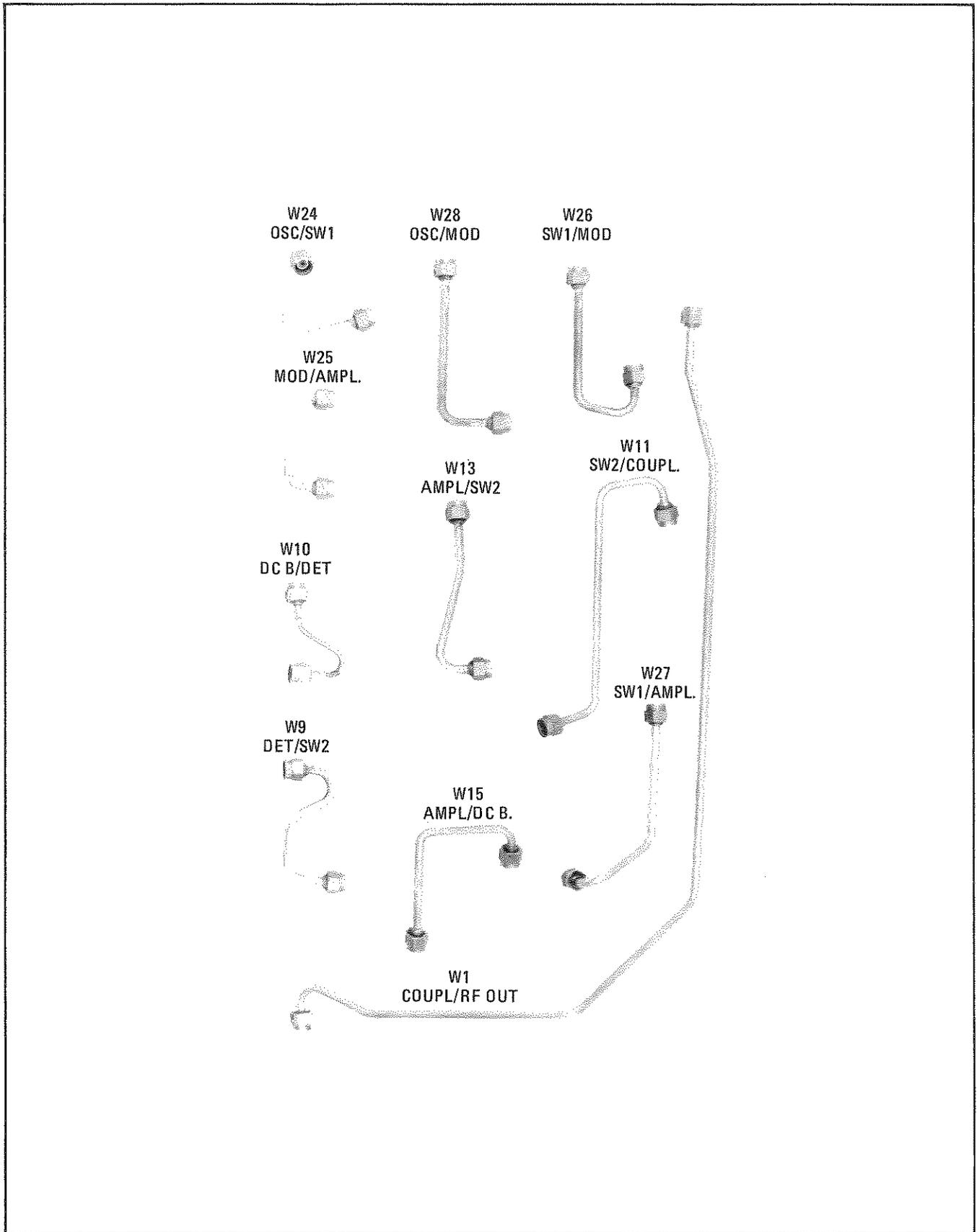


Figure 6-3. Cables in RF Section

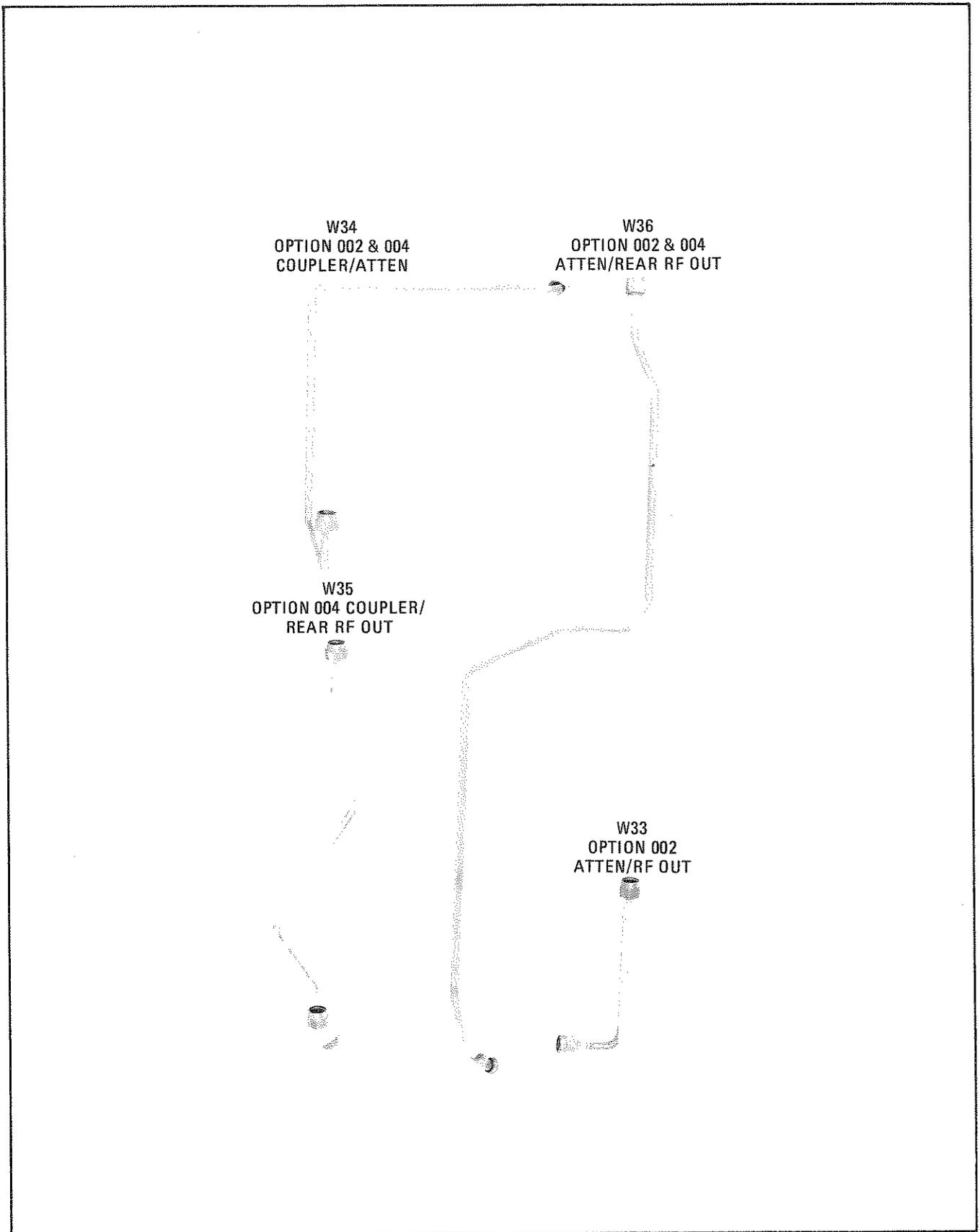
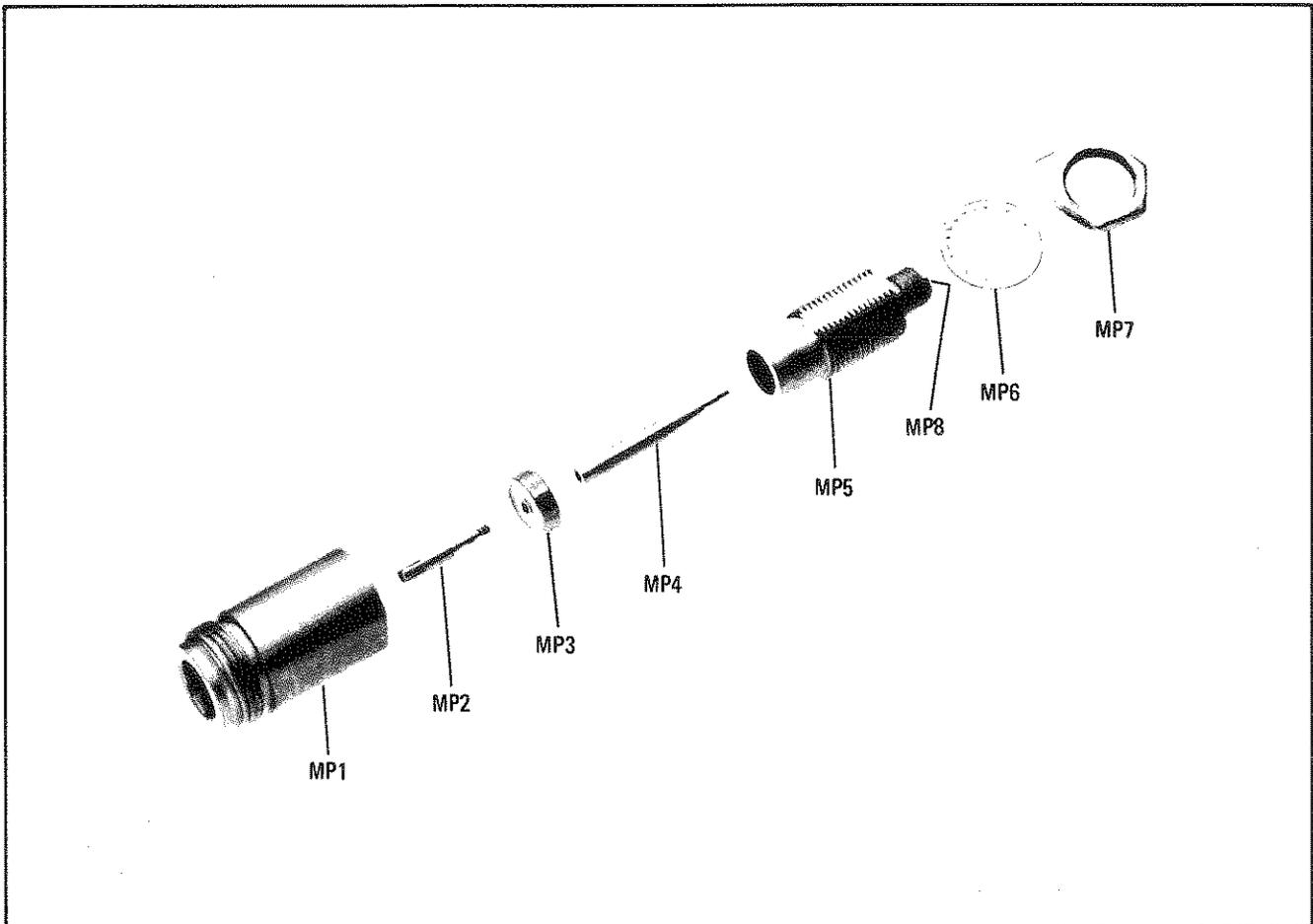


Figure 6-4. Option Cables in RF Section



Reference Designation	HP Part Number	Qty	Description	Mfr. Code	Mfr. Part Number
J1	86290-60005	1	Connector Assy (Type N)	28480	86290-60005
J1MP1	1250-1577	1	Body: RF Connector (Type N)	05879	131-445
J1MP2	1250-0915	1	Contact: RF Connector (Type N)	05879	131-149
J1MP3	5040-0306	1	Insulator	28480	5040-0306
J1MP4	08555-20093	1	Center Conductor	28480	08555-20093
J1MP5	08555-20094	1	Body: Bulkhead	28480	08555-20094
J1MP6	2190-0104	1	Washer: Lock 0.439" ID	00000	OBD
J1MP7	2950-0132	1	Nut: Hex 7/16 - 28	00000	OBD
J1MP8	08761-2027	1	Insulator	28480	08761-2027

Figure 6-5. RF Output Connector J1 Exploded View



