83522A
RF PLUG-IN
(Including Options 002 and 004)

SERIAL NUMBERS

This manual applies directly to HP Model 83522A RF Plug-ins having serial number prefix 2040A or 2127A.

For additional information about serial numbers, refer to INSTRUMENTS COVERED BY MANUAL in Section 1.

MANUAL PART NO. 83522-90003
Microfiche Part No. 83522-90004

Printed: JULY 1981

HEWLETT PACKARD

S E R V I C E N O T E

SUPERSEDES None

83522A RF Plug-in

Serial Numbers: 0000A00000/2528A99999

HP 83522A Marker Assembly Retrofits

Duplicate Service Note: 83525A-07

Situation:

HP 83522A RF Plug-ins with serial prefixes listed above may experience problems when replacing the marker assembly if a compatible motherboard and ALC assembly are not currently installed.

Solution/Action:

Marker assemblies with HP P/N 83525-60092 have new logic circuitry which will allow a new signal 'SQ MOD 2' to be fed to the ALC assembly 'SQ MOD Delay Circuit' to reduce Band 0 overshoot. However, this capability is only available if the new marker assembly is used with a revised motherboard and new ALC assembly.

If a new marker assembly is installed in a unit with the incorrect motherboard and ALC assembly, the -40V supply will be pulled down and the unit will not function properly.

Continued

DATE 15 May 1990

ADMINISTRATIVE INFORMATION

SERVICE NOTE CLASSIFICATION:

INFORMATION ONLY

AUTHOR:	ENTITY:	ADDITIONAL INFORMATION:
JG	4500	

HEWLETT PACKARD

If marker assembly 83525-60092 is installed in an HP 83522A that does NOT have motherboard 83522-60084 AND ALC assembly 83522-60098, then remove interconnect jumper W1 from the marker assembly. With jumper W1 removed, the new marker assembly will function the same as previous marker assemblies.

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 delivery. 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.

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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.

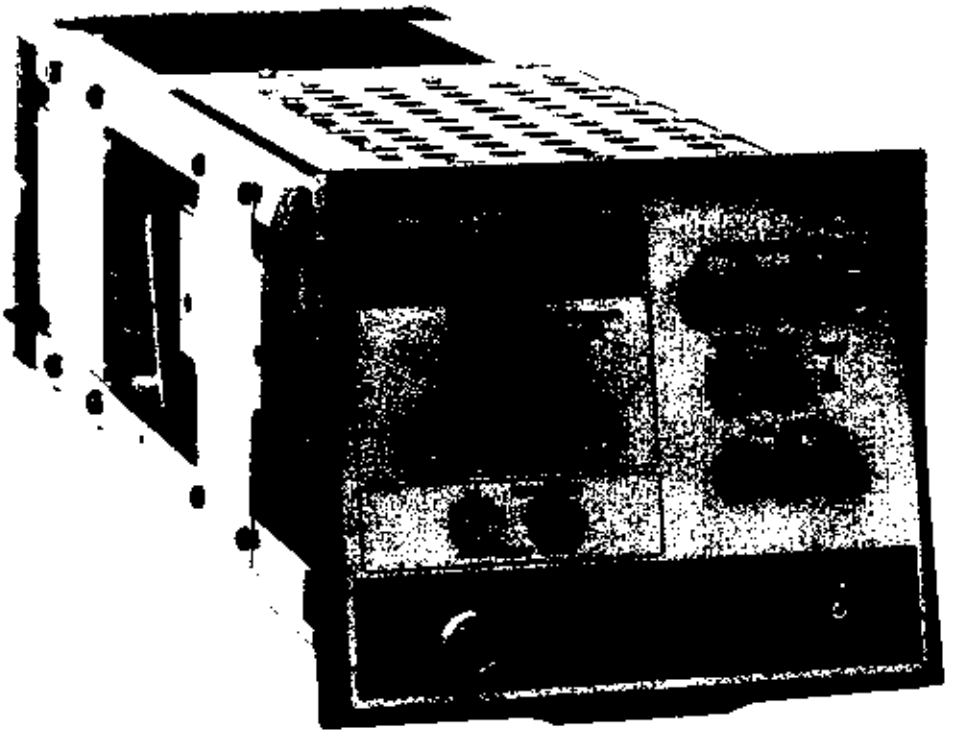


Figure 1-1. Model 83522A RF Plug-in.

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 83522A RF Plug-in. Figure 1-1 shows the Model 83522A.

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 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 83522A 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 10- by 15- centimeter (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 83522A 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 NUMBER.

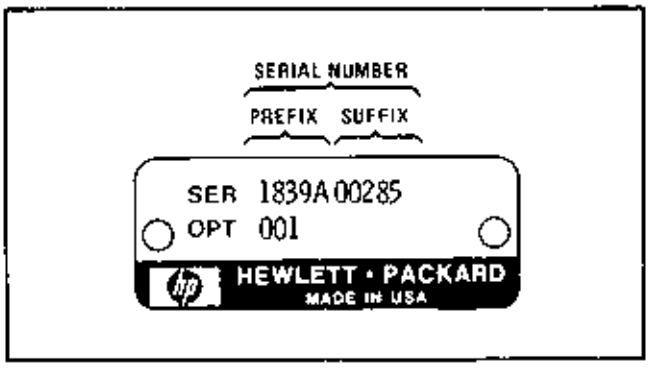


Figure 1-2. Typical Serial Number Plate

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 83522A is an RF plug-in which has been designed for use with the Model 8350A Sweep Oscillator. The Model 83522A covers the frequency range of 0.01 to 2.4 GHz. A YIG oscillator is used as the tunable RF frequency source and a fixed 3.8 GHz oscillator is mixed with the YIG oscillator to generate a 0.01 to 2.4 GHz RF output.

1-18. Model 83522A 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/ΔF). This voltage ramp is scaled and offset by the Model 83522A to provide a voltage ramp which is proportional to the YIG oscillator frequency in the Model 83522A. The Model 83522A then converts the tuning ramp voltage to a current which drives the YIG oscillator tuning coil.

1-19. The Model 83522A 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 unleveled. The RF output level is controlled by the Model 83522A RPG, the Model 8350A data entry controls (keypad and step keys), or through HP-IB control via the Model 8350A.

Table 1-1. Specifications for Model 83522A Installed in Model 8350A (1 of 2)

FREQUENCY[1]

Range 0.01 to 2.4 GHz

Accuracy[2] (25°C ± 5°C)

CW Mode ±5 MHz

All Sweep Modes (Sweep time >100 ms) ±15 MHz

Frequency Markers (Sweep time >100 ms) ±15 MHz ±0.5% of sweep width

Stability

With 10% Line Voltage Change ±20 kHz

With 10 dB Power Level Change ±100 kHz

With 3 : 1 Load SWR ±10 kHz

With Time (In a 10 minute period after one hour warmup) ±100 kHz

Residual FM, Peak (10 Hz to 10 kHz Bandwidth) <5 kHz

POWER OUTPUT[1]

Maximum Leveled Output Power:[3] +13 dBm (25°C ± 5°C)

With Option 002: +13 dBm

Power Level Accuracy:[9] ±1.0 dB (Internally Leveled)

With Option 002:[6] ±1.2 dB (at 0 dB attenuator step)

Calibrated Range: 15 dB

With Option 002: 85 dB

Attenuator Accuracy (±dB referenced from the 0 dB setting):

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

Power Variation
(at specified Maximum Leveled Power or below)

Internally Leveled: ±0.25 dB

Externally Leveled:

Negative Crystal Detector:[4] ±0.1 dB

Power Meter:[5] ±0.1 dB

	0.01 to 2.1 GHz	2.1 to 2.4 GHz
Residual AM in 100 kHz Bandwidth (in dB below carrier and at specified maximum leveled power)	≥50 dB	≥50 dB
Spurious Signals (at specified maximum leveled power)		
Harmonics (in dB below carrier)	≥25 dB	≥25 dB
Non-Harmonics (in dB below carrier)	≥30 dB	≥25 dB
Output VSWR (internally leveled)	<1.5	<1.5

Power Sweep[8]

Calibrated Range:[7] ≥15 dB

MODULATION[1]

External AM

Maximum Input: 15V

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: ≥30 dB below specified maximum leveled power

Symmetry: 40/60

Table 1-1. Specifications for Model 83522A Installed in Model 8350A (2 of 2)

External FM

Maximum Deviations for Modulation Frequencies:

	Cross Over Coupled	Direct Coupled
DC to 100 Hz:	±75 MHz	±12 MHz
100 Hz to 1 MHz:	±7 MHz	±7 MHz
1 MHz to 2 MHz:	±5 MHz	±5 MHz
2 MHz to 10 MHz:	±1 MHz	±1 MHz

Frequency Response (DC to 2 MHz): ±3 dB

CRYSTAL MARKER CAPABILITY[1]

Internal Crystal Markers (+3 to +13 dBm power level and ≤10 markers/sweep): Harmonic Markers of 10 MHz and 50 MHz are available up to 2.4 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[1]

Minimum Sweep Time (over full band): 10 ms

RF Output Connector: Type N Female

FOOTNOTES

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 Excludes coupler and detector variation. Crystal detector output should be between −10 mV and −200 mV at 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 With Option 002, in power sweep or slope functions, power can exceed attenuator step by 5 dB.

8 Power Sweep and Slope Compensation total must not exceed 15 dB.

9 Includes internally leveled power variations.

Table 1-2. Supplemental Performance Characteristics for Model 83522A Installed in Model 8350A (1 of 2)

NOTE

Values in this table are not specifications, but are typical characteristics included for user information.

FREQUENCY CHARACTERISTICS[1]

Accuracy[2]
(25°C ± 5°C)

CW Mode, typically:
0.01 to 2.4 GHz: ±1.5 MHz

Manual Sweep
0.01 to 2.4 GHz: ±40 MHz

All Sweep Modes (Sweep time 10 ms to 100 ms):
±25 MHz

Sweep Mode Linearity[3]
0.01 to 2.4 GHz: ±1 MHz

Stability with Temperature: ±200 kHz/°C

OUTPUT CHARACTERISTICS[1]

Power Output

Resolution (displayed): 0.1 dB

Remote Programming (settable):
Typically ±0.01 dB

Stability with Temperature (at maximum specified leveled power): ±0.02 dB/°C

Table 1-2. Supplemental Performance Characteristics for Model 83522A Installed in Model 8350A (2 of 2)

Spurious Signals (in dB below carrier)

Harmonics: 0.01 to 2.4 GHz

At specified maximum leveled power, typically: ≥25 dB

At power level of +10 dBm, typically: ≥30 dB

Non-Harmonics at specified maximum leveled power, typically: ≥30 dB

Impedance: 50 Ohms

Power Sweep[5]

Accuracy (including linearity): Typically ±1.0 dB

Resolution (displayed): 0.1 dB

Slope Compensation[5]

Linearity: Typically <0.2 dB

Calibrated Range:[4] Up to 5 dB/GHz; Up to 15 dB for full sweep range

Resolution (displayed): 0.01 dB/GHz

MODULATION CHARACTERISTICS[1]

External AM

Frequency Response: Typically 100 kHz

Input Impedance: Approximately 10K Ohm

Range of Amplitude Control: Typically 15 dB

Sensitivity: Typically 1 dB/V

Pulse In

TTL compatible: Logic HIGH=RF ON
Logic LOW=RF OFF

Square Wave modulation up to 30 kHz is allowable.

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[1] (Operation when RF power set between +3 to +13 dBm and ≤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: ±100 kHz

10 MHz Markers: ±200 kHz

50 MHz Markers: ±300 kHz

External Markers: ±300 kHz

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

GENERAL CHARACTERISTICS[1]

External Marker Input: Generates amplitude or Z-axis marker when sweep frequency equals external input frequency.

Frequency Range: 0.01 to 2.4 GHz

Frequency Reference Output: 1V/GHz ± 25 mV (over full sweep range) rear panel BNC output.

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

FOOTNOTES

[1] Unless otherwise noted, all characteristics 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] With respect to the SWEEP OUT voltage.
[4] With Option 002, in power sweep or slope functions, power can exceed attenuator step by 5 dB.
[5] Power Sweep and Slope Compensation must not exceed 15 dB.
[6] External marker input power typically between −10 dBm and +10 dBm (over limited power range).

1-20. Internal crystal referenced frequency markers are available to provide Z-axis intensity markers from the Model 8350A rear panel POZ 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 2.4 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 83522A 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 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 83522A. 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 by 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 83522A 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 83522A 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 83522A 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 sevice 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 83522A 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/83522A combination is capable of operation from 110 MHz to 2.4 GHz within this range. The Model 8410B has an Auto-Frequency

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).

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 83522A 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 83522A 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 AM 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 83522A 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.

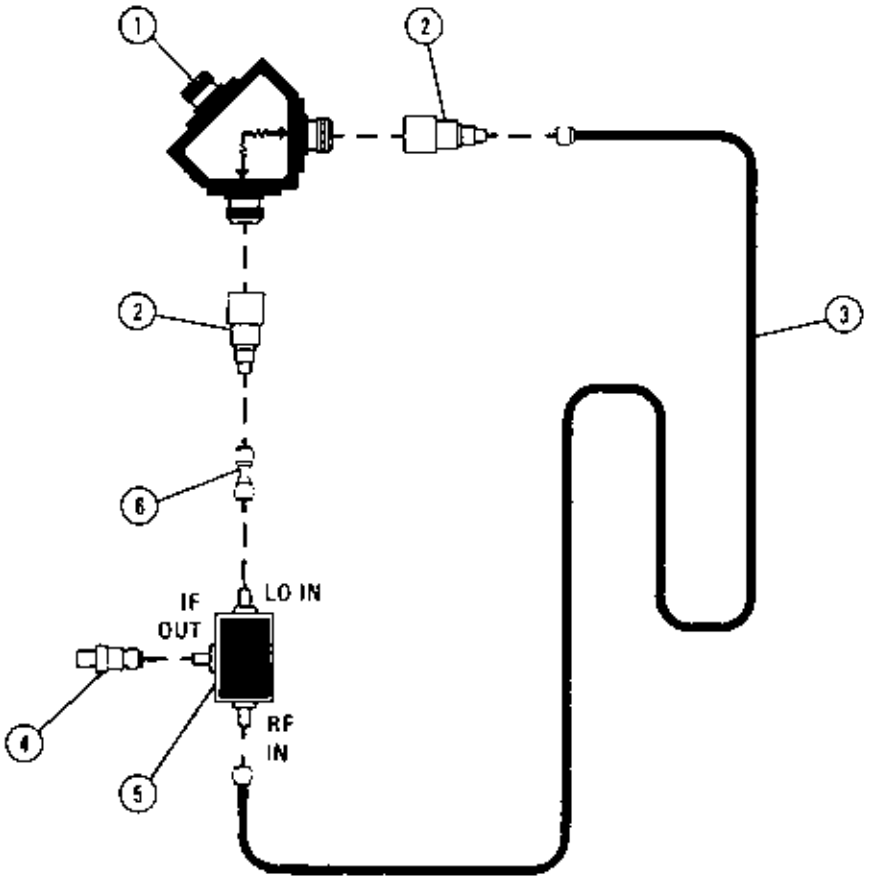
Table 1-4. Recommended Test Equipment (1 of 2)

Instrument	Critical Specifications	Recommended Model	Use[1]
Sweep Oscillator	No substitute	HP 8350A	P,A,T
Digital Voltmeter (DVM)	Range: 50V to +50V Accuracy: ±0.01% Input Impedance: ≥10M Ohms	HP 3455A	P,A,T
Oscilloscope	Dual Channel Bandwidth: dc to 100 MHz Vertical Sensitivity: ≤5 mV/Div Horizontal Sweep Rate: ≤0.1 μ S/Div X vs. Y Display Mode	HP 1740A	P,A,T
Frequency Counter	Frequency Range: 0.01 to 2.4 GHz	HP 5343A	P,A
Spectrum Analyzer	Frequency Range: 0.01 to 18 GHz Residual FM: ≤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: ≤10 Hz	HP 8901A	P,T
Swept Amplitude Analyzer	Capable of Transmission and Reflection measurements. Power Resolution: ≤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 2.4 GHz Power Range: 20 to +10 dBm	HP 11664A	P,A
Storage-Normalizer	Compatible with Display Mainframe and Swept Amplitude Analyzer	HP 8750A	P
RF Marker Source	CW Frequency: 1.2 GHz Output Power Level: ≥- 10 dBm	HP 8350A/83522A	A
Frequency Meter	Frequency Accuracy: ≤0.17% Calibration Increments: ≤2 MHz Frequency Range: 0.96 to 4.0 GHz	HP 536A	P

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

Instrument	Critical Specifications	Recommended Model	Use[1]
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: ≤ ± 3% from 10 Hz to 100 kHz ≤ ± 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 2.4 GHz Maximum SWR: ≤ 1.75	HP 478A	P,A
Power Meter	Power Range: 1 μW to 100 mW	HP 436A	P,A
Power Sensor (Used with HP 436A)	Frequency Range: 0.01 to 2.4 GHz	HP 8481A	P,A
Crystal Detector	Frequency Response: 0.01 to 2.4 GHz Maximum Input Power: 100 mW	HP 423B	P
Attenuator	Attenuation: 10 ± 0.5 dB Frequency Range: 0.01 to 2.4 GHz Maximum Input Power: ≥ +20 dBm Type-N Connector	HP 8491A Option 010	P,A
Power Splitter	Frequency Range: 0.01 to 2.4 GHz Output Port Tracking: ≤ 0.25 dB Maximum Input Power: +20 dBm	HP 11667A	P,A
1:1 Probe	General Purpose Probe	HP 10007B	A
DC Power Supply	DC Output: 0 to 6.5 Vdc ± 0.05 Vdc	HP 6213A	A
50 Ohm Termination	Type N, 50 Ohms ± 0.5 Ohms	HP 909A	P,A
Delay Line Discriminator	Refer to Figure 1-3.		A

[1] P = Performance Test; A = Adjustments; T = Troubleshooting



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 0960-0543
6	Adapter: SMA Male to SMA Male	1250-1159

Figure 1-3. Delay Line Discriminator

II - Installation

SECTION II
INSTALLATION

2-1. INTRODUCTION

2-2. This section provides installation instructions for the Model 83522A 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 83522A 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 83522A 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 (minimum or maximum), 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 83522A 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 83522A 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% to 80% relative at +25°C to +40°C. However,

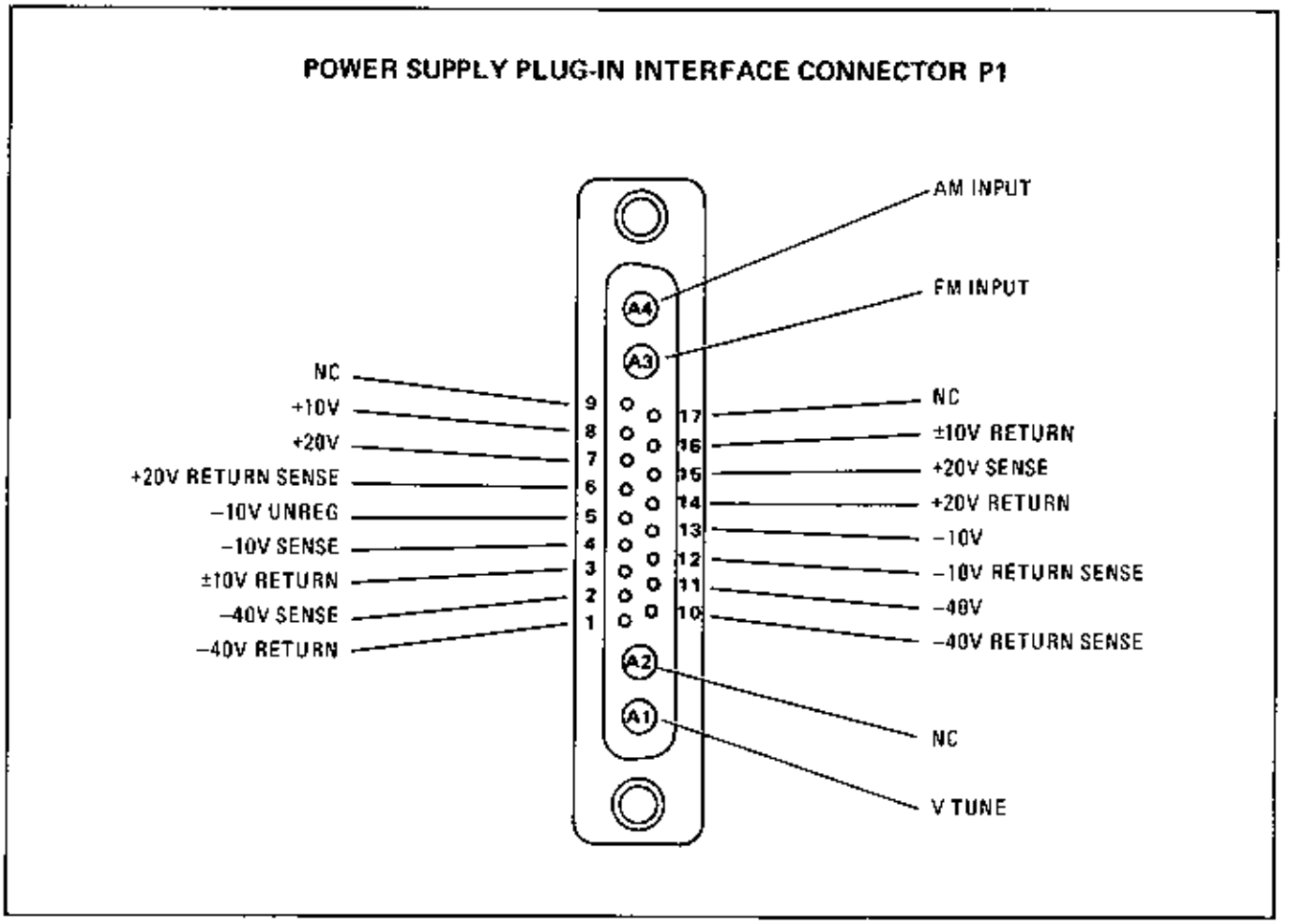


Figure 2-1. Interface Signals on Connector P1

Table 2-1. Mating Connectors

83522A 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 1V/GHz	BNC (f)	1250-0256	Specialty Connector 25-P118-1
J5 PULSE IN	BNC (f)	1250-0256	Specialty Connector 25-P118-1

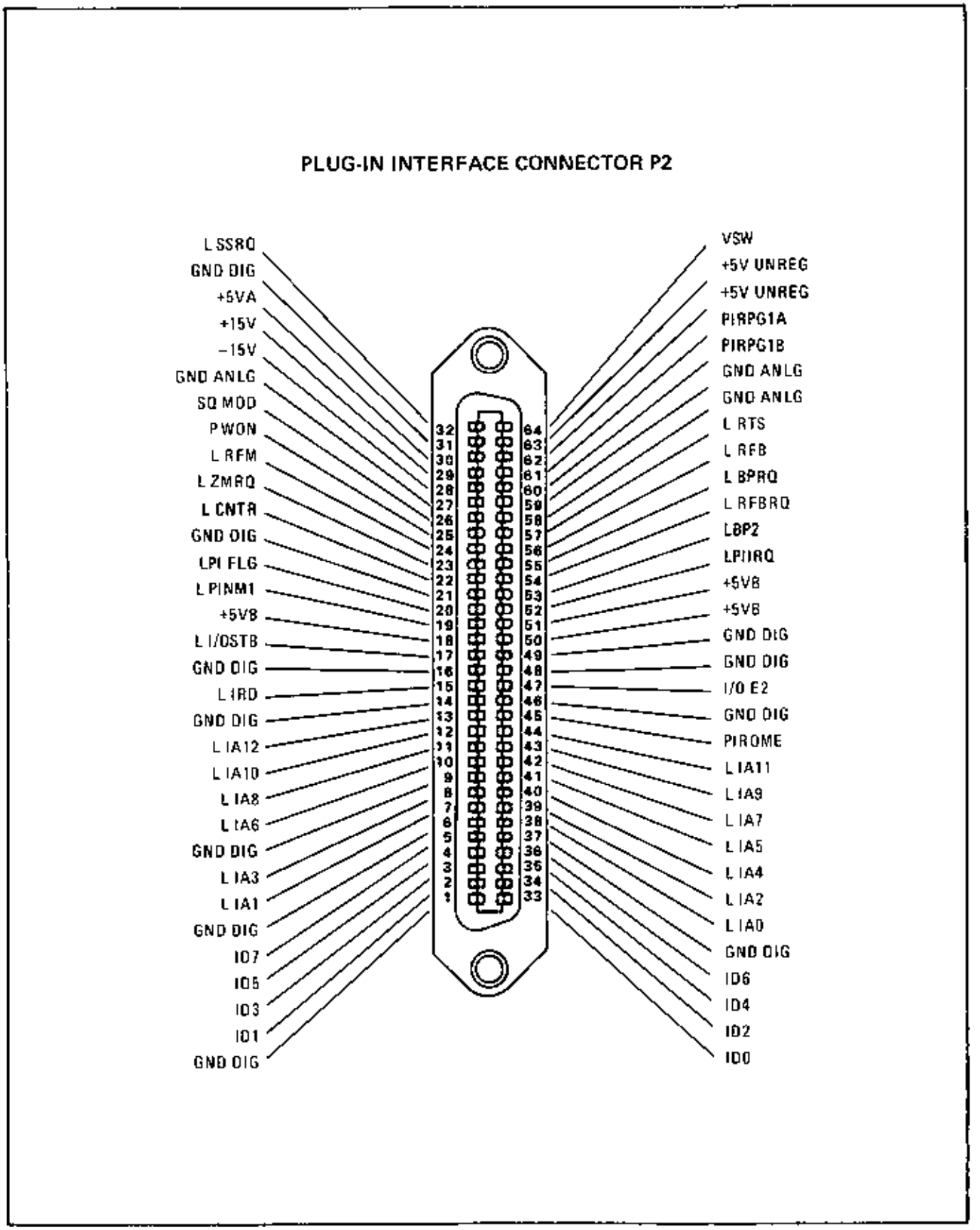


Figure 2-2. Interface Signals on Connector P2

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 (approximately 15,000 feet).

2-18. Cooling. When the Model 83522A 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 83522A 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 83522A RF Plug-in must be installed in a Model 8350A Sweep Oscillator. To install the Model 83522A 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 83522A 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 83522A 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.

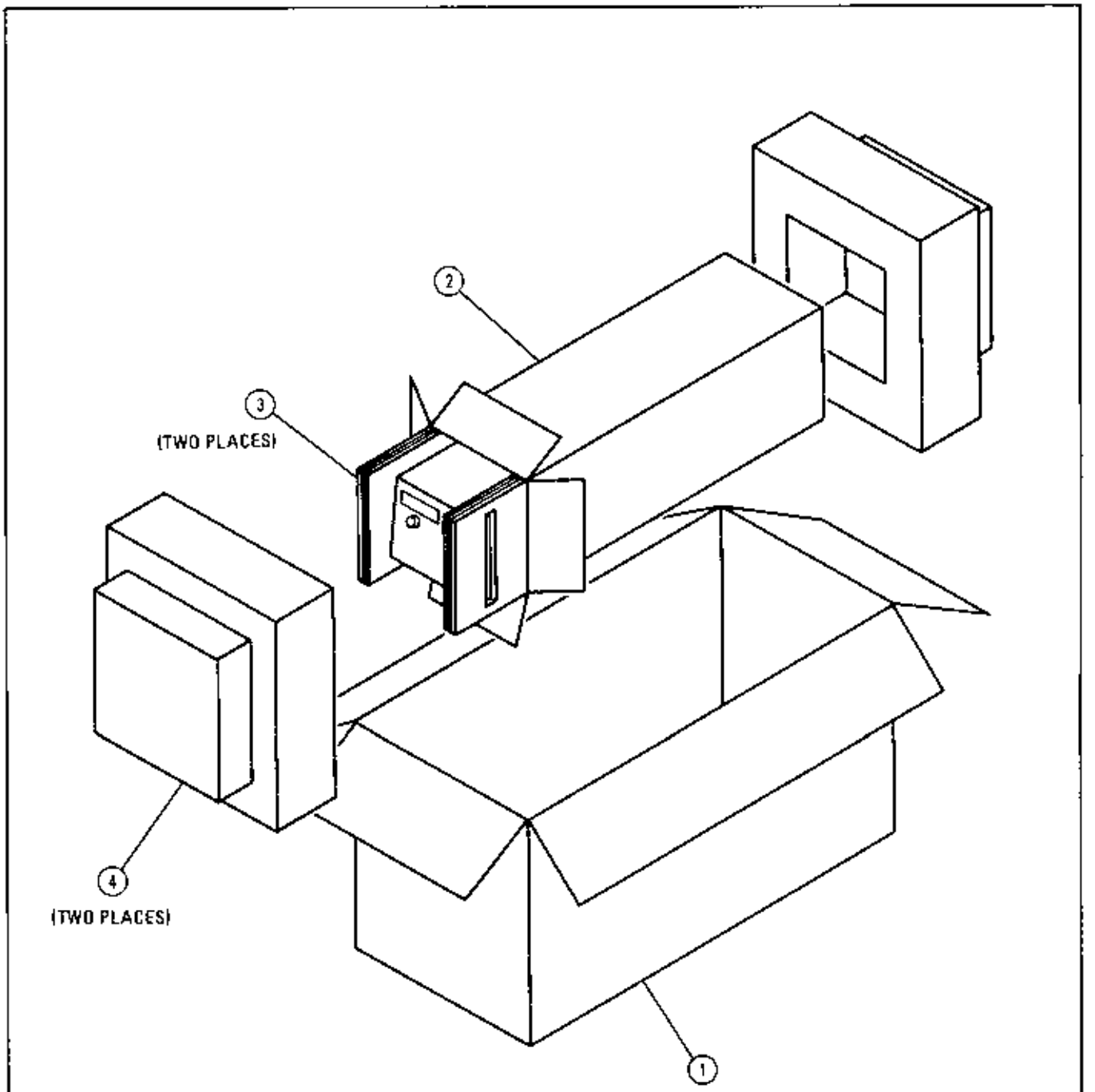
b. Use a strong shipping container.

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.



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
Not Shown	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 section is divided into four major sections. Operating Characteristics explains the frequency resolution characteristics in CW and swept modes. Front and rear Panel Features are shown with illustrated descriptions. Operating Instructions provide a front panel frequency calibration procedure, configuration switch setting instructions, and crystal detector and power meter leveling instructions. Operator's Maintenance includes information on the plug-in error codes, fuses, and service tags.

3-3. OPERATING CHARACTERISTICS

3-4. Frequency Resolution

3-5. Two areas relating to frequency resolution must be considered; input resolution and displayed resolution. Input resolution refers to the number of bits (8 bits = 256 points) internally used in the digital to analog converters (DACs) used to generate the tuning voltage for a particular mode of operation. Table 3-1 cross references input resolution with each DAC used. Displayed frequency resolution refers to the number of digits shown on the 8350A FREQUENCY displays.

Table 3-1. Input Resolution

DAC Used	Voltage Resolution	Frequency Resolution
CF	2.5 mV	0.606 MHz
Vernier	40 μV	9.45 kHz
ΔF 1 – 1/8 of band	10 mV	2.43 MHz
ΔF 1/8 – 1/64 of band	1.25 mV	0.303 MHz
ΔF ≤1/64 of band	0.156 mV	38.0 kHz

3-6. Figure 3-1 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 ΔF sweep width. Therefore the operation of all sweeps are set with a center frequency and sweep width. The center frequency is specified by the center frequency (CF) DAC and the Vernier DAC, and the sweep width is determined by the ΔF DAC.

3-7. The CF DAC has 12 bits, hence 4096 points across the plug-in frequency band (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).

3-8. Resolution of Center Frequency is enhanced with a summed voltage input generated by an 8-bit (256 points) Vernier DAC. Vernier range is set to ±0.05% of RF plug-in bandwidth (including overrange). In multiband plug-ins, total range of the vernier will vary with each band sweep. Vernier resolution is determined by dividing ±0.05% bandwidth by 256 points (128 points either side of CF). The voltage range of the total 256 points on the Vernier DAC is equal to four points on the 12-bit CF DAC (two points on either side of CF). This increases CF resolution from 0.024% (2.5mV) to 0.00038% (.04mV), and improves 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 entirely dependent on the CF DAC ±0.005% of bandwidth.

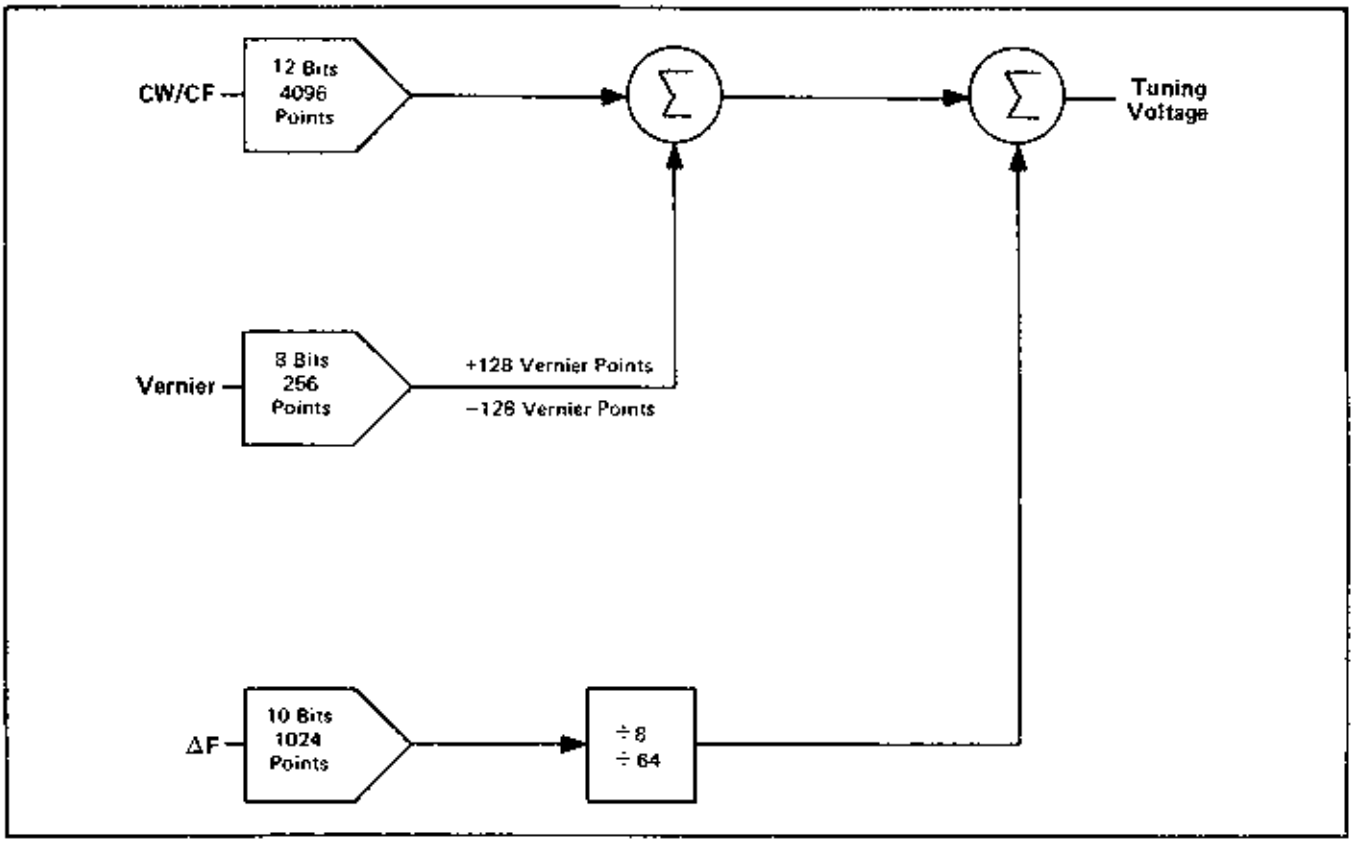


Figure 3-1. Simplified Tuning Voltage Block Diagram

3-9. The ΔF DAC has 10 bits (1024 points). The analog output from this DAC ranges from −5 to +5 volts to produce an even sweep on either side of the center frequency. The ΔF resolution improves with narrower sweep widths. For broad sweeps, the resolution is 0.1% of the full band. For sweep widths less than 1/8, but greater than 1/64 of the full band range, the resolution is improved to 0.012% of the full band. For sweep widths less than 1/64 of the full band range, the resolution is improved to 0.0015% of the full band.

3-10. Center Frequency is always displayed with 1 MHz resolution. Likewise, Vernier values are always displayed at 10 kHz resolution. Display resolutions for ΔF values vary with sweep width. Figure 3-2. illustrates the ΔF mode displayed resolution values versus displayed ΔF frequency sweep widths.

3-11. PANEL FEATURES

3-12. Front and rear panel features are described in Figure 3-3 and 3-4, respectively. Description numbers match the numbers on the illustration.

3-13. OPERATOR'S CHECKS

3-14. The Operator's Checks (local and remote) in the 8350A Sweep Oscillator manual provide a quick evaluation of 8350A and 83522A main functions. Error codes 50 to 99 indicate plug-in related problems. The 8350A 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 trouble-shooting information in Section VIII, Service, in this manual to isolate the problem.

3-15. OPERATING INSTRUCTIONS

3-16. Front Panel FREQ CAL

NOTE

The 83522A RF Plug-in may not meet the frequency accuracy specifications unless the front panel FREQ CAL (frequency calibration) procedure is performed.

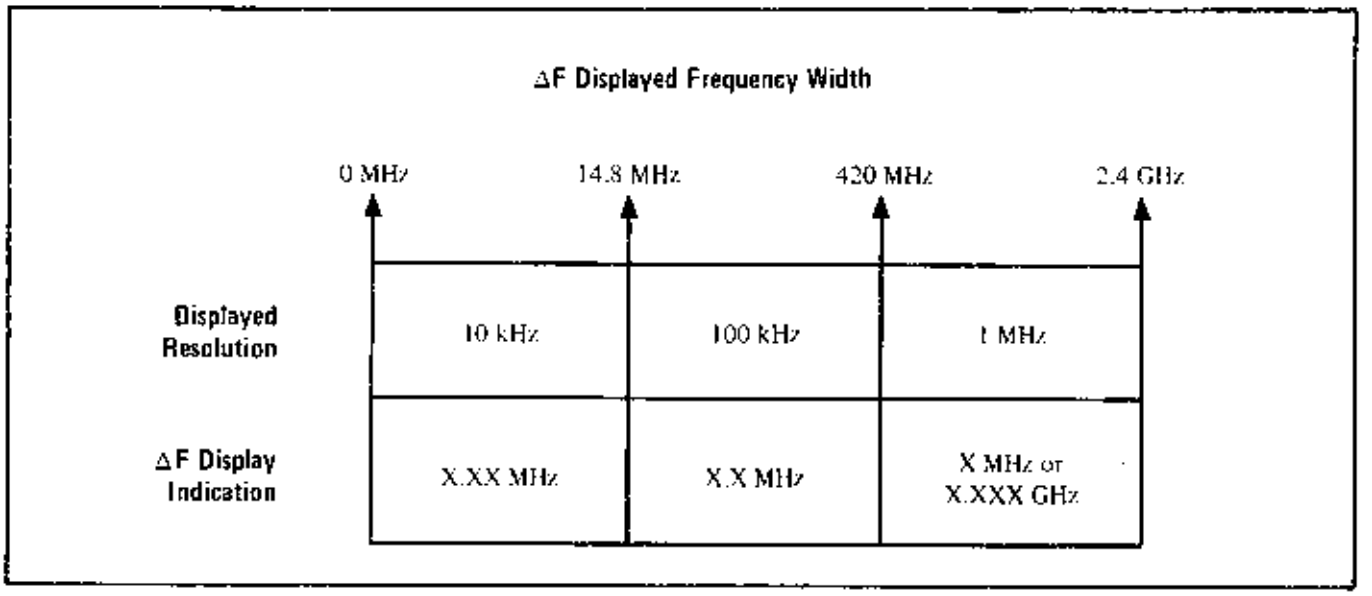


Figure 3-2. Model 83522A ΔF Sweep Mode Displayed Resolution

3-17. The front panel FREQ CAL procedure, shown in Figure 3-5, 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.

3-18. Internal Leveling

3-19. The most convenient method of RF output leveling is internal leveling. A portion of the RF output is coupled out of an internal 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).

3-20. External Crystal Detector Leveling

3-21. RF Output power may also be leveled externally using a power splitter (or external directional coupler) and a crystal detector. This leveling system uses a power splitter to sample a portion of the RF Output signal with a crystal detector to produce a dc voltage proportional to the RF signal level. The detector output 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 the 6 dB loss like the power splitter, therefore, a higher maximum leveled power output may be obtained. Figure 3-6 illustrates a typical crystal detector leveling setup.

3-22. External Power Meter Leveling

3-23. RF Output power may also be leveled with a power meter and power splitter (or directional coupler) as shown in Figure 3-7. The sweep time is limited to greater than 50 seconds when this leveling method is used. A sample of the RF output signal is routed to a power meter which produces a dc output voltage proportional to the RF signal level. This dc voltage is applied to the 83522A 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 3-7 illustrates a typical power meter leveling setup.

3-24. External Frequency Modulation

3-25. The 83522A 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 3-8 lists the available configuration switch settings. The configuration switch settings override 8350A Sweep Oscillator non-volatile memory settings at Instrument Preset.

3-26. External Amplitude Modulation

3-27. 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. RF power may be square wave modulated at repetition rates up to 30 kHz at any power 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 diode clamping action. See the specifications and supplemental characteristics in Section I for more details on the modulation characteristics when using this input.

3-28. 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.

3-29. RF Power Control

3-30. 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 3-8 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.

3-31. Option 002 Step Attenuator

3-32. With Option 002 installed, when the selected POWER setting goes below −2 dBm, the step attenuator increments as required in 10 dB steps to a maximum attenuation of 70 dB (which sets minimum power to −72 dBm). Within the individual 10 dB steps of the attenuator, the ALC loop adjusts the power output to the power level programmed by the front panel POWER control.

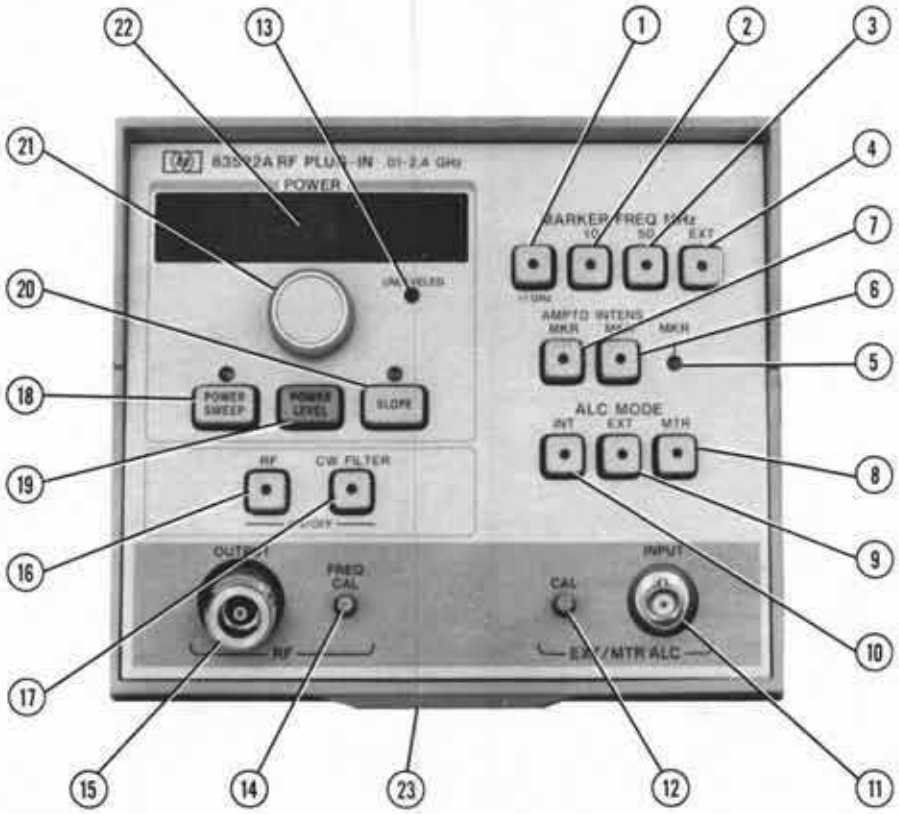
3-33. Alternate Sweep Mode With Option 002

3-34. If Option 002 attenuator is installed, and alternate sweep mode is selected, a slow sweep default condition of 1 second/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 second per attenuator change to prevent damage to the attenuator coils due to overheating.

3-35. Phase-Lock Operation

3-36. The 83522A 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 the RF Output CW frequency is determined by the stability of the reference oscillator. The CW filter should be turned off in phase lock operation.

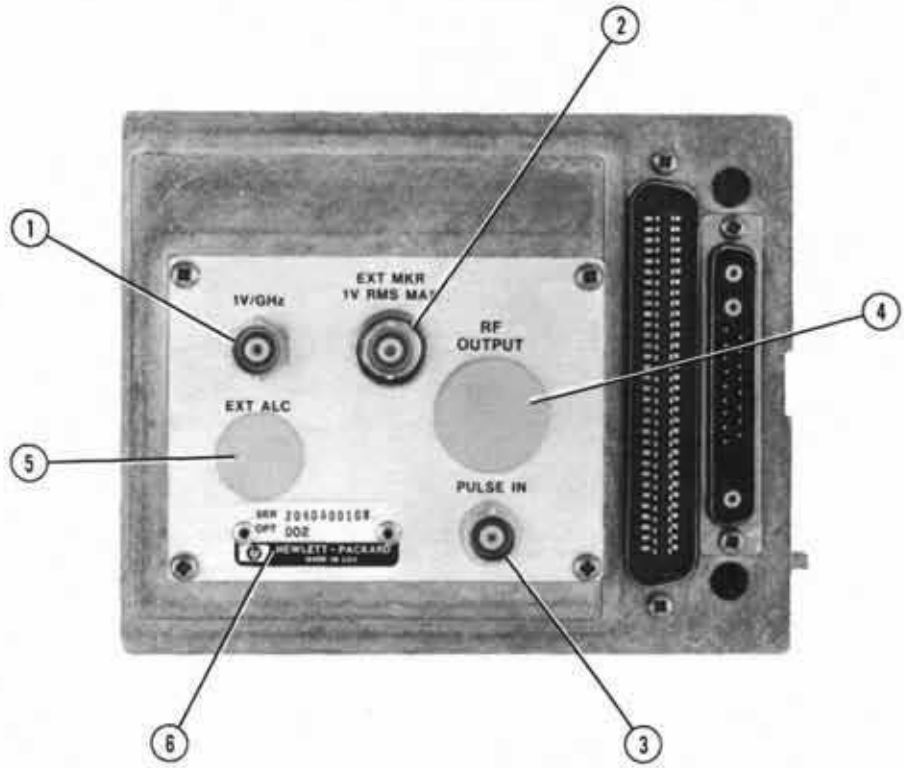
FRONT PANEL FEATURES



1. 1 MHz Crystal frequency marker enable key.
2. 10 MHz Crystal frequency marker enable key.
3. 50 MHz Crystal frequency marker enable key.
4. External frequency marker enable (input on plug-in rear panel).
5. MKR lamp indicates when RF Output frequency equals a marker pulse frequency.
6. Enables plug-in crystal markers in intensity mode.
7. Enables plug-in crystal markers in amplitude mode.
8. Power meter automatic leveling control selection (HP 432 only).
9. External (crystal detector) automatic leveling control selection (negative crystal output).
10. Internal leveling control selection.
11. Connector (BNC) for power meter or external crystal leveling inputs (rear panel on option 004).
12. Power level CAL adjust, for setting external (MTR or EXT) ALC.
13. UNLEVELED lamp lights if output power is unleveled.
14. Fine frequency adjust used for front panel frequency calibration.
15. Type-N 50-ohm RF output connector (rear panel on option 004).
16. RF on-off key. Used for zeroing a power meter or referencing an X-Y recorder.
17. CW FILTER enables an oscillator tune voltage filter when in CW mode.
18. POWER SWEEP allows setting an increase in power per sweep (dB/SWP).
19. POWER LEVEL allows setting of output power for all ALC modes (may be calibrated for external leveling).
20. SLOPE allows setting of the frequency slope compensation in dB/GHz (for lossy devices).
21. Power control knob for controlling power sweep, power level, or slope.
22. Plug-in display provides readout of selected power mode in dBm, dB/GHz, or dB/SWP to a tenth of a dB/dBm.
23. Plug-in latch handle is used to remove, install, and latch the RF plug-in in the sweep oscillator.

Figure 3-3. Front Panel Features

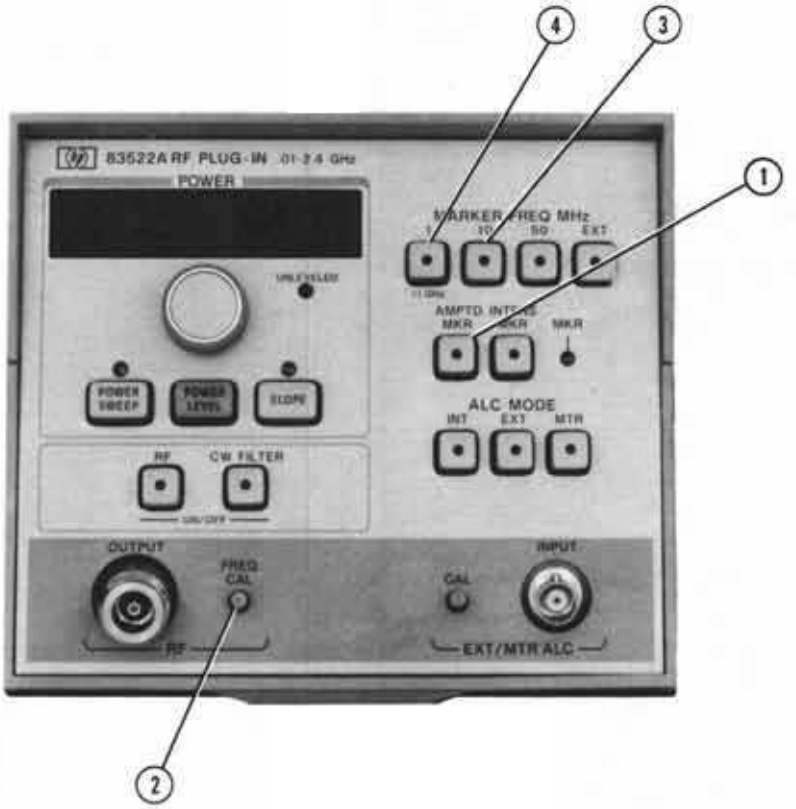
REAR PANEL FEATURES



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 3-4. Rear Panel Features

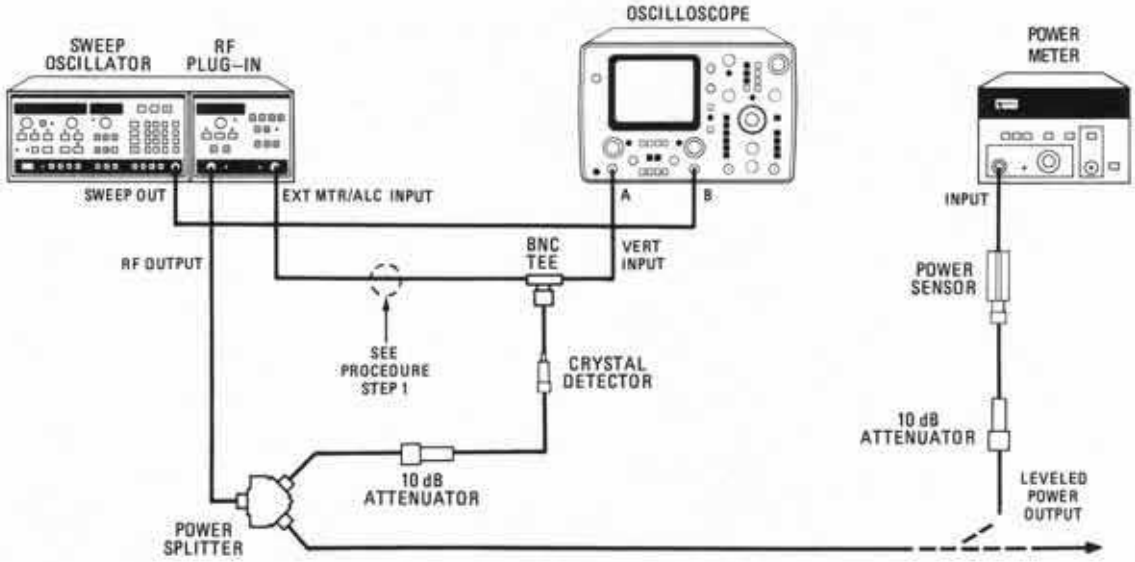
FREQ CAL PROCEDURE



1. Press 8350A INSTR PRESET CW 5 0 MHz
2. Press 83522A AMPTD MKR ① (50 MHz MARKER FREQUENCY switches on automatically).
3. Adjust FREQ CAL ② control until MKR lamp is on.
4. Press 8350A 1 0 MHz.
5. Press 83522A 10 MHz ③ Marker.
6. Fine adjust FREQ CAL ② control (if needed) until MKR lamp is on.
7. Press 83522A 1 MHz ④ Marker.
8. A small adjustment of FREQ CAL ② control may be needed for MKR lamp to light.

Figure 3-5. 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

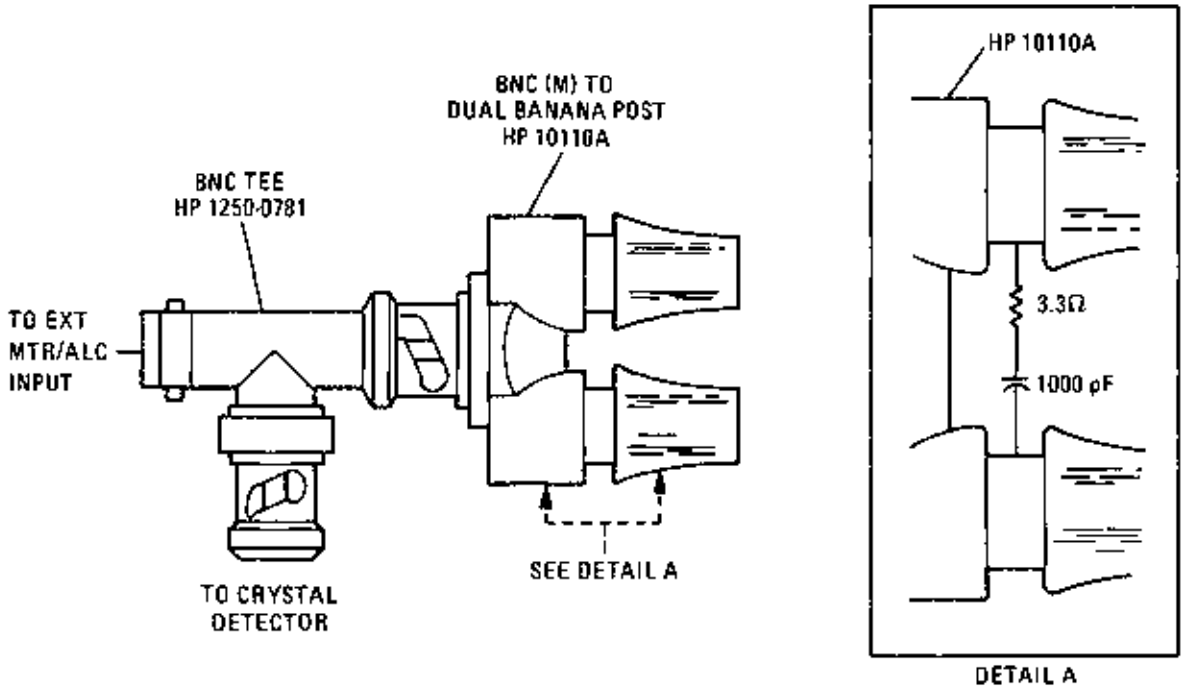
Crystal output signal must be between −10 mVdc and −200 mVdc.

1. Connect equipment as shown in test setup.

Figure 3-6. 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:

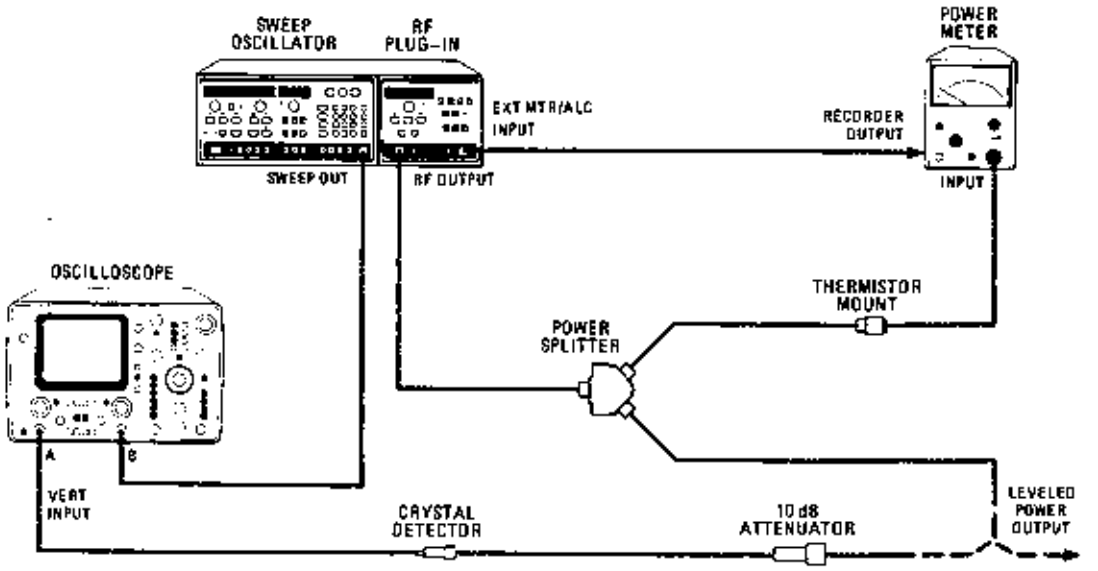
   83522A:
   ALC MODE ..... EXT

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 3-6. External Crystal Detector Leveling (2 of 2)

EXTERNAL POWER METER LEVELING



EQUIPMENT:

Sweep Oscillator	HP 8350A
RF Plug-in	HP 83522A
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 3-7. 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

   83522A: Set power to maximum specified.
   ALC MODE ..... MTR

4. Select +10 dBm range on power meter.

5. Adjust 83522A 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 3-7. Power Meter Leveled (2 of 2)

3-37. OPERATOR'S MAINTENANCE

3-38. Plug-in Error Codes

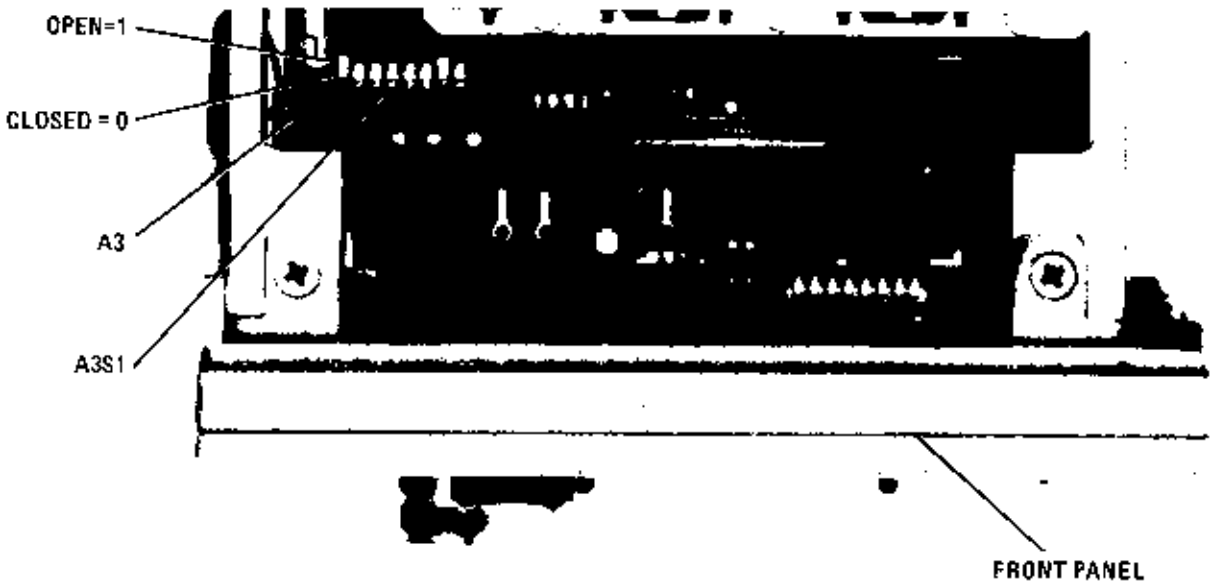
3-39. The 8350A FREQUENCY display will indicate RF plug-in error codes (50 to 99) or sweep oscillator error codes. Information on plug-in error codes may be found in Section VIII, Service, of this manual.

3-40. Fuses

3-41. Power circuits for the Model 83522A RF Plug-in are fused in the 8350A Sweep Oscillator. See the 8350A Sweep Oscillator Operating and Service Manual for fuse locations and replacement instructions.

3-42. Blue Service Tags

3-43. If the 83522A RF Plug-in requires service, the instrument may be sent to your local HP service organization as described in Section II, Installation, in this manual. Before sending the instrument back, fill out and attach one of the blue service tags located at the rear of Section III in this manual. 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 83522A Plug-in (Note 4)	0	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

1. 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

2. Switch is set at the factory as follows:

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

3. When direct-coupled FM is selected, FM sensitivity is –20 mHz/V and switch Number 5 is overridden.

4. Switches with † should not be changed from Factory setting.

Figure 3-8. Configuration Switch

IV – Performance Tests

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 83522A 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 83522A 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 TEST 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 three CW frequencies specifically for the 83522A.

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.

Table 4-1. Related Adjustments

Performance Test	83522A Adjustment	8350A Adjustment
4-13. Frequency Range and Accuracy		
CW Accuracy	5-17	5-19
Swept Frequency Accuracy	5-15 thru 5-18	
Marker Accuracy	5-15 thru 5-18	5-20
4-14. Output Amplitude		
Power Meter Leveling	5-25	
Power Variations	5-20 thru 5-22	
Power Level Accuracy	5-20, 5-22	
Power Sweep	5-24	
Slope Compensation	5-21	
4-15. Frequency Stability		5-11
4-16. Residual FM		5-11
4-19. Residual AM		5-11
4-21. FM Response	5-26	
4-16.* Internal Crystal Markers	5-27	

*Refers to paragraph number 4-16 in the 83522A manual.

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.

4-15. PERFORMANCE TESTS

NOTE

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

PERFORMANCE TESTS

4-16. INTERNAL CRYSTAL MARKERS

SPECIFICATION:

Conditions: RF power level = +3 to +13 dBm; ≤10 markers/sweep. Harmonic markers of 10 and 50 MHz are available up to 2.4 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 accomodate 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

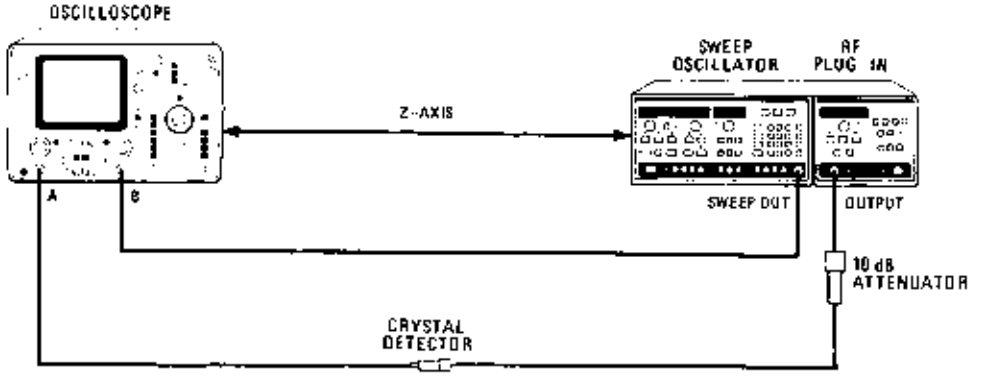


Figure 4-1. Crystal Marker Test Setup

4-16. INTERNAL CRYSTAL MARKERS (Cont'd)

PROCEDURE:

1. Connect equipment as shown in Figure 4-1.

2. Set oscilloscope for an A vs. B measurement. Set Channel B gain at 1V/DIV. Set Channel A gain as necessary.

3. On the 8350A press **INSTR PRESET** . Set 83522A 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 **ΔF** and at DATA ENTRY enter 500 MHz. On the 83522A 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 83522A **AMPTD MKR** . Monitor markers while slowly rotating the left RPG until CF equals 2150 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 83522A, 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 2350 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 83522A, 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. Model 83522A Performance Test Record Card (1 of 3)

83522A PERFORMANCE TEST RECORD CARD

NOTE

Unless otherwise indicated, procedures for the following tests are found in the 8350A Operating and Service Manual.

SPECIFICATION TESTED: LIMITS	STEP	TEST CONDITIONS	LOWER LIMIT	MEASURED VALUE	UPPER LIMIT
4-13. Frequency Range and Accuracy		**NOTE: Perform FREQ CAL adjustment in Section III before proceeding with test.**			
CW Mode					
0.01–2.4 GHz: ±5 MHz	4.	Start frequency = 10 MHz			10 MHz
	5.	Stop frequency = 2.4 GHz	2.4 GHz		
	6.	CW frequency = 10 MHz	5 MHz		15 MHz
		CW frequency = 1.00 GHz	0.995 GHz		1.005 GHz
		CW frequency = 2.00 GHz	1.995 GHz		2.005 GHz
Swept Frequency Accuracy					
0.01–2.4 GHz: ±15 MHz	8.	Start frequency = 10 MHz	0 MHz		25 MHz
	8A.	Start frequency = 1 GHz	0.985 GHz		1.015 GHz
	9.	Stop frequency = 2.4 GHz	2.385 GHz		2.415 GHz
Marker Accuracy	12.	Sweep width: 0.01–2.4 GHz			
0.01–2.4 GHz:		M1 = 100 MHz*	73 MHz		127 MHz
±15 MHz ±0.5% of sweep width		M2 = 500 MHz*	473 MHz		527 GHz
		M3 = 1.0 GHz	0.973 GHz		1.027 GHz
		M4 = 1.6 GHz	1.573 GHz		1.627 GHz
		M5 = 2.2 GHz	2.173 GHz		2.227 GHz
		*Not used for alternate test method.			
4-14. Output Amplitude					
Pwr. Mtr. Leveled: ±0.1 dB	9.				<0.2 dB
Pwr. Lvl. Accuracy: ±1.0 dBm	12.	Power = +13.0 dBm	+12.0 dBm		+14.0 dBm
Opt. 002: ±1.2 dBm	13.	+12.0	+11.0		+13.0
Calibrated Range: ≤15 dB		+11.0	+10.0		+12.0
Opt. 002: ≤85 dB		+10.0	+ 9.0		+11.0
NOTE		+ 9.0	+ 8.0		+10.0
For Opt. 002, extend upper and lower limits in step 13 by 0.2 dB.		+ 8.0	+ 7.0		+ 9.0
		+ 7.0	+ 6.0		+ 8.0
		+ 6.0	+ 5.0		+ 7.0
		+ 5.0	+ 4.0		+ 6.0
		+ 4.0	+ 3.0		+ 5.0
		+ 3.0	+ 2.0		+ 4.0
		+ 2.0	+ 1.0		+ 3.0
		+ 1.0	0.0		+ 2.0
		0.0	− 1.0		+ 1.0
		− 1.0	− 2.0		0.0
		− 2.0	− 3.0		− 1.0
Max. Leveled Power: +13 dBm	15.				+13.5 dBm
Internal Leveled: ±0.25 dB					
Power Sweep: ≤15 dB/SWP	17.	Power level = −2 dBm	≤15dB/SWP		

Table 4-2. Model 83522A Performance Test Record Card (2 of 3)

SPECIFICATION TESTED: LIMITS	STEP	TEST CONDITIONS	LOWER LIMIT	MEASURED VALUE	UPPER LIMIT
4-15. Frequency Stability					
+5 to −10% V Line Change:	2.	CW frequency = 1.0 GHz			
0.01–2.4 GHz: ±20 kHz	3.	Low line voltage			±20 kHz
	4.	High line voltage			±20 kHz
Time (10 minutes):	5.	Power = +13 dBm			
0.01–2.4 GHz: ±100 kHz		CW frequency = 1.00 GHz			
	7.				±100 kHz
10 dB Power Change:	9.	Power = +13 dBm			
0.01–2.4 GHz: ±100 kHz		CW frequency = 1.0 GHz			
	10.	Reduce power to +3 dBm			±100 kHz
3:1 Load SWR:	13.	Power = +13 dBm			
0.01–2.4 GHz: ±10 kHz		CW Frequency = 1.3 GHz			
	14.				≤20 kHz
4-16. Residual FM					
0.01–2.4 GHz: <5 kHz	2.	CW frequency = 1 GHz			
	5.				<5 kHz
4-17. Spurious Signals					
Harmonic:					
0.01–2.4 GHz: ≤20 dB	3.	In dB below carrier	≤20 dB		
Non-harmonic:					
0.01–2.1 GHz ≤30 dB			≤30 dB		
2.1–2.4 GHz: ≤25 dB			≤25 dB		
4-18. Output VSWR					
0.01–2.4 GHz: <1.5	6.	Range: 0.01–2.4 GHz			<1.5
4-19. Residual AM					
0.01–2.4 GHz: ≤50 dB	3.	Power = +13 dBm			
		CW frequency = 1.0 GHz			
	5.	Measure relative to carrier	≤50 dB		
4-20. External FM					
Direct coupled:	1.	A3S1: Close switch 5, open 6.			
DC–100 Hz: ±12 MHz	3.		±12 MHz		
Cross Over Coupled:	4.	A3S1: Close switch 6.			
DC–100 Hz: ±75 MHz			±75 MHz		
Direct/Cross Over coupling					
100 Hz–1 MHz: ±7 MHz	9.		±7 MHz		
1–2 MHz: ±5 MHz	10.		±5 MHz		
2–10 MHz: ±1 MHz			±1 MHz		
	11.	A3S1: Change switch 6 from previous setting	±7 MHz		
			±5 MHz		
			±1 MHz		

Table 4-2. Model 83522A Performance Test Record Card (3 of 3)

SPECIFICATION TESTED: LIMITS	STEP	TEST CONDITIONS	LOWER LIMIT	MEASURED VALUE	UPPER LIMIT
4-21. FM Frequency Response					
DC–2 MHz: ±3 dB	5.	Test limits measured by display divisions.	2.9 div.	_____	5.6 div.
4-22. AM On/Off Ratio Square-Wave Symmetry					
On/Off Ratio:	1.	CW frequency = 1 GHz			
≤30 dB below specified max leveled power		Power = +13 dBm			
	3.		≤30 dB	_ _ _	
Symmetry of ON/OFF time: 40/60	4.		40%	_ _ _	60%
4-23. Step Attenuator Accuracy					
Attn. Step / Accuracy	1.	CW frequency = 1.0 GHz			
		Power = +7 dBm			
10 dB ±0.5 dB		Reference Attn. = 70 dB			
20 dB ±0.7 dB	4.				
30 dB ±0.9 dB		**Ref Attn Step / Attn Error / Deviation From 0 Ref**			
40 dB ±1.2 dB		70–60 +			≤±0.5 dB
50 dB ±1.5 dB		70–50 +			≤±0.7 dB
60 dB ±1.8 dB		70–40 +			≤±0.9 dB
70 dB ±2.1 dB		70–30 +			≤±1.2 dB
		70–20 +			≤±1.5 dB
		70–10 +			≤±1.8 dB
		70– 0 +			≤±2.1 dB

NOTE
The procedure for the following test is found on the pages immediately preceding this test card.

4-16. Internal Crystal Markers					
(+3 to +13 dBm; ≤10 mkrs/SWP)	5.		10 Mkrs/SWP	_ _ _	
50 MHz: 10 Mkrs/SWP, <2.4 GHz	6.		10 Mkrs/SWP	_ _ _	
10 MHz: 10 Mkrs/SWP, <2.4 GHz	8.		10 Mkrs/SWP	_ _	
1 MHz: 10 Mkrs/SWP, <1 GHz	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 83522A 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 83522A 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-metalic 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 5-23) 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	5-19	Sets gain of frequency reference to 1 V/GHz output.
A2R4	OFFSET	5-19	Sets offset of frequency reference (1 V/GHz).
A2R6	BAND 0 OFFSET	5-19	Sets offset of frequency reference (1 V/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	5-20	Slope adjustment for frequency tracking voltage.
A4R2	0 HI	5-22	Sets power calibration at the high end of the power range (+13 dBm).
A4R4	BIAS	5-20	Sets bias on the internal detector line for 0 volts with RF power off.
A4R6	0 LO	5-20	Sets power calibration at the low end of the power range (0 dBm).
A4R7	0 MD	5-20	Sets power calibration at the middle of the power range (+9 dBm).
A4R9	PM	5-23	Sets power meter leveling calibration.
A4R11	GAIN	5-24	Sets the gain of the main ALC amplifier.
A4R47	OFS 1	5-20	Adjusts for zero offset through U7-Q6 log amplifier circuit.
A4R56	OFS 2	5-20	Adjusts for zero offset through U5 log amplifier circuit.
A4R59	OFS 3	5-20, 5-22	Adjust for zero offset through U8-Q1 Sample and Hold circuit.
A4R67	OFS 4	5-20	Adjust for zero offset through U11 Main ALC amplifier.
A5C14	LO	526	Adjusts low frequency for best frequency response flatness through U10.
A5R19	FM	5-26	Sets balance of U10 video amplifier.
A5R34	BP 1	5-21	Breakpoint that works with SL1 (slope 1) for ALC flatness.

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

Reference Designation	Adjustment Name	Adjustment Paragraph	Description
A5R36	BP 2	5-21	Breakpoint that works with SL2 (slope 2) for ALC flatness.
A5R38	BP 3	5-21	Breakpoint that works with SL3 (slope 3) for ALC flatness.
A5R40	BP 4	5-21	Breakpoint that works with SL4 (slope 4) for ALC flatness.
A5R41	SL1	5-21	Slope adjustment for best ALC flatness.
A5R42	SL 2	5-21	Slope adjustment for best ALC flatness.
A5R43	SL 3	5-21	Slope adjustment for best ALC flatness.
A5R44	SL 4	5-21	Slope adjustment for best ALC flatness.
A5R48	SLP	5-21	Sets overall slope of internal leveling ALC.
A5R50	PWSP	5-25	Sets range for power sweep.
A5R75	HI	5-26	Works in conjunction with C14 to set frequency response flatness of ALC.
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)	None	Sets the point where the frequency switches during a band crossing (not used in 83522A).
A6S1	OFFSET	5-17	Sets low end of band frequency accuracy.
A6S2	GAIN	5-17	Sets high end of band frequency accuracy.
A7R5	50M	5-27	Sets 50 MHz marker pulse width.
A7R6	10M	5-27	Sets 10 MHz marker pulse width.
A7R7	1M	5-27	Sets 1 MHz marker pulse width.

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

Reference Designation	Adjustment Name	Adjustment Paragraph	Description
A7R20	B2	5-14	Sets oscillator bias voltage at high end of band. (Not used in the 83522A.)
A7R21	S2	5-14	Sets break point of bias voltage at high end of band. (Not used in the 83522A.)
A7R26	S1	5-14	Sets break point of bias voltage at low end of band. (Not used in the 83522A.)
A7R27	B1	5-14	Sets oscillator bias voltage at low end of band. (Not used in the 83522A.)
A7R47	Z (zero)	5-18	Sets offset to minimize the frequency difference between CW and delta F ±0 with delay compensation circuits connected.
A7R65	LO	5-18	Sets delay compensation at low frequency end of band.
A7R66	HI	5-18	Sets delay compensation at high frequency end of band.
A8C4	50 MHz	5-17, 5-27	Adjusts frequency of 50 MHz oscillator.
A8R29	1M	5-27	Adjusts bias of the internal mixer when 1 MHz marker is selected.
A8R30	10M	5-27	Adjusts bias of the internal mixer when 10 MHz marker is selected.
A8R31	50M	5-27	Adjusts bias of the internal mixer when 50 MHz marker is selected.
A8R53	1 MHz	5-27	Sets gain of video amplifier U1 when 1 MHz marker is selected.
A8R54	10 MHz	5-27	Sets gain of video amplifier U1 when the 10 MHz marker is selected.
A8R55	50 MHz	5-27	Sets gain of video amplifier U1 when the 50 MHz marker is selected.
A8R67	EXT	5-28	Sets gain of video amplifier U1 when EXTERNAL MARKER is selected.
A12A1R4	HARMONICS	None	Set for minimum harmonic content in RF output signal. (Not used in 83522A.)

Table 5-2. Factory Selected Components

Reference Designator	Adjustment Paragraph	Allowable Range of Values	Basis of Selection
A5R31	5-26	75 to 125 Ohms	Selects scaling of current drive of YIG Oscillator FM coil near 100 kHz.
A6R1	None		
A6R3	None		
A6R38	None		Selected at factory to correct for frequency nonlinearity in YIG Oscillator A12.
A6R39	None		
A6R40	None		
A6R41	None		
A7R4	5-27	Typ=1200 Ohms	Allows maximum marker OFF pulse without overlapping the ON pulse.
A8C3	5-27	5 to 12 pf	Center the range of 50 mHz frequency adjustment.
A8R28	5-28	Typ=3160 Ohms Max=5110 Ohms	Minimizes feedthrough of 27.8 kHz square wave into the external marker birdie.
A12A1R1	None		Factory selected to optimize A12 YO bandwidth, power, and harmonics (not field replaceable).
A12A1R2	None		

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, 5-19
A3 Digital Interface	A3	5-13
A4 ALC	A4, A5	5-20 thru 5-24
A5 FM	A4, A5	5-20 thru 5-26
A6 YO Driver	A6, A2, A7	5-14 thru 5-17, 5-19
A7 Marker	A6, A7, A8	5-14, 5-16, 5-18, 5-27
A8 Sampler	A7, A8	5-17, 5-27, 5-28
A12 YIG Oscillator	A6, A7, A2, A12, A5	5-14, 5-15, 5-16, 5-19, 5-20 thru 5-24, 5-26
A14 Amplifier	A4, A5	5-20 thru 5-24
A15 DC Return	A4, A5	5-20 thru 5-24
A16 Cavity Oscillator	A4, A5	5-20 thru 5-24
A17 Modulator/Mixer	A4, A5	5-20 thru 5-24
DC1 Directional Detector	A4, A5	5-20 thru 5-24

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	Delay Compensation
5-19	Frequency Reference 1 V/GHz Output
5-20	ALC Adjustment
5-21	Internal Leveled Flatness
5-22	Power Calibration
5-23	Power Meter Leveling Calibration
5-24	ALC Gain Adjustment
5-25	Power Sweep
5-26	FM Driver
5-27	Marker and Sampler Adjustments
5-28	External Marker Adjustment

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 the 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.

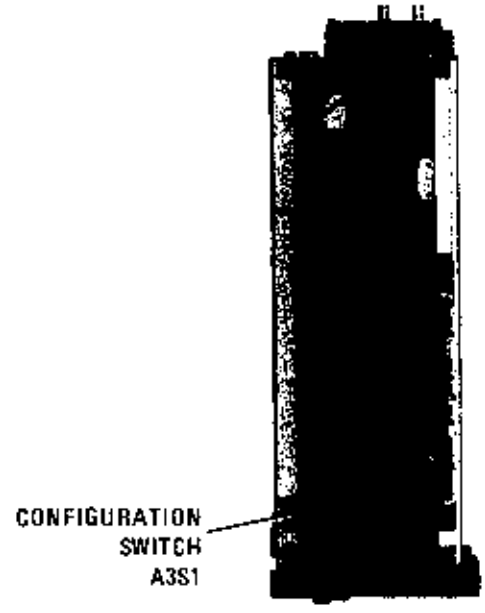


Figure 5-1. Configuration Switch A3S1 Location

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 83522A	0	0	0	x	x	x	x	x
Minimum RF Power 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

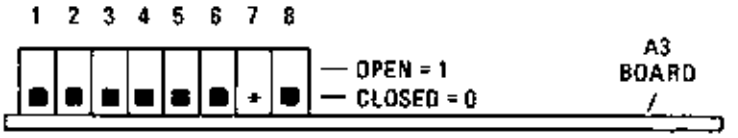
1. Switch Positions:
   1 = Switch Open = High
   0 = Switch Closed = Low (Ground)
   x = Don't Care

2. Switch A3S1 is set from the factory as follows:

Switch No.	Position
1	0
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

5-14. OSCILLATOR BIAS ON A7

REFERENCE:

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

DESCRIPTION:

Oscillator bias breakpoints are not required in the 83522A. Setting A7R27 (B1) and A7R20 (B2) fully counterclockwise removes any shaping effects the A7 Oscillator Bias Shaping Control circuit has on the YO DRIVE Voltage.

PROCEDURE:

1. Adjust A7R27 (B1) fully counterclockwise. A7R26 (S1) should then have no effect. Refer to Figure 5-2 for the adjustment location.

2. Adjust A7R20 (B2) fully counter clockwise. A7R21 (S2) should then have no effect.

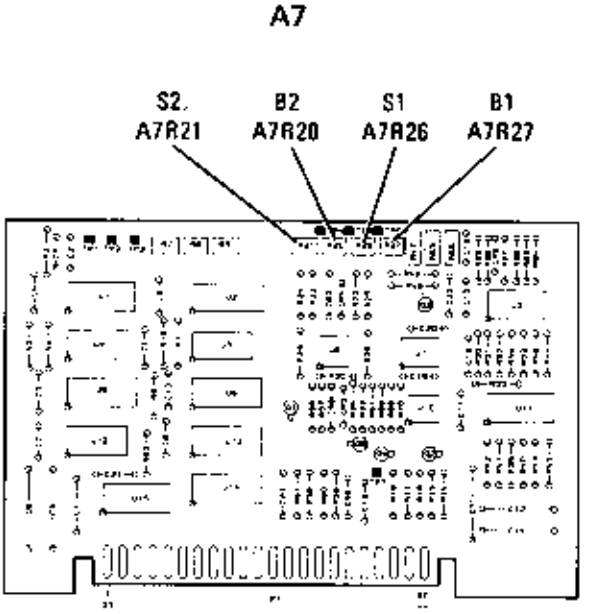


Figure 5-2. Oscillator Bias Test Point and Adjustment Location

5-15. −10V REFERENCE ON A6 YO DRIVER

REFERENCE:

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

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

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.

EQUIPMENT:

Sweep Oscillator	HP 8350A
Digital Voltmeter (DVM)	HP 3455A

PROCEDURE:

1. Connect DVM to A6TP3 (−10V REF) and common to A6TP5 (Figures 5-3 and 5-4).
2. Adjust "−10" control A6R21 for −10.000 Vdc ±0.001 Vdc.

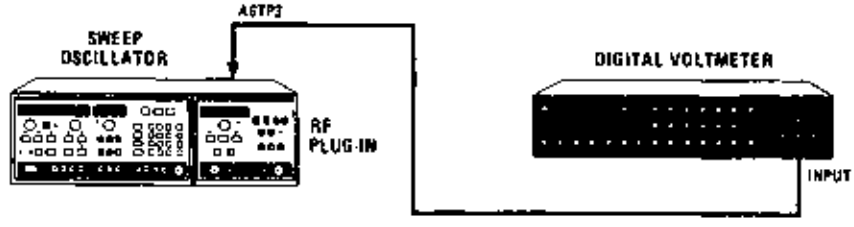


Figure 5-3. −10 Volt Reference Test Setup

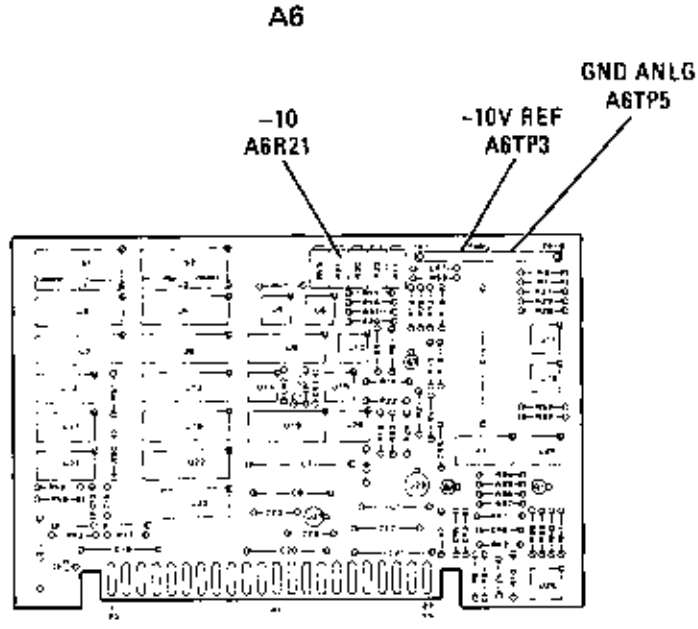


Figure 5-4. A6TP3 −10 Volt Reference Test Point Location

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.

EQUIPMENT:

Sweep Oscillator	HP 8350A
Digital Voltmeter (DVM)	HP 3455A

PROCEDURE:

NOTE

YO Driver Board adjustments should be avoided if possible. Set up equipment as shown in Figure 5-8 and perform step 23 in Paragraph 5-17 to check frequency accuracy and sweep linearity across the band. If frequencies are within ±5 MHz tolerance, do not make these YO Driver Board adjustments.

1. Connect the equipment as shown in Figure 5-5 with the DVM connected to A6P1 pin 4 (FREQ CAL) and common connected to A6TP5 (GND ANLG).

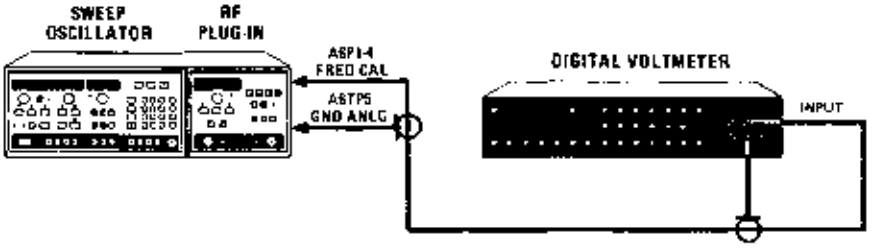


Figure 5-5. YO Driver Board Adjustment Test Setup

2. Press **INSTR PRESET** .
3. Adjust the 83522A front panel **FREQ CAL** knob for a DVM reading of 0.000 ± 0.010 Vdc. This sets the FREQ CAL control to the electrical center of its range.
4. Float ground on DVM and connect floating ground to A6TP13 (+20 V FREQ. REF.). Connect measurement lead of DVM to A6TP16. (See Figure 5-5 and 5-6.)

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

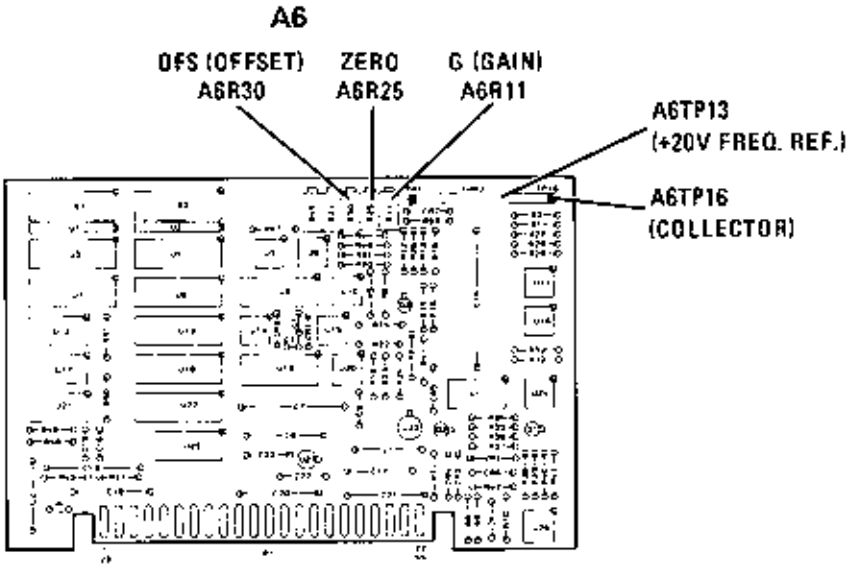


Figure 5-6. YO Driver Board Test Points

5. Press **CW** , then DATA ENTRY of 2.4 GHz.

NOTE

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

6. Press **SHIFT** , then DATA ENTRY of 00.

7. Make DATA ENTRY of 2C80. (Refer to HEX entry key diagram in Figure 5-7 for location of "C".)

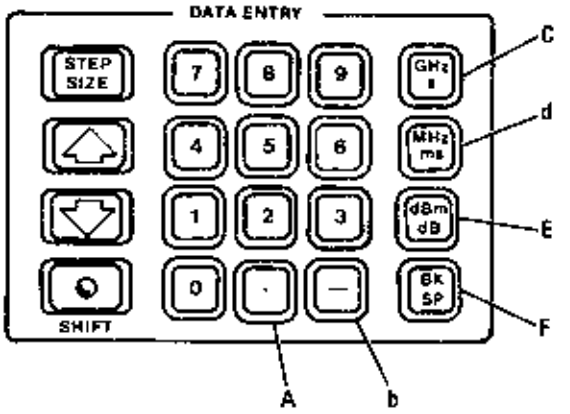


Figure 5-7. Front Panel Hexadecimal Entry Keys

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

8. Press **M2** , then DATA ENTRY of 00.

9. Press ◀ to shift address to 2C81.

10. Press **M2** , then DATA ENTRY of 40.

11. Press ◀ to shift address to 2C82.

12. Press **M2** , then DATA ENTRY of 00. If the DVM indication is not −6.250 ± 0.010 Vdc, adjust A6R11 "G" (gain) to set it to −6.250 ± 0.010 Vdc. Note the actual DVM reading to within ± 0.1 mVdc accuracy. This value will be used in step 16 of this procedure.

NOTE

The accuracy of the adjustment in steps 12 through 16 is dependent upon the relative difference between the value noted in step 12 and the adjustment value in step 16. The absolute value of the voltage set in step 12 is selected to ensure that the A6 YO Driver circuits are operating within the correct range as the adjustments are made. If −6.250 ± 0.010 Vdc cannot be achieved when adjusting A6R11 (G) in step 12, set it as close as possible and note this value for use in step 16.

13. Press **M2** then DATA ENTRY of FF.

14. Press ◀ to shift address to 2C81.

15. Press **M2** then DATA ENTRY of 4F.

16. Add −12.9968 to the value previously noted in step 12. If the voltage in step 12 was set to exactly −6.250 Vdc, this new value would then be −19.2468 Vdc (−6.2500 + −12.9968 = −19.2468). Adjust A6R30 "G" to this new value ± 0.1 mVdc.

NOTE

If it was not possible to set the voltage to −6.250 Vdc in step 12, add −12.9968 to the value noted in step 12. Adjust A6R30 "OFS" to this new value. If there is insufficient range to adjust it to the new value, a circuit malfunction exists. Refer to troubleshooting procedures in Section VIII to correct the problem.

17. Press **M2** then DATA ENTRY of 0F. Adjust A6R25 "ZERO" for −12.6218 Vdc ±0.1 mVdc.

18. Press **M2** then DATA ENTRY C0.

19. Press ◀ to shift address to 2C82.

20. Press **M2** then DATA ENTRY of 00.

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

21. Adjust A6R11 "G" (gain) for DVM indication of −19.5000 Vdc ±0.1 mVdc.

22. Repeat steps 4 through 21 to check for the 12.9968 volt difference between steps 12 and 16 with no further adjustment.

5-17. FREQUENCY ACCURACY

REFERENCE:

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

DESCRIPTION:

The frequency accuracy of the marker reference oscillator is first set to 50 MHz using a frequency counter. The frequency accuracy of the RF plug-in band is then set by selecting special calibration modes (shift 90 for the low end of band and shift 91 for the high end). In these calibration modes, the RPG acts as the calibration adjustment and a resulting frequency error code is displayed on the front panel FREQUENCY display as the RF output frequency is monitored with a frequency counter. This error code is then entered into the A6 calibration switches (A6S1 for the low end and A6S2 for the high end). After the frequency accuracy is set, the 50 MHz markers are roughly checked for accuracy at the center of the band within the range of the the FREQ CAL control.

EQUIPMENT:

Sweep Oscillator	HP 8350A
Digital Voltmeter	HP 3455A
Frequency Counter	HP 5343A
10 dB Attenuator	HP 8491A Option 010
1 : 1 Probe	HP10007B

PROCEDURE:

50 MHz Oscillator Calibration

NOTE

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

1. Press 8350A **INSTR PRESET** , set **STOP** frequency to 2 GHz, and press 83522A **AMPTD MKR** . Connect Frequency Counter to A8TP1 through the 1 : 1 probe (Figures 5-8 and 5-9) and check that output frequency is 50.000 MHz ±250 Hz. If not, adjust A8C4 50 MHz Oscillator for correct frequency. If necessary, select A8C3 for correct adjustment range. Refer to Adjustment paragrapgh 5-27.

5-17. FREQUENCY ACCURACY (Cont'd)

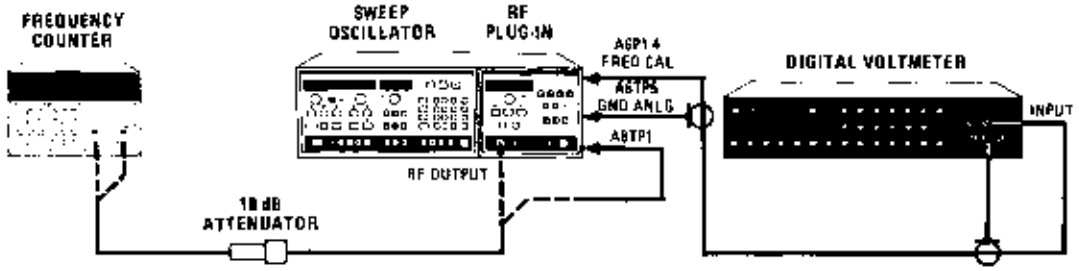


Figure 5-8. Test Setup for Frequency Accuracy Adjustments

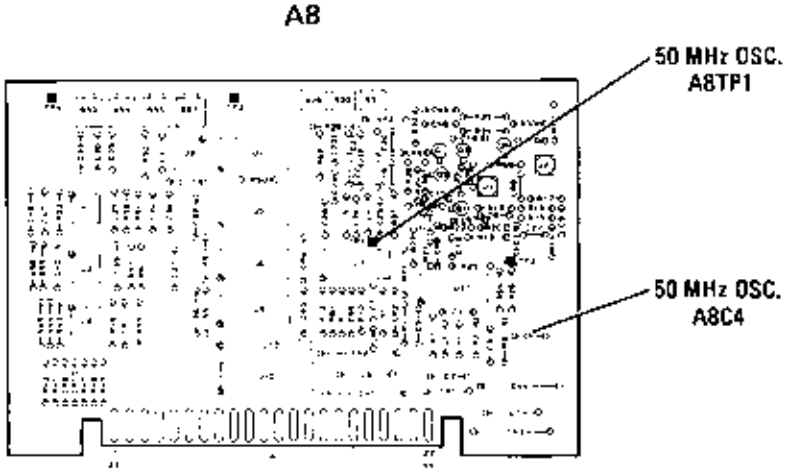


Figure 5-9. 50 MHz Oscillator Output and Adjustments

Frequency Accuracy Calibration

2. Connect equipment as shown in Figure 5-8 with frequency counter and 10 dB attenuator connected to RF OUTPUT. Connect the DVM to A6P1 pin 4 (FREQ CAL) and common to A6TP5 (GND ANLG).

3. Press **INSTR PRESET**

4. Adjust **FREQ CAL** knob for a DVM reading of 0.000 ± 0.010 Vdc. This sets the FREQ CAL adjustment to the electrical center of its range.

5. Press **CW** . then at DATA ENTRY enter 50 MHz.

6. Press **SAVE** then **1** .

5-17. FREQUENCY ACCURACY (Cont'd)

7. Press CW , then at DATA ENTRY, press 2.4 GHz.
8. Press SAVE then 2 .
9. Press CW , then at DATA ENTRY enter 1.2 GHz.
10. Press SAVE 3 .
11. Press RECALL 1 and 50 MHz should be displayed.
12. Press SHIFT , then 90. (This selects low end frequency calibration mode.)
13. Adjust POWER RPG control for a reading of 50 MHz on external frequency counter.
14. Set switch A6S1 (Figure 5-10) for the value displayed in POWER window. Refer to the diagram in Figure 5-11.

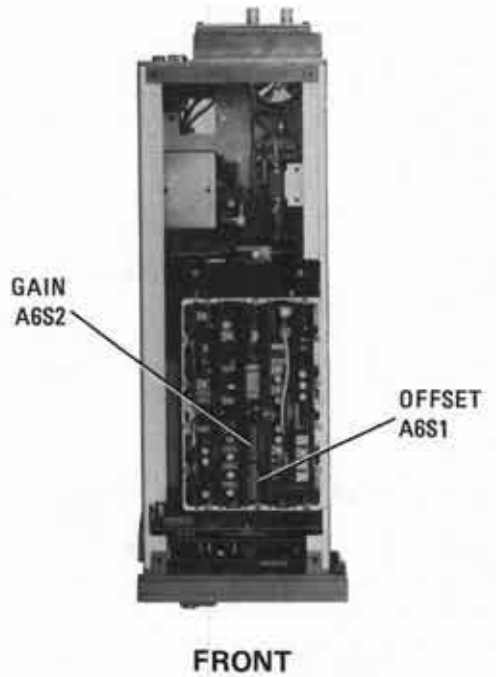


Figure 5-10. Frequency Calibration Adjustments Location

5-17. FREQUENCY ACCURACY (Cont'd)

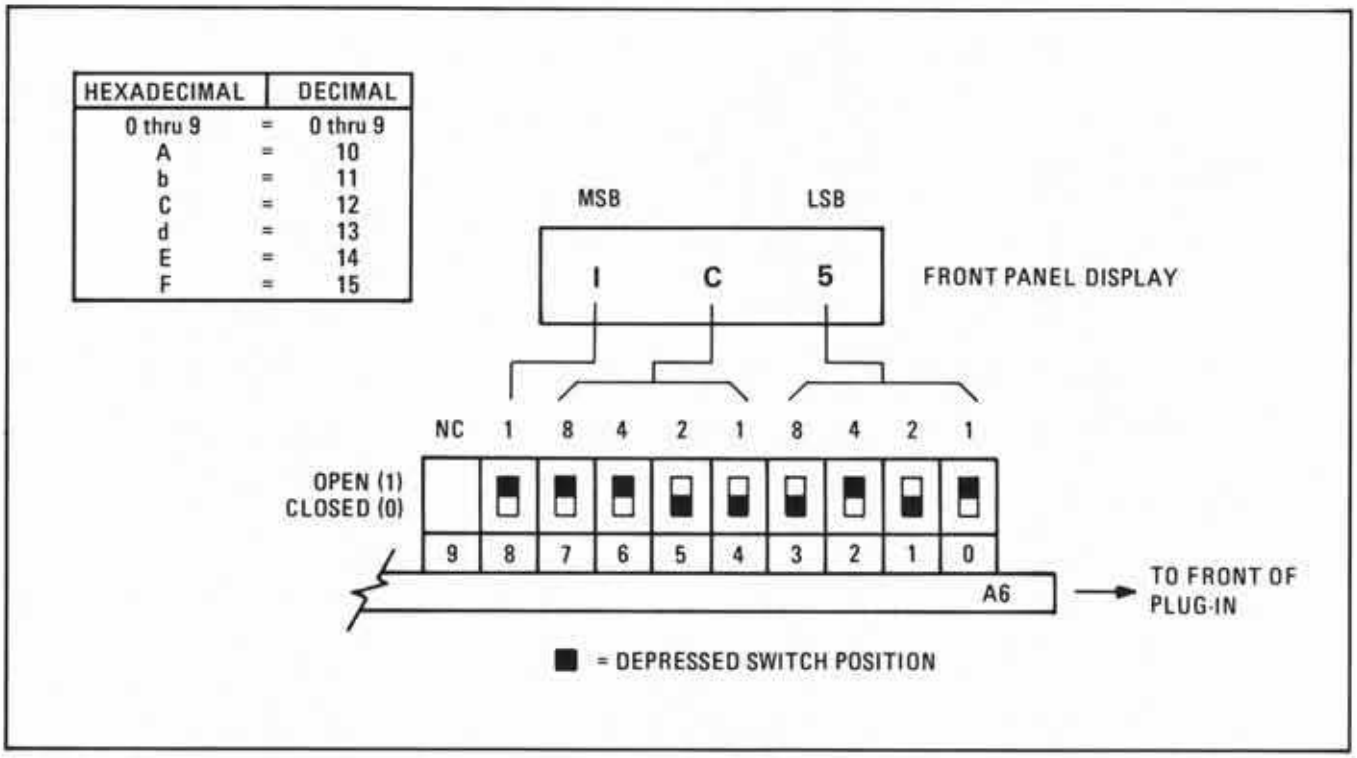


Figure 5-11. A6S1 and A6S2 Frequency Calibration Switch Configuration

15. Press INSTR PRESET , then RECALL 1 .
16. Verify that a setting of 50 MHz on 8350A produces a 50 MHz ± 5 MHz indication on the external frequency counter.
17. Press RECALL 2 and 2.400 GHz should be displayed.
18. Press SHIFT , then 91. (This selects high end frequency calibration mode.)
19. Adjust POWER RPG control for a reading on the external frequency counter of 2.400 GHz.
20. Set A6S2 (Figure 5-10) for the reading displayed in the POWER window.
21. Press INSTR PRESET , then RECALL 2 .
22. Verify that a setting of 2.400 GHz on 8350A produces an 2.400 GHz ±5 MHz indication on the external frequency counter.
23. Manually adjust FREQUENCY across high band and check for corresponding external counter readings ±5 MHz. Check at 100 MHz, 500 MHz, 1.0 GHz, 1.5 GHz, and 2.0 GHz.

5-17. FREQUENCY ACCURACY (Cont'd)

50 MHz Marker Accuracy Check

24. Press RECALL 1 and 50 MHz should be displayed.

25. Press 50 MHz MARKER then INTENS MKR .

26. Adjust FREQ CAL control so the MKR lamp lights.

27. Press RECALL 3 and 1.200 GHz should be displayed. The external frequency counter should read 1.200 GHz ±5 MHz. This indicates that the Frequency Accuracy Adjustments have been properly performed.

5-18. 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. The Frequency Calibration procedure is first done to ensure that the proper frequencies are referenced during the adjustment procedure. An 8350A amplitude marker is used as the frequency reference (which will not change as sweep time is modified). At a slow (0.5 second) sweep time, the 8350A amplitude marker is set adjacent to an 83522A 50 MHz crystal marker at the frequency of interest. Sweep time is then decreased to 10 milliseconds and delay in the YO is observed as a shift in the spacing between the 8350A amplitude marker and the 83522A crystal marker. At sweep speeds faster than 100 milliseconds, delay should not exceed ±5 MHz (the difference between CW and Swept Frequency accuracies).

EQUIPMENT:

Sweep Oscillator	HP 8350A
Digital Voltmeter	HP 3455A
Oscilloscope	HP 1740A

5-18. DELAY COMPENSATION (Cont'd)

PROCEDURE:

NOTE

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

1. Connect the equipment as shown in Figure 5-12 with the DVM connected to A6TP6 (DELAY COMP) and common to A6TP5 (GND ANLG).

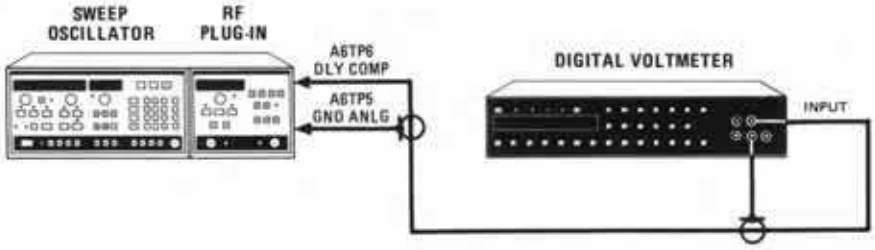


Figure 5-12. Delay Compensation Offset Adjustment Test Setup

2. On the 8350A, press INSTR PRESET .
3. On the 8350A, select CW mode and with the DVM, measure and note the voltage at A6TP6 (DELAY COMP).
4. Press CF , then ΔF . At DATA ENTRY, enter 0 MHz.
5. Adjust A7R47 (Z) for the same reading at A6TP6 as was obtained in step 3. Refer to Figure 5-13 for the adjustment location. Remove the DVM test leads.
6. On the 8350A, press INSTR PRESET CW 5 0 MHz .
7. On the 83522A, press AMPTD MKR . (50 MHz Marker Frequency switches on automatically at Instrument Preset.)
8. Adjust the 83522A FREQ CAL control until the MKR lamp is on.
9. On the 8350A, press 1 0 MHz .
10. On the 83522A, press 10 MHz marker.
11. Fine adjust the FREQ CAL control (if needed) until the MKR lamp is on.
12. On the 83522A, press 1 MHz marker.

5-18. DELAY COMPENSATION (Cont'd)

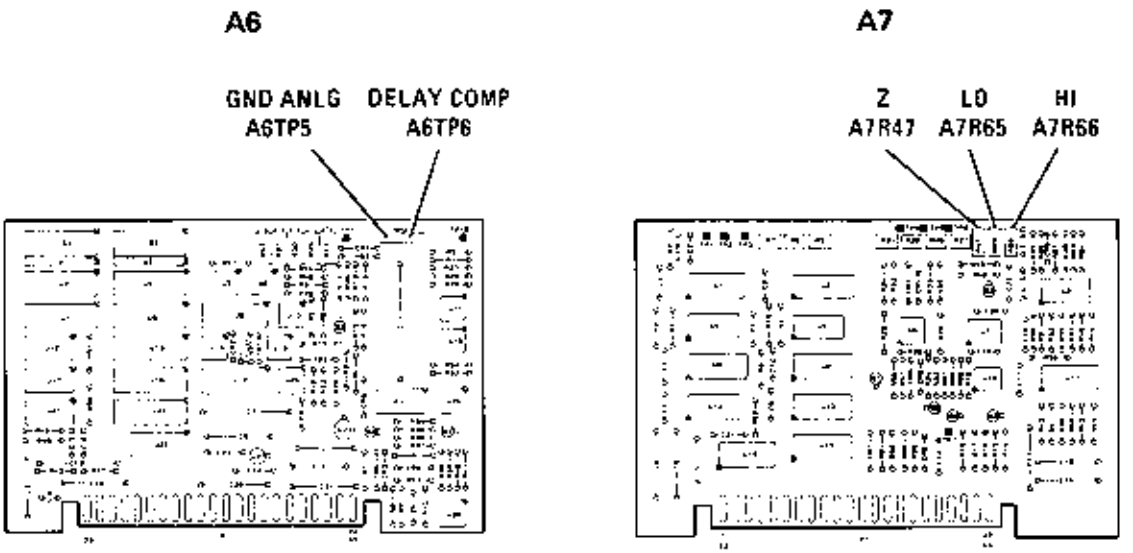


Figure 5-13. Delay Compensation Adjustment Locations

13. A small adjustment of the **FREQ CAL** control may be necessary for the MKR lamp to light. The RF output frequency (and crystal marker frequency) is now calibrated accurately. Do not change the position of the FREQ CAL control for the remainder of the test or the frequency calibration will be lost.

14. Connect the equipment as shown in Figure 5-14. On the 8350A, press **INSTR PRESET**, then **CF**, **MI 1 5 0 MHz**, **SWEEP TIME .5 S**.

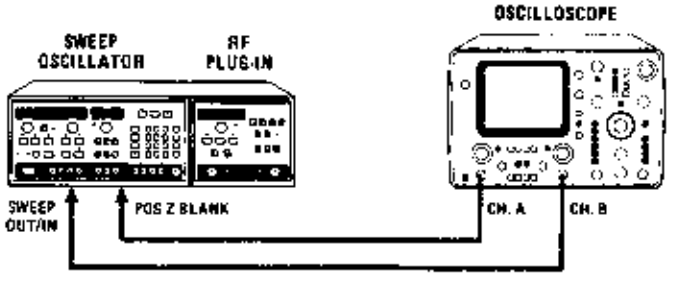


Figure 5-14. Delay Compensation Adjustment Test Setup

5-18. DELAY COMPENSATION (Cont'd)

15. On the 83522A, ensure that the power is set to +13 dBm and press [redacted].

16. Set the oscilloscope controls as follows:

Display Mode	A vs.B
Display	MAG X10
Ch. A Vertical Sensitivity	2V/DIV
Ch. B Vertical Sensitivity	1V/DIV

Adjust the HOIZONTAL POSITION control to set the start of sweep exactly on the leftmost graticule.

NOTE

Although the HP 1740A is the specified oscilloscope, the use of an oscilloscope with a variable persistance screen may be advantageous in order to more clearly see the 50 MHz markers when the sweep speed is decreased to 10 milliseconds.

17. On the 8350A, press [redacted]. Rotate the VERNIER to place the third crystal marker (150 MHz marker) exactly 0.4 divisions to the left of the leading edge of the 8350A amplitude marker as shown in Figure 5-15. It may be necessary to fine adjust the oscilloscope horizontal position control and the Channel A vertical position control to move the leading edge of the 8350A amplitude marker and the desired crystal marker to a convenient graticule which may be used as a point of reference.

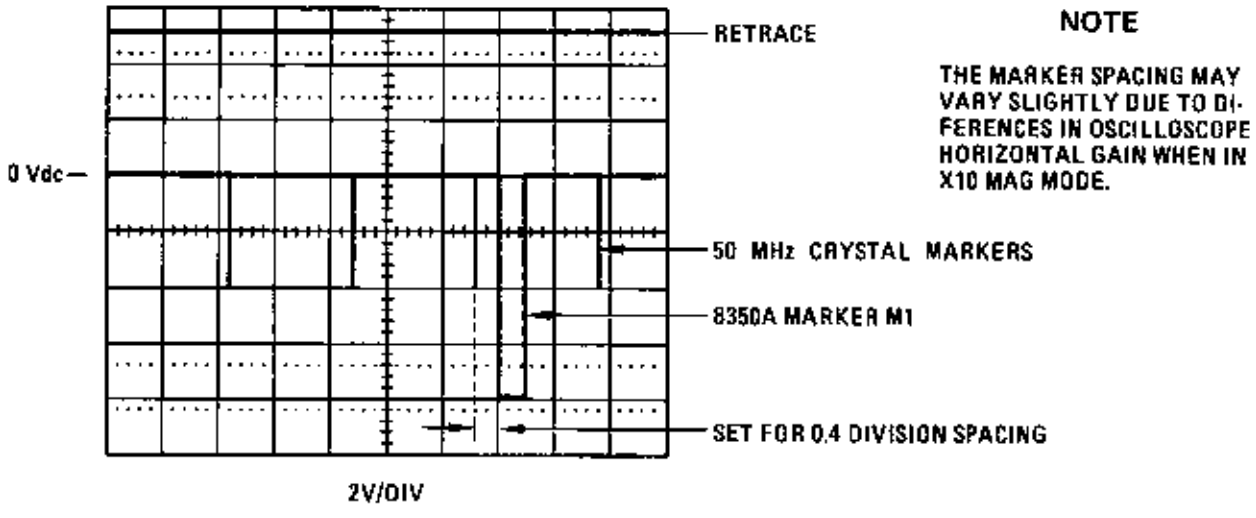


Figure 5-15. Delay Compensation Adjustment Waveform

5-18. DELAY COMPENSATION (Cont'd)

18. On the 8350A, press [redacted].

19. Adjust A7R65 "LO" (low end of band) to again place the third crystal marker exactly 0.4 divisions to the left of the 8350A amplitude marker. It may be necessary to fine adjust the oscilloscope horizontal position control to reset the 8350A amplitude marker to the reference graticule selected in step 17.

20. Rotate the 8350A FREQUENCY/TIME vernier to change the sweep time from 10 milliseconds to 0.5 seconds. The spacing between the 8350A amplitude marker and the crystal marker used should not vary greater than ±5 MHz from its original position set in step 17 (determined by ±1/10 the distance between 50 MHz markers).

21. On the 8350A, press [redacted].

22. Adjust the oscilloscope HORIZONTAL POSITION control to look at the highest frequency crystal marker possible (up to 2.4 GHz).

NOTE

The highest frequency marker available may be limited by the gain of the oscilloscope horizontal deflection amplifiers when used in the X10 magnification mode. Sufficient accuracy may be obtained by using any marker greater than 1.6 GHz.

23. On the 8350A, press [redacted]. Rotate the 8350A FREQUENCY/TIME vernier to place the marker near center screen on the oscilloscope. Temporarily removing the oscilloscope from X10 magnification will aid in finding and moving the marker. Reset the oscilloscope to X10 magnification before proceeding.

24. On the 8350A, press [redacted]. Rotate the VERNIER to place the desired crystal marker exactly 0.4 divisions to the left of the leading edge of the 8350A amplitude marker as shown in Figure 5-15. It may be necessary to fine adjust the oscilloscope horizontal position control to move the leading edge of the 8350A amplitude marker to a convenient graticule which may then be used as a point of reference.

25. On the 8350A, press [redacted].

26. Adjust A7R66 "HI" (high end of band) to again place the crystal marker selected in step 24 exactly 0.4 divisions to the left of the 8350A amplitude marker. A slight readjustment of the oscilloscope horizontal position control may again be necessary.

27. Rotate the 8350A FREQUENCY/TIME vernier to change the sweep time from 10 milliseconds to 0.5 seconds. The spacing between the 8350A amplitude marker and the crystal marker used should not vary greater than ±5 MHz from its original position set in step 24 (determined by ±1/10 the distance between 50 MHz markers).

5-19. FREQUENCY REFERENCE 1V/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 output. Example: 1 GHz = 1 Volt; 2.4 GHz = 2.4 Volts, etc.

EQUIPMENT:

Sweep Oscillator	HP 8350A
Digital Voltmeter	HP 3455A

PROCEDURE:

NOTE

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

1. Connect a DVM to A2TP1 (Figure 5-16).

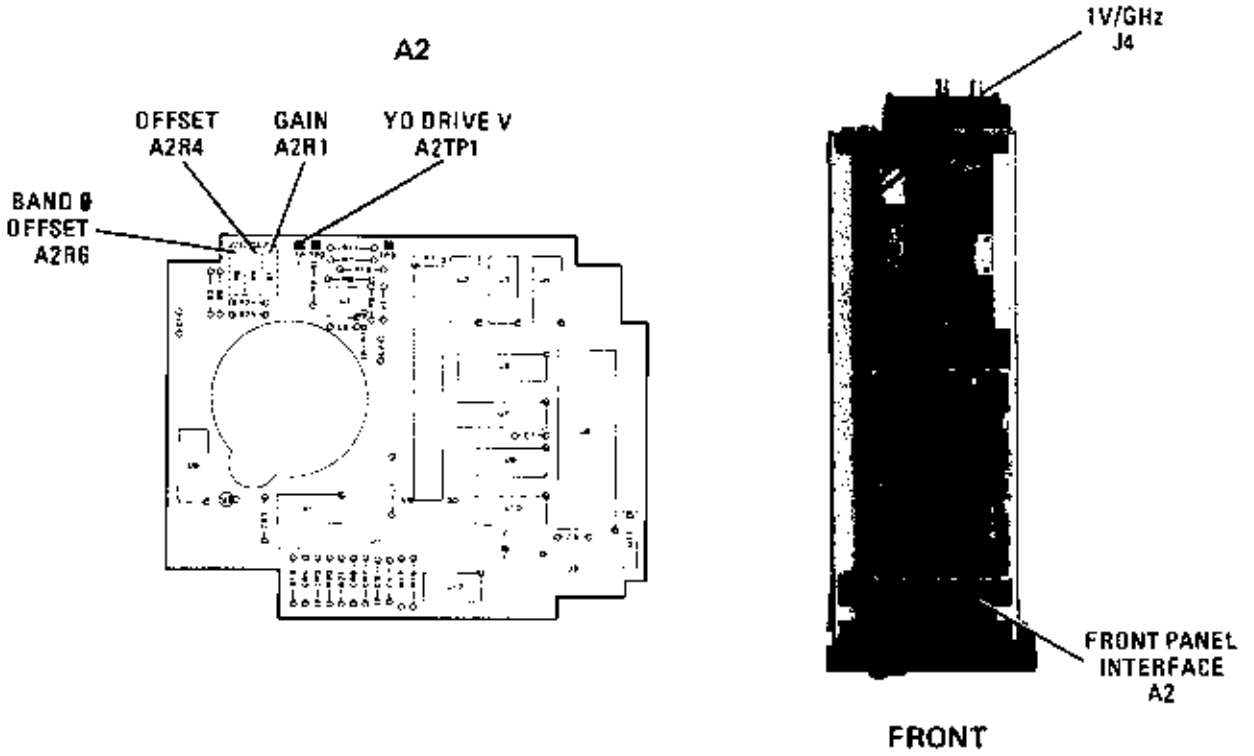


Figure 5-16. Frequency Reference Adjustments Location

5-19. FREQUENCY REFERENCE 1V/GHz OUTPUT (Cont'd)

2. Adjust A2R6 "Band 0 Offset" to the center of its mechanical range.
3. Connect the DVM to the rear panel 1V/GHz Frequency Reference connector, J4.
4. Press **CW** , then at DATA ENTRY enter 2.4 GHz.
5. Adjust A2R4 "OFFSET" for a DVM reading of 2.400 Vdc ±2 mVdc.
6. Press **CW**., then at DATA ENTRY enter 10 MHz.
7. Adjust A2R1"GAIN" for a DVM reading of 10 mVdc ±2 mVdc.
8. Repeat steps 3 through 7 until there is no change.

5-20. ALC ADJUSTMENT

NOTE

Complete adjustment of the leveling loop requires several procedures to be performed in the order prescribed, from Paragraph 5-20 through 5-24. 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 amplifier. Power is roughly calibrated and low band flatness is optimized.

EQUIPMENT:

Sweep Oscillator	HP 8350A
Digital Voltmeter	HP 3455A
Power Meter	HP 436A
Power Sensor	HP 8481A
Swept Amplitude Analyzer	HP 8755C/HP 182T
Detector	HP 11664A
Extender Board	HP 08350-60031
10 dB Pad	HP 8491A Opt. 010

5-20. ALC ADJUSTMENT (Cont'd)

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. Connect the digital voltmeter to A4TP12 with floating ground on A4TP14. Refer to Figure 5-18. Adjust A4R47 OFS 1 (offset 1) for 0.000V ± 0.001V.

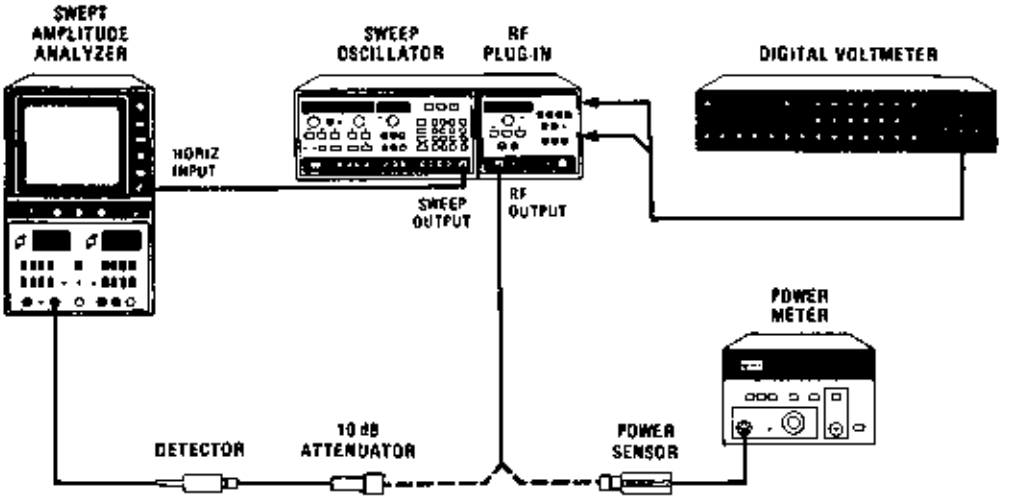


Figure 5-17. ALC Adjustments Test Setup

5-20. ALC ADJUSTMENT (Cont'd)

A4

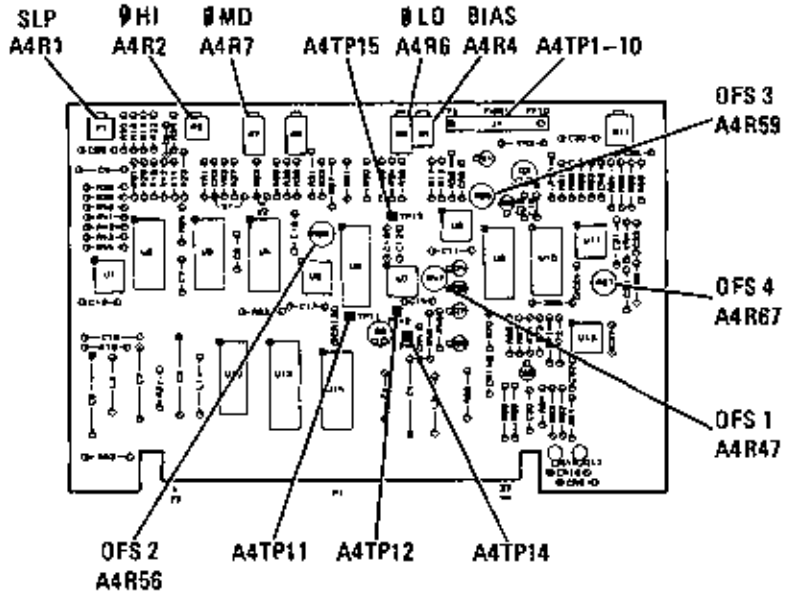


Figure 5-18. ALC Adjustments Location

3. Attach jumper from A4TP11 to ground. Connect DVM to A4TP5 (reference to ground). Adjust A4R56 OFS 2 (offset 2) for 0.000V ± 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 0.002V ± 0.001V.

5. Press 8350A front panel **CW** and ensure that the power is leveled (83522A UNLEVELED light off). Connect DVM high to A4TP7 and DVM low to A4TP15 (floating ground). Adjust A4R67 OFS 4 (offset 4) for 0.000V ± 0.001V.

6. Set CW frequency to 50 MHz. Turn off **RF** power. Connect DVM to A4TP10 and adjust A4R4 (BIAS) for 0.000V ± 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 83522A RF OUTPUT.

8. Set **POWER** for plug-in front panel reading of +0 dBm at 50 MHz. Adjust A4R6 0 LO (low power) for an RF OUTPUT power at the 83522A connector of +0 dBm ± 0.1 dB.

9. Set **POWER** for plug-in front panel reading of +9 dBm. Adjust A4R7 0 MD (mid power) for an RF OUTPUT power at the 83522A connector of +9 dBm ± 0.1 dB.

10. Iterate steps 8 and 9 until both low and midpower ranges are calibrated.

5-20. ALC ADJUSTMENT (Cont'd)

11. Set **POWER** for plug-in front panel reading of +13 dBm. Adjust A4R2 0 HI (high power) for an RF OUTPUT power at the 83522A connector of +13 dBm ± 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 ⊔⌐ **MOD** for compatibiliy 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 2.4 GHz as observed on the 8755C.

NOTE

The FM PC Board will be reinstalled in Paragraph 5-21.

5-21. INTERNAL LEVELED FLATNESS

NOTE

Complete adjustment of the leveling loop requires several procedures to be performed in the order prescribed, from Paragraph 5-20 through 5-24. 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.

EQUIPMENT:

Sweep Oscillator	HP 8350A
Swept Amplitude Analyzer	HP 8755C/HP 182T
Detector	HP 11664A
10 dB Attenuator	HP 8491A Option 010

5-21. INTERNAL LEVELED FLATNESS (Cont'd)

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. Reinstall the A5 FM Driver Assembly. Connect equipment as shown in Figure 5-19, with the 8755C monitoring the RF output. Select 8350A ⌊⊓ **MOD** . Sweep the full range of the plug-in.

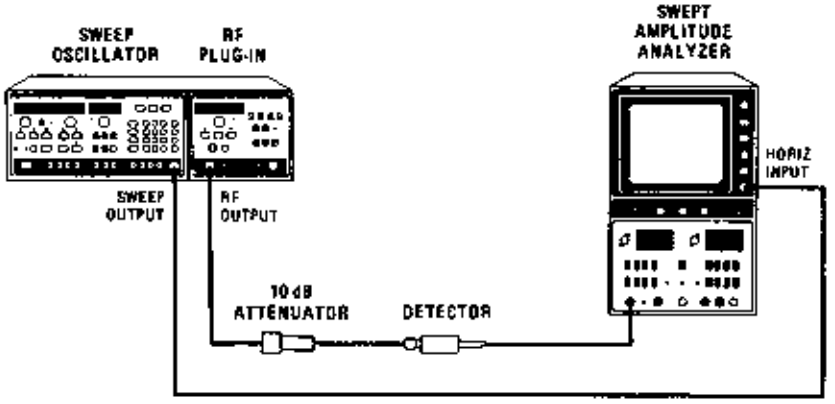


Figure 5-19. Internal Leveling Adjustment Setup

NOTE

The following step negates any flatness compensation by effectively removing the ALC Flatness Adjustments from the leveling circuitry. This step may be omitted if RF flatness approaches specified limits.

2. Adjust all breakpoint potentiometers fully clockwise against the stops: A5R34 "BP1", A5R36 "BP2", A5R38 "BP3", and A5R40 "BP4" as shown in Figure 5-20. This effectively removes the circuit from the leveling loop.

5-21. INTERNAL LEVELED FLATNESS (Cont'd)

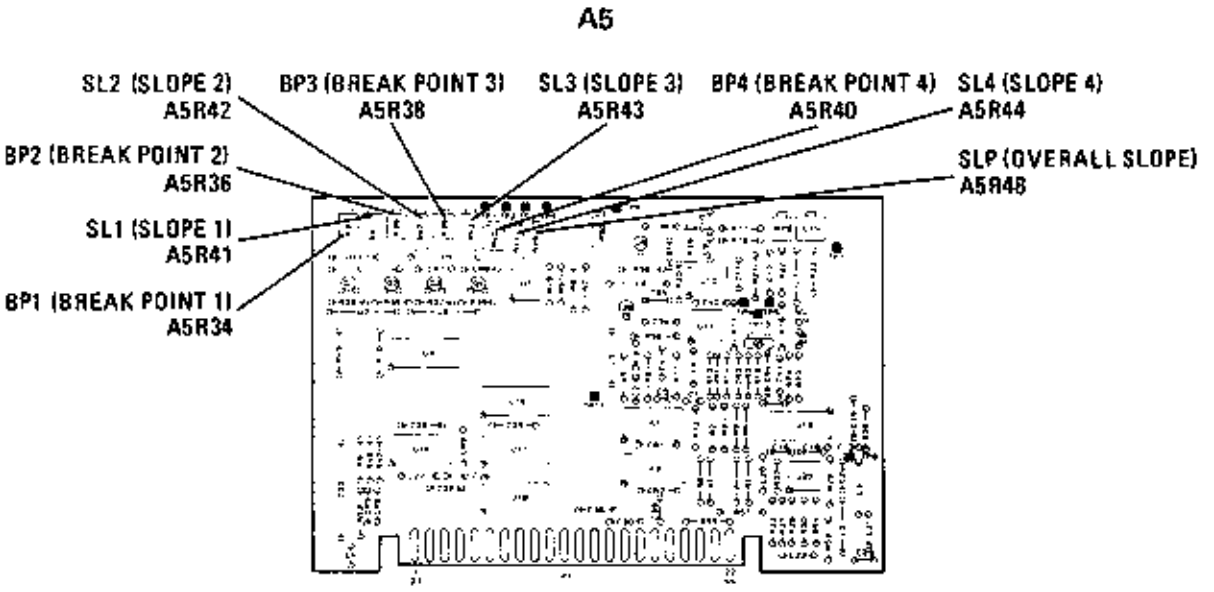


Figure 5-20. Internal Leveling Adjustments Location

3. 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.). The breakpoint potentiometers determine the frequency at which the slope adjustments will take effect. This is observed as a pivot point on the CRT trace.

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.

5-22. POWER CALIBRATION

NOTE

Complete adjustment of the leveling loop requires several procedures to be performed in the order prescribed, from Paragraph 5-20 through 5-24. Deviation from this routine may cause improper leveling and/or flatness problems.

5-22. POWER CALIBRATION (Cont'd)

REFERENCE:

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

DESCRIPTION:

Power is calibrated on a power meter at three breakpoints over the leveled power range: 0, +9, and +13 dBm.

EQUIPMENT

Sweep Oscillator	HP 8350A
Swept Amplitude Analyzer	HP 8755C/HP 182T
Detector	HP 11664A
Power Meter	HP 436A
Power Sensor	HP 8481A

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 8755C monitoring the RF output. Select 8350A **⊓ MOD** . Observe the full band trace and select a frequency 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.

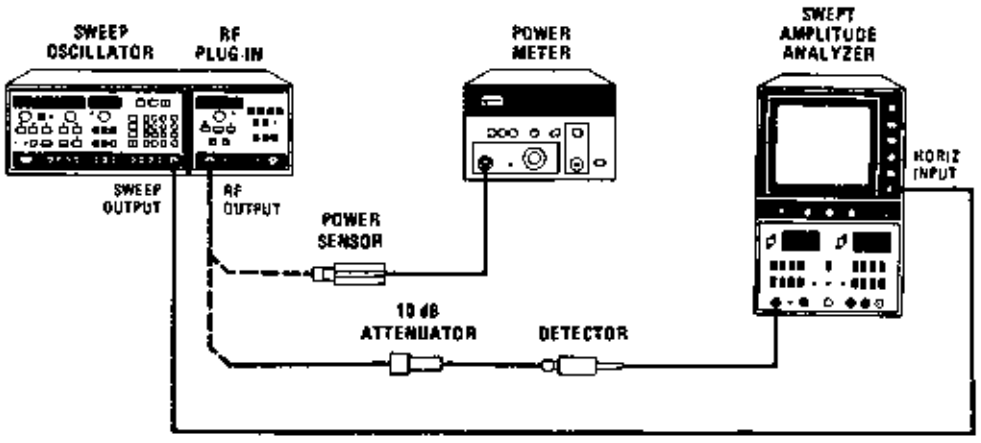


Figure 5-21. Power Calibration Test Setup

5-22. POWER CALIBRATION (Cont'd)

NOTE

If the following steps result in A4R6 and A4R7 being adjusted near the stops, connect DVM low to A4TP15 (floating ground) and DVM high to A4TP12. Adjust A4R59 for −0.2 mV ±0.01 mV.

2. Remove detector and connect power meter to RF OUTPUT. On 8350A, press **MOD** to turn off modulation (annunciator off). Adjust A4R6 (0 LO) for RF OUTPUT power at the 83522A connector of +0 dBm ±0.1 dBm. Set **POWER** first to −2 dBm, note power meter reading, then set **POWER** to +2 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 83522A connector of +9 dBm ±0.1 dBm.

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 83522A connector of +13 dBm ±0.1 dBm.

6. Step the RF power in 1 dB intervals from +0 to +13 dBm. RF OUTPUT power at the 83522A connector should be the indicated front panel setting ±0.1 dBm. If necessary, readjust 0 LO, 0 MD, and 0 HI to calibrate power.

A4

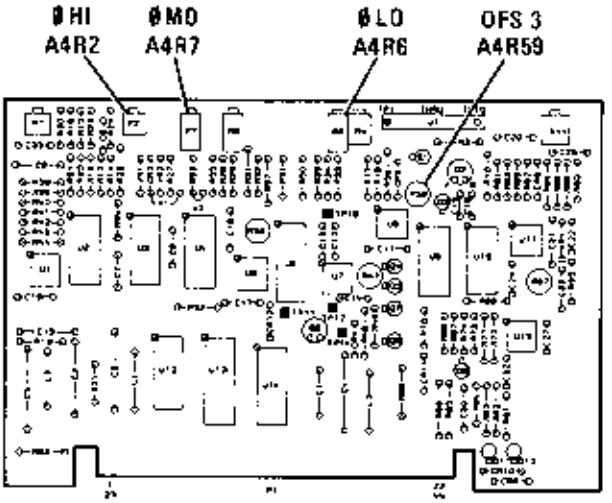


Figure 5-22. Power Calibration Adjustment Location

5-23. 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 5-20 through 5-24. 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.

EQUIPMENT:

Sweep Oscillator	HP 8350A
Power Meter	HP 432A
Thermistor Mount	HP 478A
10 dB Attenuator	HP 8491A Option 010

PROCEDURE:

NOTE

If, during the following procedure, ALC loop oscillations occur, reduce loop gain by adjusting A4R11 (Figure 5-26) counterclockwise. This adjustment will be set in the next procedure.

1. Connect equipment as shown in Figure 5-23. Ensure 8350A ⎍ **MOD** is off. Press **CW** and select a frequency at midband.

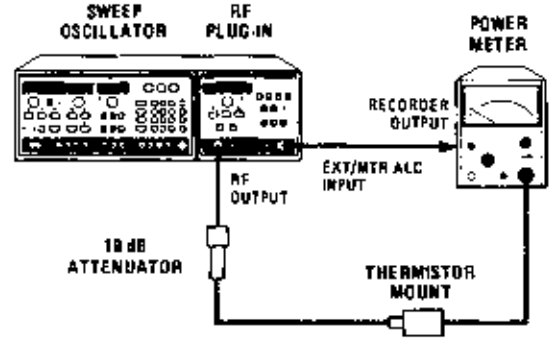


Figure 5-23. Power Meter Leveling Calibration

5-23. POWER METER LEVELING CALIBRATION (Cont'd)

2. Set 83522A **POWER LEVEL** to +5 dBm. Set power meter **RANGE** switch to 0. Adjust 83522A **POWER LEVEL**, if necessary, to obtain a meter reading of −5.

3. Press 83522A **MTR ALC** mode. Adjust 83522A front panel **CAL** knob to return the power meter needle to its previous position at −5.

4. Increase the 83522A **POWER LEVEL** by exactly 5.0 dBm. Adjust A4R9 "PM" (Figure 5-24) for a power meter reading of 0 (83522A front panel power indication should be approximately +10 dBm).

5. Iterate between power level settings of +5 and +10 dBm, adjusting the **CAL** knob and A4R9 respectively, until no further adjustment is necessary.

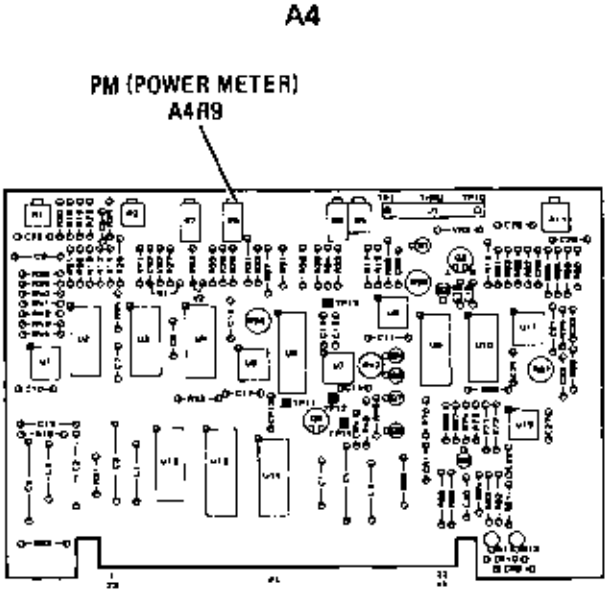


Figure 5-24. Power Meter Leveling Adjustment Location

5-24. ALC GAIN ADJUSTMENT

NOTE

Complete adjustment of the leveling loop requires several procedures to be performed in the order prescribed, from Paragraph 5-20 through 5-24. Deviation from this routine may cause improper leveling and/or flatness problems.

REFERENCE:

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

5-24. ALC GAIN ADJUSTMENT (Cont'd)

DESCRIPTION:

A4R11, at the inverting input of A4U11, adjusts the gain of the Main ALC Amplifier. A4R11 is adjusted for maximum possible gain without producing oscillations.

EQUIPMENT

Sweep Oscillator	HP 8350A
Oscilloscope	HP 1740A
Crystal Detector	HP 423A
Power Meter	HP 432A
Thermistor Mount	HP 478A
Power Splitter	HP 11667A Option 001
10 dB Attenuator	HP 8491A Option 010

PROCEDURE:

NOTE

This procedure assumes that A3S1 is set to the factory-set position (Table 5-8).

1. Connect equipment as shown in Figure 5-25.

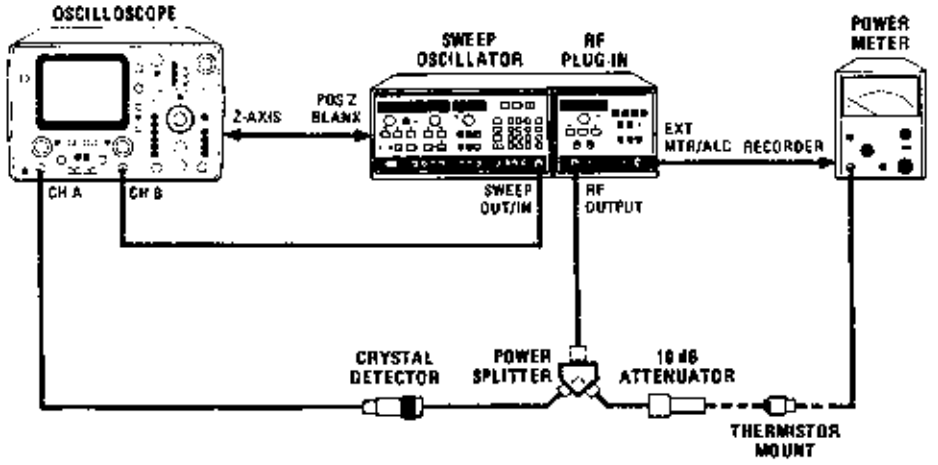


Figure 5-25. ALC Gain Adjustment Test Setup

2. Press 8350A **INSTR PRESET** .

3. On the oscilloscope, select A versus B mode to display a plot of frequency versus amplitude. Set the Channel A vertical sensitivity for 0.05 VOLTS/DIV and AC coupling. Set Channel B for 1 VOLT/DIV. Adjust horizontal POSITION and Channel A vertical POSN controls for a stable display at mid screen. Then, increase Channel A sensitivity to 0.01 V/DIV.

5-24. ALC GAIN ADJUSTMENT (Cont'd)

4. Set the power meter **RANGE** switch to +5 dBm. Note the power meter needle position.

5. On the 83522A, press **MTR ALC** mode.

6. On the 8350A, press **SWEEP TIME 50 SEC** .

7. If necessary, adjust the output power with the 83522A front panel **POWER** control to position the power meter needle to the same reading noted in step 4. Then, decrease the power meter **RANGE** switch by three 5 dB steps to −10 dB. This attenuates the output power by 15 dB. The 83522A is now operating at the low end of its calibrated power range, approximately −2 dBm.

8. Observe the trace dot as it sweeps across the CRT. Adjust A4R11 "GAIN" (Figure 5-26) clockwise, increasing the gain of the ALC loop, until the trace dot begins to oscillate. Then, reduce the gain slightly to eliminate oscillations and obtain a focused "dot" trace.

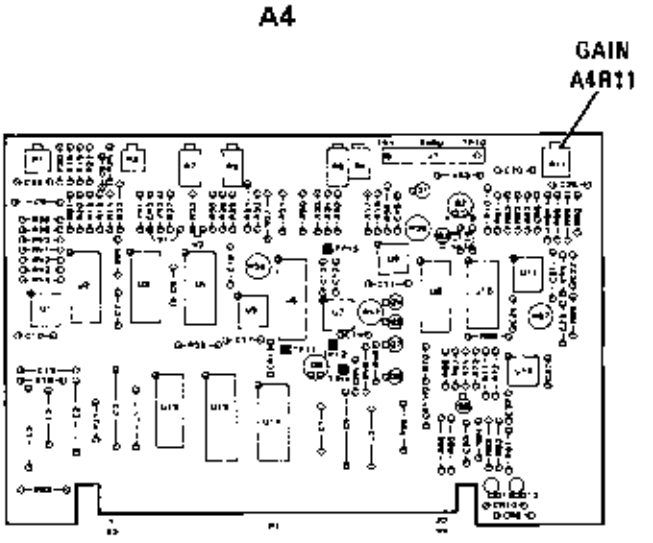


Figure 5-26. ALC Gain Adjustment Location

9. Set the 83522A to the maximum leveled power by returning the power meter **RANGE** switch to the previous setting of +5 dB. Observe the trace through the entire sweep to ensure no oscillations at high power. If oscillations occur, reduce the gain by adjusting A4R11 "GAIN" counterclockwise.

10. Press 8350A **INSTR PRESET** . The 83522A should now be internally leveled at the maximum specified power level.

11. On the oscilloscope, adjust Channel A vertical sensitivity to obtain the internally leveled sweep trace at center screen. If oscillations are present, further reduce loop gain by adjusting A4R11 "GAIN" counterclockwise.

12. Reduce the 83522A power level to +2 dBm with the 83522A front panel **POWER** control. If oscillations occur as the sweep progresses, further reduce gain by adjusting A4R11 "GAIN" counterclockwise.

5-25. 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:

Sweep Oscillator	HP 8350A
Swept Amplitude Analyzer	HP 8755C/HP 182T
Detector	HP 11664A
10 dB Attenuator	HP 8491A Option 010

PROCEDURE:

NOTE

ALC gain adjustments (paragraph 5-24) must be checked before power sweep adjustment 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.

1. Connect equipment as shown in Figure 5-27. Select 8350A ⊓ **MOD** .

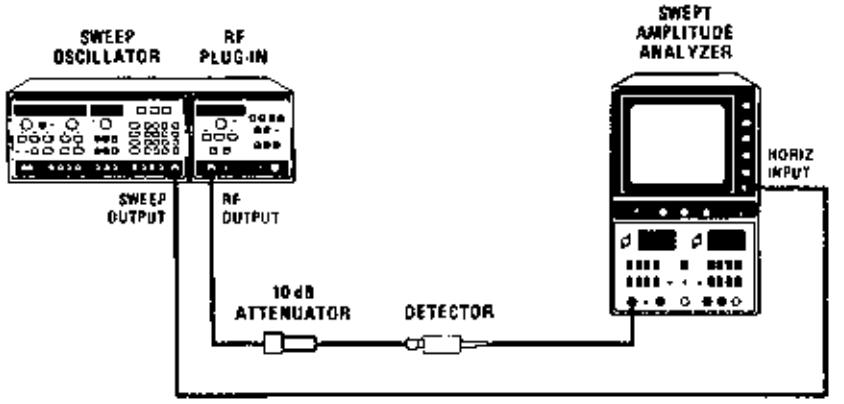


Figure 5-27. Power Sweep Test Setup

5-25. POWER SWEEP (Cont'd)

2. Select [redacted] mode and set power level to 0 dBm.
3. Press [redacted] and at DATA ENTRY select 10 dB/sweep.
4. While observing 8755C display of RF output, adjust A5R50 PWSP (power sweep) (Figure 5-28) for 10 dB/sweep.

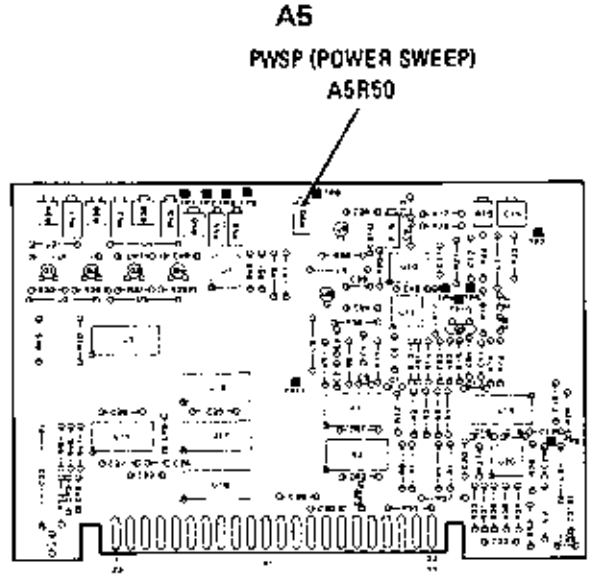


Figure 5-28. Power Sweep Adjustment Location

5-26. 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 ±3 dB is checked between DC and 2 MHz.

5-26. FM DRIVER (Cont'd)

EQUIPMENT:

Sweep Oscillator	HP 8350A
Digital Voltmeter (DVM)	HP 3455A
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 5-29 except disconnect function generator from rear panel FM INPUT connector.

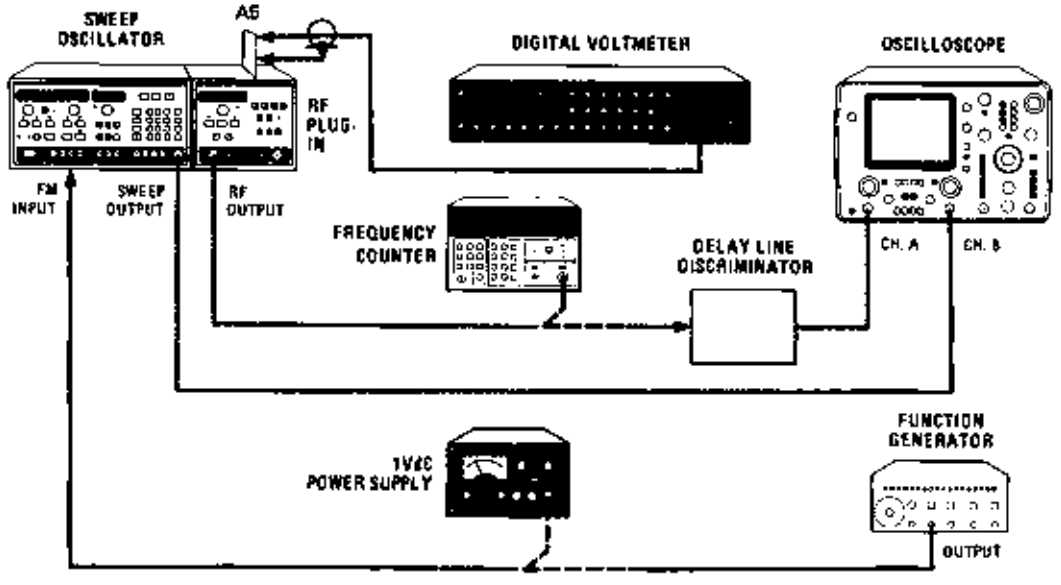


Figure 5-29. Test Setup for FM Driver Adjustments

5-26. FM DRIVER (Cont'd)

2. Place A5 FM Driver on extender board.

3. Connect DVM between A5 board connector pin 21 and A5TP7 (ground). (See Figure 5-30.) Adjust A5R19 "FM OFFSET" control for zero Vdc ±1 mVdc.

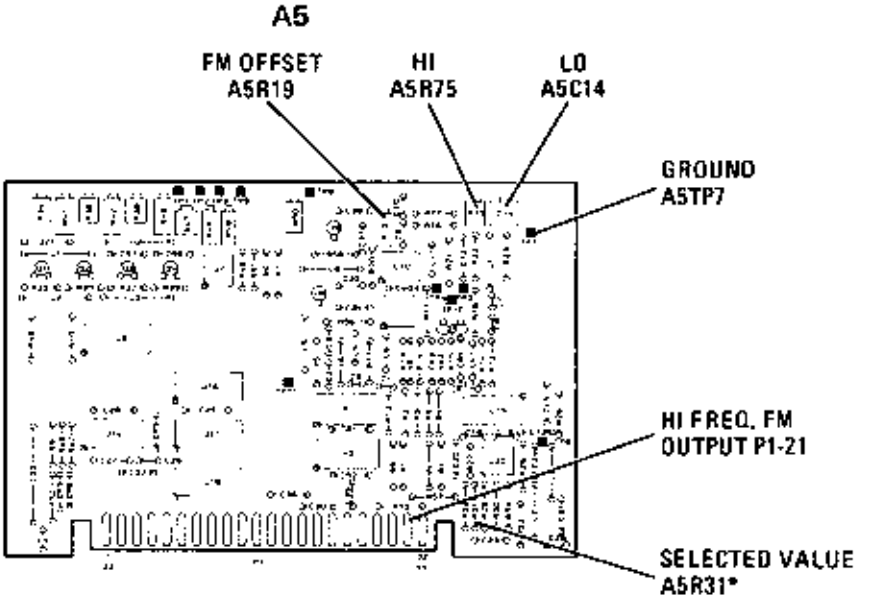


Figure 5-30. A5 FM Driver Adjustment Location

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

83522A 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:

5-26. FM DRIVER (Cont'd)

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

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

NOTE

The A3S1 switch positions select the 83522A 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

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 83522A RF OUTPUT. Connect a +1 Vdc power supply to rear penel 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" conrol for a trace 4 cm high centered on CRT.

8. Manually sweep function generator frequency from DC to 100 kHz. Select resistor A5R31 (Figure 5-30) so amplitude at 100 Hz and at 100 kHz are the same ±0.2 cm on CRT. Refer to Table 5-2 for the allowable range of values for A5R31.

5-26. FM DRIVER (Cont'd)

9. Manually sweep function generator frequency from DC to 10 MHz. Adjust A5C14 "LO" and A5R75 "HI" controls several times (Figure 5-30) 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 5-31). 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.

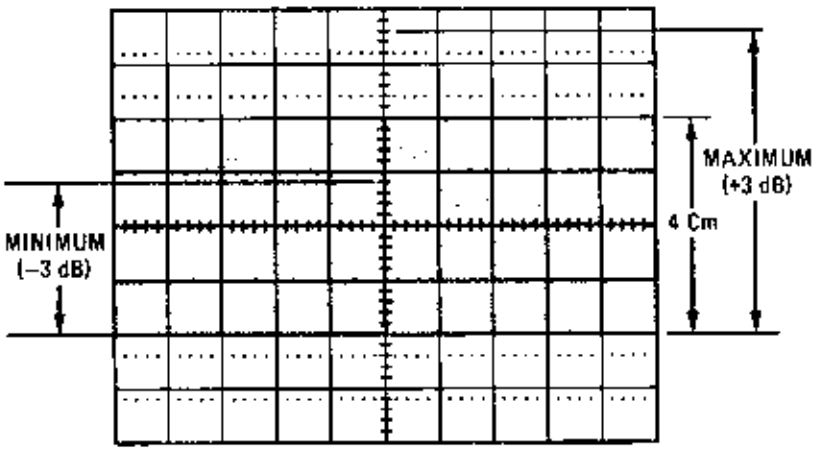


Figure 5-31. FM Flatness Tolerance, DC to 2 MHz

5-27. 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 sweep. Proper marker functioning requires adjustment of the crystal oscillator, the internal mixer, and IF gain for each marker frequency.

5-27. MARKER AND SAMPLER ADJUSTMENTS (Cont'd)

EQUIPMENT:

Sweep Oscillator	HP 8350A
Oscilloscope	HP 1740A
Frequency Counter	HP 5343A
50 Ohm Termination	HP 909A

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 5-32. Terminate 83522A 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.

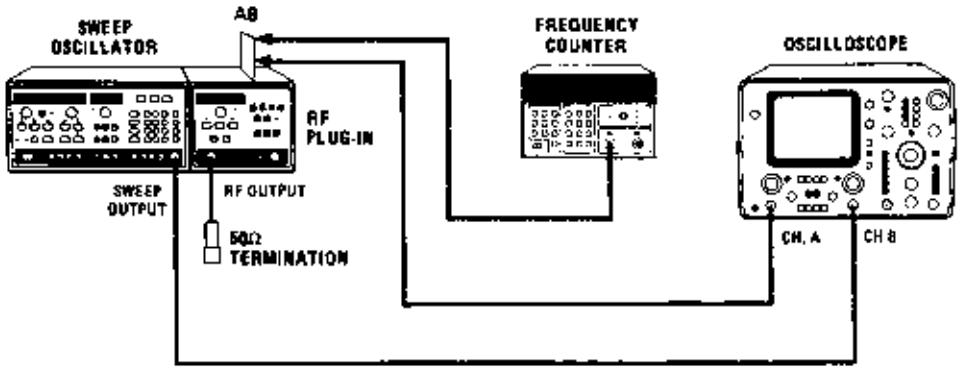


Figure 5-32. Marker Adjustments Test Setup

5-27. MARKER AND SAMPLER ADJUSTMENTS (Cont'd)

2. Set 8350A **START/STOP** sweep for 10 MHz to 2.4 GHz. Select 83522A **AMPTD MARKERS** . Connect counter with 1:1 capacitive probe to A8TP1. Adjust A8C4 (Figure 5-33) for frequency counter indication of 50 MHz ±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.)

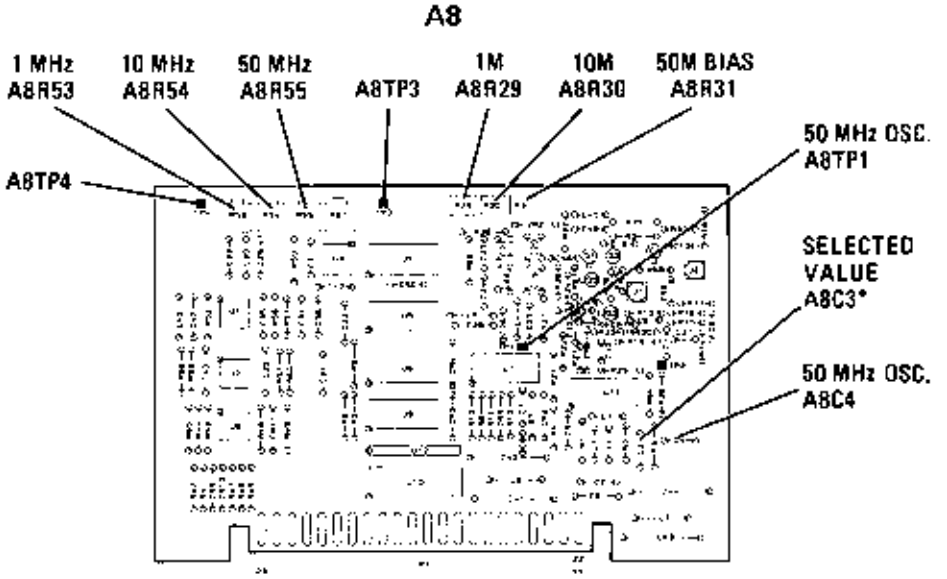


Figure 5-33. Marker Adjustments on A8

3. Select 100 ms Sweep Time. Connect oscilloscope with 1:1 probe to A8TP3 (Figure 5-33). Set 8350A power to +13 dBm and select 1 **MHz** Markers. Adjust A8R29 (1M) for the flattest envelope height. (See Figure 5-34.) Select **10 MHz** Markers. Adjust A8R30 (10M) for the flattest envelope height (Figure 5-33). 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 5-33). 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, ΔF = 10 MHz.** Select **50 MHz** Markers. Center the birdie envelope on the screen with plug-in front panel **FREQ CAL** control. (See Figure 5-35.) Then select 10 MHz Markers. Change **ΔF** to 1 **MHz.** Recenter birdie. Display is now calibrated for 100 kHz/Division.

5-27. MARKER AND SAMPLER ADJUSTMENTS (Cont'd)

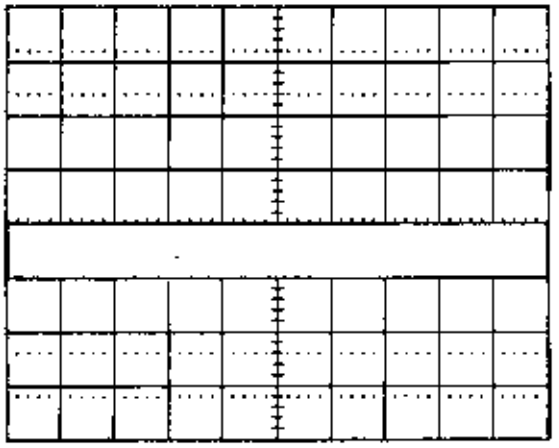


Figure 5-34. Marker Envelope

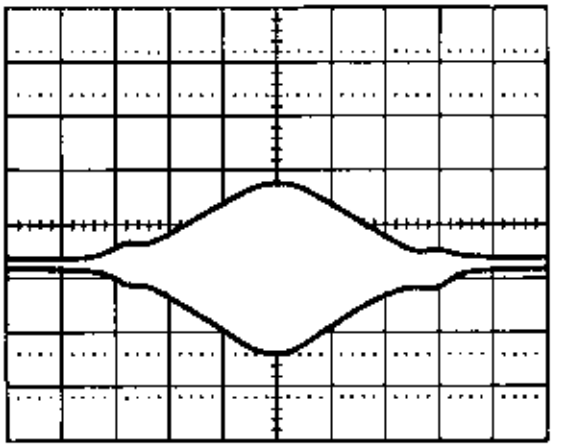


Figure 5-35. 50 MHz Birdie

6. Connect scope probe to A7TP1 (Figure 5-36). Adjust A7 Marker Threshold potentiometers for the proper pulse width of each marker as follows:

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)

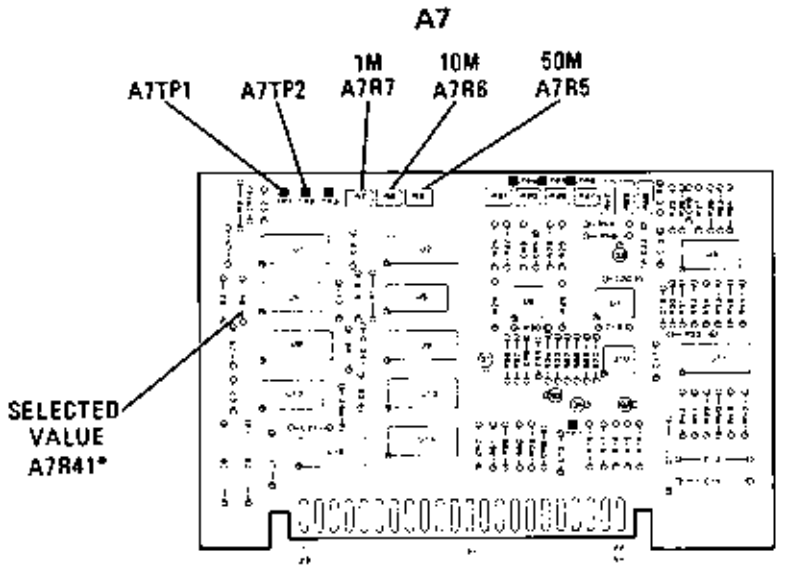


Figure 5-36. Marker Adjustments on A7

5-27. MARKER AND SAMPLER ADJUSTMENTS (Cont'd)

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 5-37.) 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 5-38 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.)

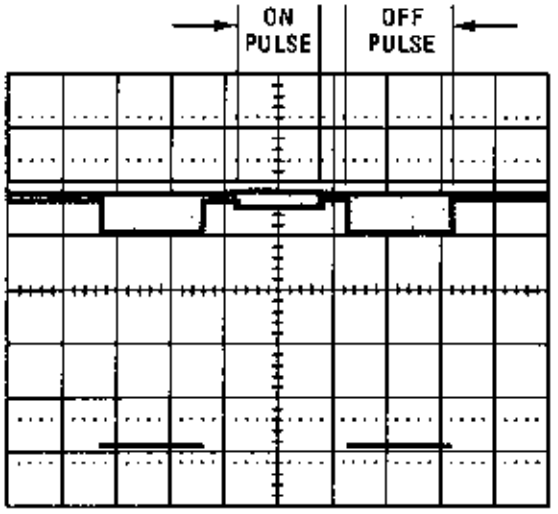


Figure 5-37. On/Off Pulse of Correctly Adjusted Circuit

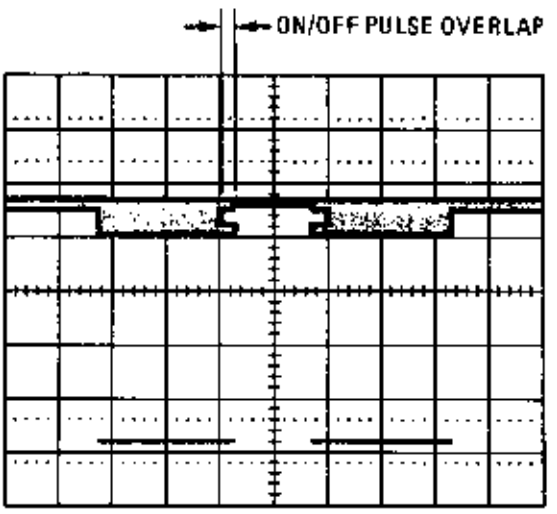


Figure 5-38. On/Off Pulse of Misadjusted Circuit Showing Overlap

5-28. 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.

5-28. EXTERNAL MARKER ADJUSTMENT (Cont'd)

EQUIPMENT:

Sweep Oscillator	HP 8350A
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 Sweep Oscillator, 27.8 kHz square wave modulation is selected.

1. Connect equipment as shown in Figure 5-39. Set external marker source to a selected marker frequency. Set power level between −10 and +10 dBm.

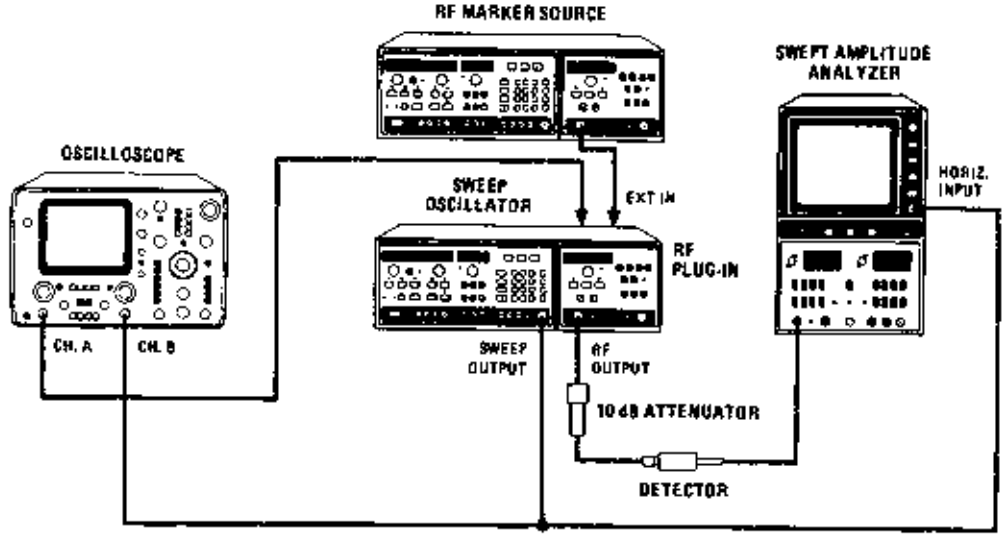


Figure 5-39. External Marker Adjustments Test Setup

5-28. EXTERNAL MARKER ADJUSTMENT (Cont'd)

2. For best external marker operation, set the 8350A to the minimum required sweep width and sweep speed. Select 8350A ⊔⊓ **MOD** .

3. If no marker is observed on the 8755C, adjust A8R67 (EXT) control (Figure 5-40) until a marker appears on the screen. If the marker does not appear, go to step 4.

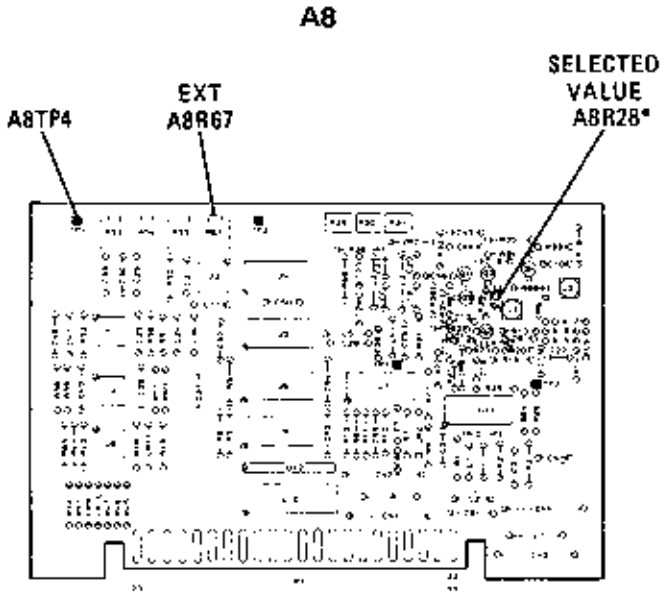


Figure 5-40. External Marker Adjustments Location

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 ⊔⊓ **MOD** on and off. If the modulation feedthrough obscures more than half of the birdie (peak value), reduce 83522A 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. Refer to Table 5-2 for the allowable range of values for A8R28.

NOTE

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

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 service or adjustments performed with the protective covers removed should only be done 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 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).

Table 6-1. Exchange Parts

Reference Designations	New Part Number	Rebuilt-Exchange Part Number	Description
A12	5086-7331	5086-6331	YO 3.8 - 6.2 GHz
A14	5086-7217	5086-6217	AMPLIFIER 0.01 – 2.4 GHz
A17	5086-7219	5086-6219	MODULATOR/MIXER
NOTE For module exchange procedure, see Paragraph 8-29.			

c. The total quantity (Qty.) in the major assembly (A1, A2, or A3, etc.).

d. The description of the part.

e. A typical manufacturer of the part in a five-digit code.

f. The manufacturer's part 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. The attaching hardware is given in Figure 6-2.

6-12. ORDERING INFORMATION

6-13. To order a part lised in the replaceable parts table. quote the Hewlett-Packard Part Number (with Check Digit). indicate the quantity required, and address the order to the nearest Hewlett-Packard office. Including 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 List, 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 6-2. Manufacturers Code List, Reference Designations, and Abbreviations (1 of 3)

MANUFACTURERS CODE LIST

MFR NO.	MANUFACTURER NAME	ADDRESS		ZIP CODE
00000	ANY SATISFACTORY SUPPLIER			
00031	NIPPON ELECTRIC CO	TOKYO	JA	
00046	UNITRODE COMPUTER PRODUCTS CORP	METHUEN	MA	53204
01121	ALLEN-BRADLEY CO	MILWAUKEE	WI	53204
01295	TEXAS INSTR INC SEMICOND CMPNT DIV	DALLAS	TX	75222
01921	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	94043
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
56289	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
AT ..... Attenuator, Isolator, Limiter, Termination
B ..... Fan, Motor
BT ..... Battery
C ..... Capacitor
CP ..... Coupler
CR ... Diode, Diode Thyristor, Step Recovery Diode (SCR), Varactor
DC ..... Directional Coupler
DL ..... Delay Line
DS .... Annunciator, Lamp, Light Emitting Diode (LED), Signaling Device (Audible or Visible)
E ..... Miscellaneous Electrical Part
F ..... Fuse
FL ..... Filter
H ..... Hardware
HY ..... Circulator
J ..... Electrical Connector (Stationary Portion), Jack
K ..... Relay
L ..... Coil, Inductor
M ..... Meter
MP ..... Miscellaneous Mechanical Part
P ..... Electrical Connector (Movable Portion), Plug
Q .... Silicon Controlled Rectifier (SCR), Transistor, Triode Thyristor
R ..... Resistor
RT ..... Thermistor
S ..... Switch
T ..... Transformer
TB ..... Terminal Board
TC ..... Thermocouple
TP ..... Test Point
U ..... Integrated Circuit, Microcircuit
V ..... Electron Tube
VR ... Breakdown Diode (Zener), Voltage Regulator
W ..... Cable, Transmission Path, Wire
X ..... Socket
Y ..... Crystal Unit (Piezoelectric, Quartz)
Z ... Tuned Cavity, Tuned Circuit

ABBREVIATIONS

A

A ..... Across Flats, Acrylic, Air (Dry Method), Ampere
ADJ ..... Adjust, Adjustment
ALC ..... Alcohol, Automatic Level Control
AM ..... Amplitude Modulation
AMP ..... Amperage
AMPL ..... Amplifier
ANLG ..... Analog
ASSY ..... Assembly
ASTBL ..... Astable
ATTEN ... Attenuation, Attenuator

B

BCD ..... Binary Coded Decimal
BFR ..... Before, Buffer
BNC ..... Type of Connector
BSC ..... Basic

C

C ..... Capacitance, Capacitor, Center Tapped, Centistoke, Ceramic, Cermet, Circular Mil Foot, Closed Cup, Cold, Compression
CER ..... Ceramic
CH ..... Center Hole
CHAM ..... Chamfer
CNTR ..... Container, Counter
COAX ..... Coaxial
COM .... Commercial, Common
CONN .... Connect, Connection, Connector
CONT ..... Contact, Continuous, Control, Controller
CONV ..... Converter
CP ..... Cadmium Plate, Candle Power, Centipoise, Conductive Plastic, Cone Point
CRP ..... Crepe, Crimp
CS .... Case, Centistoke, Cesium, Cross Section

D

D ..... Deep, Depletion, Depth, Diameter, Direct Current
DB ..... Decibel, Double Break
DBL ..... Double
DCDR ..... Decoder
DEG ..... Degree
DIFF ..... Differential
DO ... Package Type Designation
DRVR ..... Driver
DX ..... Duplex

E

E-MODE ... Enhancement Mode
ECL ..... Emitter-Coupled Logic
EPROM ..... Eraseable Programmable Read Only Memory
EXCL ..... Excluding, Exclusive
EXT ..... Extended, Extension, External, Extinguish

F

F ..... Fahrenheit, Farad, Female, Film (Resistor), Fixed, Flange, Flint, Fluorine, Frequency
FEM ..... Female
FF ... Flange, Female Connection; Flip Flop
FL ..... Flash, Flat, Fluid
FM ... Flange, Male Connection; Foam, Frequency Modulation
FR ..... Folder
FT ..... Current Gain Bandwidth Product (Transition Frequency), Feet, Foot
FXD ..... Fixed

G

GE ..... Germanium
GEN ..... General, Generator
GHZ ..... Gigahertz
GL ..... Glass
GP ..... General Purpose, Group

H

HD ..... Hand, Hard, Head, Heavy Duty
HEX ..... Hexadecimal, Hexagon, Hexagonal

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

HI ..... High
HS .... Heat Sealed, Heat Shrink, High Speed

I

IC ..... Collector Current, Integrated Circuit
ID ..... Identification, Inside Diameter
IF ..... Forward Current, Intermediate Frequency
IN ..... Inch, Indium
IN ..... Inch, Indium
INP ..... Input
INT ..... Integral, Intensity, Internal
INTL ..... Internal, International
INV ..... Invert, Inverter

J

J-FET ..... Junction Field Effect Transistor
JFET ..... Junction Field Effect Transistor
JGK ..... Jade Gray Knob (HP 6009-0021)

K

KB ..... Knob

L

LED ..... Light Emitting Diode
LG ..... Length, Long
LKG ..... Leakage, Locking
LKWR ..... Lockwasher
LO ..... Local Oscillator, Low
LS ..... Loudspeaker, Low Power Schottky, Series Inductance
LT ..... Left, Light, Liter

M

MA ..... Milliampere
MACH ..... Machined
MCD ..... Millicandela
MISC ..... Miscellaneous
MLD ..... Mold, Molded
MOD ..... Model, Modified, Modular, Modulated, Modulator
MONO/ASTBL ..... Monostable/Astable
MONOSTBL ..... Monostable
MOSFET ..... Metal Oxide Semiconductor Field Effect Transistor
MTG ..... Mounting
MV ..... Millivolt, Multivibrator
MW ..... Milliwatt

N

N-CHAN ..... N-Channel
NAND ..... Logic Not-AND
NM .... Nanometer, Nonmetallic
NMOS ..... N-Channel Metal Oxide Semiconductor
NO .... Normally Open, Number
NPN ... Negative Positive Negative (Transistor)
NS ..... Nanosecond, Non-Shorting, Nose

O

OCTL ..... Octal
OD ..... Olive Drab, Outside Diameter
OP ..... Operational
OPT ... Optical, Option, Optional

P

PAN-HD ..... Pan Head
PC ..... Picocoulomb, Piece, Printed Circuit
PCB ..... Printed Circuit Board
PD ..... Pad, Palladium, Pitch Diameter, Power Dissipation
PF ..... Picofarad; Pipe, Female Connection; Power Factor
PL ..... Phase Lock, Plain, Plate, Plug
PLSTC ..... Plastic
POS ..... Position, Positive
POZI ..... Pozidriv Recess
PRCN ..... Precision
PRP ..... Purple, Purpose
PVC ..... Polyvinyl Chloride

Q

QUAD ..... Set of Four

R

RCVR ..... Receiver
RCVY ..... Recovery
REF ..... Reference
RES ..... Research, Resistance, Resistor, Resolution
RETRIG ..... Retriggerable
RGLTR ..... Regulator
RKR ..... Rocker
RND ..... Round
RPG .... Rotary Pulse Generator
RT ..... Real Time, Right

S

SCR ..... Screw, Scrub, Silicon Controlled Rectifier
SEC ..... Second, Secondary
SGL ..... Single
SHFT ..... Shaft
SI ..... Silicon, Square Inch
SLDR ..... Solder
SM ..... Samarium, Seam, Small, Square Meter, Sub Modular, Subminiature
SMB ..... Subminiature, B Type (Snap-On Connector)
SNP ..... Snap
STAT ..... Status
STL ..... Steel
SW ..... Single Wall, Switch
SZ ..... Size

T

TA ..... Ambient Temperature, Tantalum
TC ..... Thermoplastic
THD ..... Thread, Threaded
THK ..... Thick
TPG ..... Tapping
TPL ..... Triple
TRIG ..... Trigger, Triggerable, Triggering, Trigonometry
TRMR ..... Trimmer
TRN ..... Turn, Turns
TTL ..... Tan Translucent, Transistor Transistor Logic

U

U/W ..... Used With
UF ..... Microfarad

V

V ..... Vanadium, Variable, 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
A1	**83525-60008**	**8**	**1**	**BOARD ASSEMBLY-FRONT PANEL** (DOES NOT INCLUDE A1RPG1 ROTARY PULSE GENERATOR)	**28480**	**83525-60008**
A1C1	0160-4084	9	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	9		CAPACITOR-FXD 1UF ±20% 50VDC CER	28480	0160-4084
A1C4	0160-4084	9		CAPACITOR-FXD 1UF ±20% 50VDC CER	28480	0160-4084
A1C5	0180-0552	8	1	CAPACITOR-FXD 220UF±20% 10VDC TA	28480	0180-0552
A1DS1				NOT ASSIGNED		
A1DS2	1990-0487	7	3	LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	28480	5082-4584
A1DS3	1990-0487	7		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	28480	5082-4584
A1DS4	1990-0670	0	11	LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	28480	1990-0670
A1DS5	1990-0670	0		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	28480	1990-0670
A1DS6	1990-0486	6		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	28480	5082-4684
A1DS7	1990-0670	0		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	28480	1990-0670
A1DS8	1990-0670	0		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	28480	1990-0670
A1DS9	1990-0670	0		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	28480	1990-0670
A1DS10	1990-0670	0		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	28480	1990-0670
A1DS11	1990-0670	0		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	28480	1990-0670
A1DS12	1990-0670	0		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	28480	1990-0670
A1DS13	1990-0487	7		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	28480	5082-4584
A1DS14	1990-0670	0		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	28480	1990-0670
A1DS15	1990-0670	0		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	28480	1990-0670
A1DS16	1990-0670	0		LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	28480	1990-0670
A1DS17	1990-0699	3	3	LED-VISIBLE LUM-INT=7MCD IF=30MA-MAX	28480	HLM1-2350
A1DS18	1990-0699	3		LED-VISIBLE LUM-INT=7MCD IF=30MA-MAX	28480	HLM1-2350
A1DS19	1990-0699	3		LED-VISIBLE LUM-INT=7MCD IF=30MA-MAX	28480	HLM1-2350
A1J1	1251-4827	1	3	CONNECTOR 50-PIN M POST TYPE	28480	1251-4827
A1MP1	2950-0006	3	2	NUT-HEX-DBL-CHAM 4-40-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
A1MP2	2950-0006	3		NUT-HEX-DBL-CHAM 4-40-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
A1MP3	2190-0067	4	2	WASHER-LK INTL T 1/4 N .256-IN-ID	28480	2190-0067
A1MP4	2190-0067	4		WASHER-LK INTL T 1/4 N .256-IN-ID	28480	2190-0067
A1MP5—MP9	0380-1233	9	4	SPACER-SPECIALTY .450 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-T0-316R-F
A1R2	0698-3444	1		RESISTOR 316 1% .125W F TC=0±100	24546	C4-1/8-T0-316R-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
A1R5				NOT ASSIGNED		
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-T0-75R0-F
A1R8	0757-0398	4		RESISTOR 75 1% .125W F TC=0±100	24546	C4-1/8-T0-75R0-F
A1R9	0757-0398	4		RESISTOR 75 1% .125W F TC=0±100	24546	C4-1/8-T0-75R0-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-D.P2000 OHM X R	91236	761-3-R200
A1U2	1990-0739	1	1	NUMERIC DISPLAY .15 HI	28480	1990-0739
A1U3	1810-0403	7	1	NETWORK-RES-STOR RI-R15 330 OHM±2%	01121	316A331
A1XDS1-A1XDS16				NOT ASSIGNED		
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
A2	**83525-60009**	**9**	**1**	**BOARD ASSEMBLY-SUB-PANEL**	**28480**	**83525-60009**
A2C1	0160-4084	9		CAPACITOR-FXD 1UF ±20% 50VDC CER	28480	0160-4084
A2C2	0160-4084	9		CAPACITOR-FXD 1UF ±20% 50VDC CER	28480	0160-4084
A2C3	0160-4084	9		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	9		CAPACITOR-FXD 1UF ±20% 50VDC CER	28480	0160-4084

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
A2C7	0160-3879	7	30	CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A2CR1				NOT ASSIGNED		
A2CR2				NOT ASSIGNED		
A2CR3	1901-0033	2	19	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
A2J2				NOT ASSIGNED		
A2J3	1200-0508	0	1	SOCKET-IC 14-CONT DIP-SLDR	28480	1200-0508
A2K1	0490-0916	6	3	RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
A2L1	9100-1618	1	4	INDUCTOR RF-CH-VLD 5 BUH ±5%	28480	9100-1618
A2MP1	0380-0773	0	4	SPACER-RVT-ON .5-IN-LG .152-IN-ID	00000	ORDER BY DESCRIPTION
A2P1	1251-5491	7	2	CONNECTOR 26-PIN F POST TYPE	28480	1251-5491
A2Q1				NOT ASSIGNED		
A2Q2				NOT ASSIGNED		
A2Q3	1854-0474	4	1	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	*	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 QUAL 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	6	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A2U6	1820-2150	8	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	6	4	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS174N
A2U9	1828-0417	8	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 8-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 BDC	28480	8159-0005
A2XU6	1200-0552	4	1	SOCKET-IC 40-CONT DIP-SLDR	28480	1200-0552
A3	**83525-60007**	7	**1**	**BOARD ASSEMBLY-DIGITAL INT**	**28480**	**83525-60007**
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

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
A3MP1	5040-6852	3	2	BOARD EXTRACTOR-ORANGE	28480	5040-6852
A3MP2	5000-9045	8	1	EXTRACTOR PIN-031 BOARD	28480	5000-9045
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	0698-7217	9	7	RESISTOR 100 1% .05W F TC=0±100	24546	C3-1/8-TO-100R-G
A3S1	3101-2743	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	1820-2091	2	1	IC NMOS	04713	MC68A21P
A3U5	1820-2006	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
A3U11	1820-1416	5		IC SCHMITT-TRIG TTL LS INV HEX 1-INP	01295	SN74LS14N
A3U12	1810-0338	7	3	NETWORK-RES 16-D-P100.0 OHM X 8	11236	761-3-R100
A3U13	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A3U14	1820-1491	6	1	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		NETWORK-RES 16-D-P100.0 OHM X 8	11236	761-3-R100
A3U17	1820-2075	4	2	IC MISC TTL LS	01295	SN74LS245N
A3U18	1820-2075	4		IC MISC TTL LS	01295	SN74LS245N
A3U19	1810-0338	7		NETWORK-RES 16-D-P100.0 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
A4	**83522-60006**	**6**	**1**	**BOARD ASSEMBLY-ALC**	**28480**	**83522-60006**
A4C1	0160-0127	7		CAPACITOR-FXD 1UF ±20% 25VDC CER	28480	0160-0127
A4C2	0180-0374	3	5	CAPACITOR-FXD 10UF±10% 20VDC TA	56289	150D106X902082
A4C3	0180-0374	3		CAPACITOR-FXD 10UF±10% 20VDC TA	56289	150D106X902082
A4C4	0180-0374	3		CAPACITOR-FXD 10UF±10% 20VDC TA	56289	150D106X902082
A4C5	0180-0374	3		CAPACITOR-FXD 10UF±10% 20VDC TA	56289	150D106X902082
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		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	3	CAPACITOR-FXD 10PF ±5PF 200VDC CER	28480	0160-3874
A4C15	0160-0127	7		CAPACITOR-FXD 1UF ±20% 25VDC CER	28480	0160-0127
A4C16	0160-4084	8		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	2	CAPACITOR-FXD 220PF ±20% 100VDC CER	20932	5024EM100RD221M
A4C19	0160-0572	1	5	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	1	CAPACITOR-FXD 510PF ±5% 100VDC M CA	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	1	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				NOT ASSIGNED		
A4C30	0160-4084	8		CAPACITOR-FXD 1UF ±20% 50VDC CER	28480	0160-4084
A4C31				NOT ASSIGNED		
A4C32	0160-0573	2	2	CAPACITOR-FXD 4700PF ±20% 100VDC CER	28480	0160-0573
A4C33	0160-0570	9		CAPACITOR-FXD 220PF ±20% 100VDC CER	20932	5024EM100RD221M
A4CR1				NOT ASSIGNED		
A4CR2	1901-1098	1	15	DIODE-SWITCHING 1N4150 50V 200MA 4NS	00046	1N4150
A4CR3				NOT ASSIGNED		
A4CR4	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	00046	1N4150
A4CR5	1901-1098	*		DIODE-SWITCHING 1N4150 50V 200MA 4NS	00046	1N4150
A4CR6	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	00046	1N4150
A4CR7				NOT ASSIGNED		
A4CR8	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	00046	1N4150
A4CR9				NOT ASSIGNED		
A4CR10	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	00046	1N4150
A4CR11	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	00046	1N4150
A4CR12	1901-0535	9	8	DIODE-SCHOTTKY	28480	1901-0535

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
A4J1	1251-4672	4	1	CONNECTOR 10-PIN M POST TYPE	28480	1251-4672
A4L1	9140-0210	1	3	INDUCTORRF-CH-MLD 100UH 5% 1660X 385LG	28480	9140-0210
A4L2	9140-0210	1		INDUCTORRF-CH-MLD 100UH 5% 1660X 385LG	28480	9140-0210
A4L3	9140-0210	1		INDUCTORRF-CH-MLD 100UH 5% 1660X 385LG	28480	9140-0210
A4MP1	5040-6848	7	1	EXTRACTOR-YELLOW	28480	5040-6848
A4MP2	5000-9043	6	5	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	2	TRANSISTOR-DUAL NPN PD=400MW	28480	1854-0295
A4Q3	1855-0414	4	1	TRANSISTOR J-FET 2N4393 N-CHAN D-MODE	04713	2N4393
A4Q4	1855-0423	5	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		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	5	2	TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A4Q10				NOT ASSIGNED		
A4Q11	1853-0007	7	2	TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A4Q12	1854-0404	0	3	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A4Q13				NOT ASSIGNED		
A4Q14				NOT ASSIGNED		
A4R1	2100-2633	5	2	RESISTOR-TRMR 1K 10% C SIDE-ADJ 1-TRN	30983	ET50X102
A4R2	2100-2516	3	2	RESISTOR-TRMR 100K 10% C SIDE-ADJ 1-TRN	32997	3329W-1-104
A4R3				NOT ASSIGNED		
A4R4	2100-2514	1	5	RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	30983	ET50W203
A4R5				NOT ASSIGNED		
A4R6	2100-3611			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				NOT ASSIGNED		
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-TO-5110-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-TO-7501-G
A4R13	0698-7258	3	1	RESISTOR 8.25K 1% .05W F TC=0±100	24546	C3-1/8-TO-8251-G
A4R14	0698-7251	6	7	RESISTOR 4.22K 1% .05W F TC=0±100	24546	C3-1/8-TO-4221-G
A4R15	0698-7236	7	3	RESISTOR 1K 1% .05W F TC=0±100	24546	C3-1/8-TO-1001-G
A4R16	0698-7268	5	2	RESISTOR 21.5K 1% .05W F TC=0±100	24546	C3-1/8-TO-2152-G
A4R17	0698-7253	8	4	RESISTOR 5.11K 1% .05W F TC=0±100	24546	C3-1/8-TO-5111-G
A4R18	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0±100	24546	C3-1/8-TO-2152-G
A4R19	0698-7260	7	8	RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-TO-1002-G
A4R20	0698-7263	0	1	RESISTOR 13.3K 1% .05W F TC=0±100	24546	C3-1/8-TO-1332-G
A4R21	0698-7274	3	1	RESISTOR 38.3K 1% .05W F TC=0±100	24546	C3-1/8-TO-3832-G
A4R22	0698-7261	8	1	RESISTOR 11K 1% .05W F TC=0±100	24546	C3-1/8-TO-1102-G
A4R23	0757-0464	7	2	RESISTOR 90.9K 1% .125W F TC=0±100	24546	C4-1/8-TO-9092-F
A4R24	0698-7269	6	3	RESISTOR 23.7K 1% .05W F TC=0±100	24546	C3-1/8-TO-2372-G
A4R25				NOT ASSIGNED		
A4R26				NOT ASSIGNED		
A4R27	0698-7260	7		RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-TO-1002-G
A4R28	0698-7227	6	1	RESISTOR 422 1% .05W F TC=0±100	24546	C3-1/8-TO-422R-G
A4R29	0698-6946	3	1	RESISTOR 5.62K 5% .125W F TC=0±50	24546	RC55-1/8-T2-5421-D
A4R30	0698-7260	7		RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-TO-1002-G
A4R31	0837-0119	7	1	THERMISTOR ROD 5K-OHM TC=+ 7%/C-DEG	28480	0837-0119
A4R32	0698-7259	4	3	RESISTOR 9.09K 1% .05W F TC=0±100	24546	C3-1/8-TO-9091-G
A4R33	0698-7269	6		RESISTOR 23.7K 1% .05W F TC=0±100	24546	C3-1/8-TO-2372-G
A4R34	0698-7240	3	1	RESISTOR 1.47K 1% .05W F TC=0±100	24546	C3-1/8-TO-1471-G
A4R35	0698-7237	8	1	RESISTOR 1.1K 1% .05W F TC=0±100	24546	C3-1/8-TO-1101-G
A4R36				NOT ASSIGNED		
A4R37				NOT ASSIGNED		
A4R38	0698-7212	9		RESISTOR 100 1% .05W F TC=0±100	24546	C3-1/8-TO-100R-G
A4R39	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0±100	24546	C3-1/8-TO-1961-G
A4R40	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0±100	24546	C3-1/8-TO-1961-G
A4R41	0698-7283	4	1	RESISTOR 90.9K 1% .05W F TC=0±100	24546	C3-1/8-TO-9092-G
A4R42	0698-7267	4	1	RESISTOR 19.6K 1% .05W F TC=0±100	24546	C3-1/8-TO-1962-G
A4R43	0698-7272	1		RESISTOR 31.6K 1% .05W F TC=0±100	24546	C3-1/8-TO-3162-G
A4R44	0698-7275	4	1	RESISTOR 42.2K 1% .05W F TC=0±100	24546	C3-1/8-TO-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-TO-825R-F
A4R49				NOT ASSIGNED		
A4R50	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0±100	24546	C3-1/8-TO-5112-G
A4R51	0698-7282	3	1	RESISTOR 82.5K 1% .05W F TC=0±100	24546	C4-1/8-TO-8252-G
A4R52	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0±100	24546	C3-1/8-TO-1961-G
A4R53	0698-7260	7		RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-TO-1002-G
A4R54				NOT ASSIGNED		
A4R55	0698-7254	9	2	RESISTOR 5.62 1% .05W F TC=0±100	24546	C3-1/8-TO-5621-G
A4R56	2100-2030	6		RESISTOR-TRMR 20K 10% C TOP-ADJ 1-TRN	73138	82PR20K

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
A4R57	0757-0280	3	75	RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-TO-1001-F
A4R58	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-TO-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-TO-3831-G
A4R61	0698-7259	4		RESISTOR 9.09K 1% .05W F TC=0±100	24546	C3-1/8-TO-9091-G
A4R62	0698-7270	9	1	RESISTOR 26.1K 1% .05W F TC=0±100	24546	C3-1/8-TO-2612-G
A4R63	0757-0447	4	3	RESISTOR 16.2K 1% .125W F TC=0±100	24546	C4-1/8-TO-1622-F
A4R64	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-TO-1001-F
A4R65	0698-7260	7		RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-TO-1002-G
A4R66	0757-0438	3	4	RESISTOR 5.11K 1% .125W F TC=0±100	24546	C4-1/8-TO-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-TO-100*-G
A4R69	0698-3440	7	3	RESISTOR 196 1% .125W F TC=0±100	24546	C4-1/8-TO-196R-F
A4R70	0698-1269	6		RESISTOR 23.7K 1% .05W F TC=0±100	24546	C3-1/8-TO-2372-G
A4R71	0757-0418	9	2	RESISTOR 619 1% .125W F TC=0±100	24546	C4-1/8-TO-619R-F
A4R72	0698-3447	4	4	RESISTOR 422 1% .125W F TC=0±100	24546	C4-1/8-TO-422R-F
A4R73	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0±100	24546	C3-1/8-TO-5112-G
A4R74	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0±100	24546	C3-1/8-TO-4221-G
A4R75-A4R80				NOT ASSIGNED		
A4R81	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0±100	24546	C3-1/8-TO-5111-G
A4R82	0698-3132	4		RESISTOR 261 1% .125W F TC=0±100	24546	C4-1/8-TO-2610-F
A4R83	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0±100	24546	C4-1/8-TO-1471-F
A4R84	0698-7229	8		RESISTOR 51[illegible] 1% .05W F TC=0±100	24546	C3-1/8-TO-511R-G
A4R85	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0±100	24546	C4-1/8-TO-51R1-F
A4R86	0698-3440	7		RESISTOR 196 1% .125W F TC=0±100	24546	C4-1/8-TO-196R-F
A4R87	0698-7256	1	2	RESISTOR 6.81K 1% .05W F TC=0±100	24546	C3-1/8-TO-6811-G
A4R88	0698-7262	9	2	RESISTOR 12.1K 1% .05W F TC=0±100	24546	C3-1/8-TO-1212-G
A4R89				NOT ASSIGNED		
A4R90				NOT ASSIGNED		
A4R91	0698-7276	5	1	RESISTOR 46.4K 1% .05W F TC=0±100	24546	C3-1/8-TO-4642-G
A4R92				NOT ASSIGNED		
A4R93	0698-7212	9		RESISTOR 100 1% .05W F TC=0±100	24546	C3-1/8-TO-100R-G
A4R94	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0±100	24546	C3-1/8-TO-5111-G
A4R95	0698-7222	1	1	RESISTOR 261 1% .05W F TC=0±100	24546	C3-1/8-TO-2610-G
A4R96	0698-3157	3	4	RESISTOR 19.6K 1% .125W F TC=0±100	24546	C4-1/8-TO-1962-F
A4R97				NOT ASSIGNED		
A4TP1-TP10	1251-4872	4	10	CONNECTOR 10-PIN M POST TYPE	28480	1251-4872
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	2	IC MULTIPLXR 4-CHAN-ANLG DUAL 16-DIP-C	06665	MUX24FD
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	06665	MUX24FD
A4U7	1826-0319	7		IC OP AMP TO-99	27014	LF356H
A4U8	1826-0027	5	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		IC CONV 12-B-D/A 16-DIP-C	24355	AD7542BD
A4U15	1826-0028	3	2	IC COMPARATOR PRCN TO-99	01295	LM311H
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
A4W1	8151-0013	4	3	WIRE JUMPER	28480	8151-0013
A4W2	8151-0013	4		WIRE JUMPER	28480	8151-0013
A5	**83525-60005**	**6**	**1**	**BOARD ASSEMBLY-FM**	**28480**	**83525-60005**
A5C1	0160-0575	4	7	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

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

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A5C11	0140-0198	5		CAPACITOR-FXD 200PF ±5% 300VDC MICA	72136	DM15F201J0300WV1CR
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 150V	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	D6R8GS1835K
A5C30	0180-2617	1		CAPACITOR-FXD 6.8UF±10% 35VDC TA	25088	D6R8GS1835K
A5C31	0180-2617	1		CAPACITOR-FXD 6.8UF±10% 35VDC TA	25088	D6R8GS1835K
A5C32	0180-2617	1		CAPACITOR-FXD 6.8UF±10% 35VDC TA	25088	D6R8GS1835K
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	6	2	DIODE-SWITCHING 20V 75MA 4NS	28480	1901-0047
A5CR4	1901-0047	6		DIODE-SWITCHING 20V 75MA 4NS	28480	1901-0047
A5CR5	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	00046	1N4150
A5CR6	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	00046	1N4150
A5CR7	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	00046	1N4150
A5CR8	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	00046	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	08503-81001	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	0698-0063	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-4841-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

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
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-TRVR 50K 10% C SIDE-ADJ 17-TRN	32997	3292X-1-503
A5R42	2100-3611	1		RESISTOR-TRVR 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	3	RESISTOR-TRMR 2K 10% C SIDE-ADJ 17-TRN	28480	2100-3759
A5R49	0698-7280	1		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
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	6	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 QUAL TO-99	28480	1826-0092
A5U8	1826-0349	3	1	IC V RGLTR TO-39	07263	UA78M06HL
A5U9	1826-0701	1	1	IC V RGLTR 6V	28480	1826-0701
A5U10	1826-0546	2	1	IC WIDEBAND AMPL V:D 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		

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
A5U16	1820-1196	8		D FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS174N
A5U17	1826-0899	5	1	D CONV 8-B D/A 16-DIP-C	24355	AD7524AD
A5U18	1820-1216	3		D DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A5U19	1826-0700	0	1	D OP AMP WB 14-DIP-C	34371	HA1-5195-3
A5U20	1820-0224	1	1	D OP AMP SPCL TO-99	27014	LM0002CH
A5U21	1810-0366	1	1	NETWORK-RES 9-SIP220.0 OHM X 5	01121	208472J
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 BOC	28480	8159-0005
A5W2				NOT ASSIGNED		
A5W3				NOT ASSIGNED		
A5W4	8159-0005	0		WIRE 22AWG W PVC 1X22 BOC	28480	8159-0005
A5W5	8159-0005	0		WIRE 22AWG W PVC 1X22 BOC	28480	8159-0005
A5W6	8159-0005	0		WIRE 22AWG W PVC 1X22 BOC	28480	8159-0005
A6	**83525-60002**	**2**	**1**	**BOARD ASSEMBLY-YO DRIVER** (DOES NOT INCLUDE R1,3,38,39,40,& 41)	**28480**	**83525-60002**
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	0160-2206	4	1	CAPACITOR-FXD 80UF±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	05001	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	3	CAPACITOR-FXD 6.8UF±10% 35VDC TA	56289	150D685X9035B2
A6C18	0180-0116	1		CAPACITOR-FXD 6.8UF±10% 35VDC TA	56289	150D685X9035B2
A6C19	0160-2207	5		CAPACITOR-FXD 100UF±10% 10VDC TA	56289	150D107X9010R2
A6C20	0180-0116	1		CAPACITOR-FXD 6.8UF±10% 35VDC TA	56289	150D685X9035B2
A6C21	0180-0276	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
A6L1	9100-1666	9	2	INDUCTOR RF-CH-MLD .36MH 5% .230X.57LG	28480	9100-1666
A6L2	9100-1666	9		INDUCTOR RF-CH-MLD .36MH 5% .230X.57LG	28480	9100-1666
A6L3	08503-60001	9		COIL-TOROID	28480	08503-60001
A6MP1	5040-6849	8		EXTRACTOR-BLUE	28480	5040-6849
A6MP2	5000-9043	0		PIN PC 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*				NOT FIELD REPLACEABLE		
A6R2	0698-8484	9	4	RESISTOR 6.44K 1% 1W F TC=0+4	28480	0698-8484
A6R3*				NOT FIELD REPLACEABLE		
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	0698-6356	0	1	RESISTOR 100K 1% .125W F TC=0±25	28480	0698-6356
A6R9	0698-3274	5	1	RESISTOR 10K 1% .25W 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	5	2	RESISTOR-TRMR 100 10% C SIDE-ADJ 17-TRN	28480	2100-3757
A6R12	0699-0517	5	1	RESISTOR 5.621K 1% 1W F TC=0+4	28480	0699-0517
A6R13	0698-3457	6	1	RESISTOR 31.6K 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-TO-1002-F
A6R15	0757-0401	0		RESISTOR 100 1% .125W F TC=0±100	24546	C4-1/8-TO-101-F
A6R16	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0±100	24546	C4-1/8-TO-1961-F
A6R17	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0±100	24546	C4-1/8-TO-1961-F

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
A6R19	0698-6317	3	1	RESISTOR 500 1% .125W F TC=0+25	03888	PME55-1/8-T9-500R-F
A6R19	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+100	24546	C4-1/8-T0-1001-F
A6R20	0698-8486	*	1	RESISTOR 9.84K 1% .1W F TC=0+a	28480	0698-8486
A6R21	2100-3750	9	1	RESISTOR-TRVR 20K 10% C SIDE-ADJ 17-TRN	28480	2100-3750
A6R22	0698-8479	2	1	RESISTOR 4.16K 1% .1W F TC=0+a	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-TRVR 200K 10% C SIDE-ADJ 17-TRN	28480	2100-3753
A6R26	0698-6384	4	1	RESISTOR 330K 1% .125W F TC=0+75	28480	0698-6384
A6R27	0698-8489	4	2	RESISTOR 15K 1% .1W F TC=0+a	28480	0698-8489
A6R28	0698-6406	*	2	RESISTOR 6.54K 1% .1W F TC=0+a	28480	0698-6406
A6R29	0698-6406	*		RESISTOR 6.54K 1% .1W F TC=0+a	28480	0698-6406
A6R30	2100-3757	6		RESISTOR-TRVR 100 10% C SIDE-ADJ 17-TRN	28480	2100-3757
A6R31	0699-0518	6	1	RESISTOR 11.499K 1% .1W F TC=0+a	28480	0699-0518
A6R32	0698-8483	4		RESISTOR 5K 1% .1W F TC=0+a	28480	0698-8483
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-T0-1211-F
A6R38*				NOT FIELD REPLACEABLE		
A6R39*				NOT FIELD REPLACEABLE		
A6R40*				NOT FIELD REPLACEABLE		
A6R41*				NOT FIELD REPLACEABLE		
A6R42	0698-3453	2	*	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	0757-0467	4		RESISTOR 16.2K 1% .125W F TC=0+100	24546	C4-1/8-T0-1622-F
A6R45	2100-3732	7	*	RESISTOR-TRVR 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	0698-6825	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	24546	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	1826-0473	9	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	3	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	*	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	*	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
A6U20	1826-0471	2		IC OP AMP LOW-DRIFT TO-99	28480	1826-0471
A6U21	1820-1211	8	*	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	*	V REF PRCN 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	1826-0473	9		IC SWITCH ANLG 8-DIP-P	01295	TL610CP
A6U27	1826-0512	2	1	IC 78M15C V RGLTR TO-39	04713	MC78M15CG
A6V1	1902-0197	1	2	DIODE-ZNR 82.5V 5% DO-15 PD=1W TC=+.092%	28480	1902-0197
A7	**83525-60004**	**4**	**1**	**BOARD ASSEMBLY-MARKER**	**28480**	**83525-60004**
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		CAPACITOR-FXD 680PF ±5% 100VDC CER	28480	0160-4824

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
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	0180-3229	7	4	CAPACITOR-FXD 33UF±10% 10VDC TA	56289	150D336X9010B2
A7C9	0180-3229	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	0160-3879	7		CAPACITOR-FXD 01UF ±20% 100VDC CER	28480	0160-3879
A7C18	0160-4084	8		CAPACITOR-FXD 1UF ±20% 50VDC CER	28480	0160-4084
A7C19	0160-4388	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
A7CR2				NOT ASSIGNED		
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		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 VOSFET 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-TO-511R-F
A7R2	0757-0290	6	2	RESISTOR 6.19K 1% .125W F TC=0±100	19701	MF4C1/8-TO-6191-F
A7R3	0698-3152	8	2	RESISTOR 3.48K 1% .25W F TC=0±100	24546	C4-1/8-TO-3481-F
A7R4	0698-3152	8		RESISTOR 3.48K 1% .25W F TC=0±100	24546	C4-1/8-TO-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-TO-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-TO-422R-F
A7R15	0698-3442	9		RESISTOR 237 1% .125W F TC=0±100	24546	C4-1/8-TO-237R-F
A7R16	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-1002-F
A7R17	0757-0346	2		RESISTOR 10 1% .125W F TC=0±100	24546	C4-1/8-TO-10R0-F
A7R18	0757-0346	2		RESISTOR 10 1% .125W F TC=0±100	24546	C4-1/8-TO-10R0-F
A7R19	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-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-TO-1002-F
A7R23	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-1002-F
A7R24	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-1002-F
A7R25	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-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-TO-5112-F
A7R29	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0±100	24546	C4-1/8-TO-5112-F
A7R30	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-1002-F
A7R31				NOT ASSIGNED		
A7R32				NOT ASSIGNED		
A7R33	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-TO-1001-F
A7R34	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-1002-F
A7R35	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-TO-1001-F
A7R36	0698-3157	3	2	RESISTOR 19.6K 1% .125W F TC=0±100	24546	C4-1/8-TO-1962-F
A7R37	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-1002-F
A7R38	0757-0462	3	1	RESISTOR 75K 1% .125W F TC=0±100	24546	C4-1/8-TO-7502-F
A7R39	0698-0083	6		RESISTOR 1.96K 1% .125W F TC=0±100	24546	C4-1/8-TO-1961-F
A7R40	0699-0071	6	1	RESISTOR 9.64M 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-TO-1002-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
A7R42	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-1002-F
A7R43	0698-0083	6		RESISTOR 1.96K 1% .125W F TC=0±100	24546	C4-1/8-TO-1961-F
A7R44	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0±100	24546	C4-1/8-TO-4641-F
A7R45	0698-3449	6	1	RESISTOR 28.7K 1% .125W F TC=0±100	24546	C4-1/8-TO-2872-F
A7R46	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-1002-F
A7R47	2100-3611	*		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-TO-100*-F
A7R50	0757-0443	0	1	RESISTOR 11K 1% .125W F TC=0±100	24546	C4-1/8-TO-1102-F
A7R51	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-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 681 1% .125W F TC=0±100	24546	C4-1/8-TO-681R-F
A7R54	0757-0279	0	3	RESISTOR 3.16K 1% .125W F TC=0±100	24546	C4-1/8-TO-3161-F
A7R55	0757-0289	2		RESISTOR 13.3K 1% .125W F TC=0±100	19701	MF4C1/8-TO-1332-F
A7R56	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-1002-F
A7R57	0757-0442	9		RESISTOR 10K 1% .125W F TC=0±100	24546	C4-1/8-TO-1002-F
A7R58	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-TO-100*-F
A7R59	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0±100	24546	C4-1/8-TO-147*-F
A7R60	0698-3446	3		RESISTOR 383 1% .125W F TC=0±100	24546	C4-1/8-TO-383R-F
A7R61	0757-0401	0		RESISTOR 100 1% .125W F TC=0±100	24546	C4-1/8-TO-101-F
A7R62	0698-3157	3		RESISTOR 1.96K 1% .125W F TC=0±100	24546	C4-1/8-TO-1961-F
A7R63	0757-0200	7	1	RESISTOR 5.62K 1% .125W F TC=0±100	24546	C4-1/8-TO-5621-F
A7R64	0757-0444	1	1	RESISTOR 12.1K 1% .125W F TC=0±100	24546	C4-1/8-TO-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-TO-1212-F
A7R68	0698-3153	9		RESISTOR 3.83K 1% .125W F TC=0±100	24546	C4-1/8-TO-3831-F
A7R69	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-TO-1001-F
A7R70	0698-3446	3		RESISTOR 383 1% .125W F TC=0±100	24546	C4-1/8-TO-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-D:P-C	08665	SW-02FQ
A7U3	1826-0753	3	1	IC OP AMP LOW-BIAS-H-IMPD 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	9		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS:74N
A7U10	1826-0458	5	1	IC OP AMP TO 99	27014	LF256H
A7U11	1826-0720	4		IC SWITCH ANLG QUAD 16-D.P-C	08865	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	SN74LS:74N
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
A8	**83525-60003**	3	1	**BOARD ASSEMBLY-SAMPLER**	**28480**	**83525-60003**
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 1.7-11PF 375V	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
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

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

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
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 68PF ±.33PF 50VDC CER	28480	0160-4399
A8C28	0160-4800	6	1	CAPACITOR-FXD 120PF ±5% 100VDC CER	28480	0160-4800
A8C29	0160-4805	1	7	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	INDUCTOR-RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A8L2	9100-1626	1	1	INDUCTOR-RF-CH-MLD 36UH 5% .166DX.385LG	28480	9100-1626
A8L3	9100-1683	2	1	INDUCTOR-RF-CH-MLD 360UH 5% .20DX.46LG	28480	9100-1683
A8L4	9100-2261	2	1	INDUCTOR-RF-CH-MLD 2.7UH 10% .105DX.26LG	28480	9100-2261
A8L5	9100-1623	6	1	INDUCTOR-RF-CH-MLD 27UH 5% .166DX.385LG	28480	9100-1623
A8L6	9100-1618	1		INDUCTOR-RF-CH-MLD 5.6UH 10%	28480	9100-1618
A8L7	9100-1618	1		INDUCTOR-RF-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	9	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	RES-STOR 38.3 1% .125W F TC=0±100	24546	C4-1/8-T0-38R3-F
A8R2	0757-0416	7		RES-STOR 511 1% .125W F TC=0±100	24546	C4-1/8-T0-511R-F
A8R3	0757-0416	7		RES-STOR 511 1% .125W F TC=0±100	24546	C4-1/8-T0-511R-F
A8R4	0757-0416	7		RES-STOR 511 1% .125W F TC=0±100	24546	C4-1/8-T0-511R-F
A8R5	0698-3447	4		RES-STOR 422 1% .125W F TC=0±100	24546	C4-1/8-T0-422R-F
A8R6	0757-0280	3		RES-STOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-100*-F
A8R7	0698-0084	9	2	RES-STOR 2.15K 1% .125W F TC=0±100	24546	C4-1/8-T0-215*-F
A8R8	0757-0280	3		RES-STOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-100*-F
A8R9	0698-3447	4		RES-STOR 422 1% .125W F TC=0±100	24546	C4-1/8-T0-422R-F
A8R10	0698-0084	9		RES-STOR 2.15K 1% .125W F TC=0±100	24546	C4-1/8-T0-215*-F
A8R11	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-100*-F
A8R12	0757-0280	3		RESISTOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-100*-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	*	RESISTOR 75.0 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	*	RESISTOR 10.0 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

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
A8R23	0698-7205	0		RES·STOR 511 1% .05W F TC=0±100	24546	C3-1/8-T00-511R-G
A8R24	0698-7212	9		RES·STOR 100 1% .05W F TC=0±100	24546	C3-1/8-T0-100R-G
A8R25	0757-0401	0		RES·STOR 100 1% .125W F TC=0±100	24546	C4-1/8-T0-101-F
A8R26	0698-7229	8		RES·STOR 511 1% .05W F TC=0±100	24546	C3-1/8-T0-511R-G
A8R27	0757-0280	3		RES·STOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A8R28*	0698-7246	1	2	RES·STOR 3.16K 1% .05W F TC=0±100	24546	C3-1/8-T0-3161-G
A8R29	2100-2515	2		RES·STOR-TRMR 200K 10% C SIDE-ADJ 1-TRN	30983	ET50W204
A8R30	2100-2515	2		RES·STOR-TRMR 200K 10% C SIDE-ADJ 1-TRN	30983	ET50W204
A8R31	2100-2515	2		RES·STOR-TRMR 200K 10% C SIDE-ADJ 1-TRN	30983	ET50W204
A8R32	0698-7260	7		RES·STOR 10K 1% .05W F TC=0±100	24546	C3-1/8-T0-1002-G
A8R33	0698-7249	2	1	RES·STOR 348K 1% .05W F TC=0±100	24546	C3-1/8-T0-3483-G
A8R34	0757-0458	7		RES·STOR 51.1K 1% .125W F TC=0±100	24546	C4-1/8-T0-5112-F
A8R35	0757-0280	3		RES·STOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A8R36	0757-0394	0		RES·STOR 51.1 1% .125W F TC=0±100	24546	C4-1/8-T0-51R1-F
A8R37	0757-0394	0		RES·STOR 51.1 1% .125W F TC=0±100	24546	C4-1/8-T0-51R1-F
A8R38	0698-7280	1		RES·STOR 68.1K 1% .05W F TC=0±100	24546	C3-1/8-T0-6812-G
A8R39	0698-7254	9	1	RES·STOR 5.62K 1% .05W F TC=0±100	24546	C3-1/8-T0-5621-G
A8R40				NOT ASSIGNED		
A8R41	0757-0280	3		RES·STOR 1K 1% .125W F TC=0±100	24546	C4-1/8-T0-1001-F
A8R42	0757-0288	1	1	RES·STOR 9.09K 1% .125W F TC=0±100	19701	MF4C1/8-T0-9091-F
A8R43	0757-0289	2		RES·STOR 13.3K 1% .125W F TC=0±100	19701	MF4C1/8-T0-1332-F
A8R44	0757-0442	9		RES·STOR 10K 1% .125W F TC=0±100	24546	C4-1/8-T0-1002-F
A8R45	0698-3150	6		RES·STOR 2.37K 1% .125W F TC=0±100	24546	C4-1/8-T0-2371-F
A8R46	0757-0447	4		RES·STOR 16.2K 1% .125W F TC=0±100	24546	C4-1/8-T0-1622-F
A8R47	0698-3136	9		RES·STOR 17.8K 1% .125W F TC=0±100	24546	C4-1/8-T0-1782-F
A8R48	0757-0459	8	1	RES·STOR 56.2K 1% .125W F TC=0±100	24546	C4-1/8-T0-5622-F
A8R49	0757-0401	0		RES·STOR 100 1% .125W F TC=0±100	24546	C4-1/8-T0-101-F
A8R50	0757-1094	9		RES·STOR 1.47K 1% .125W F TC=0±100	24546	C4-1/8-T0-1471-F
A8R51	0757-0458	7		RES·STOR 51.1K 1% .125W F TC=0±100	24546	C4-1/8-T0-5112-F
A8R52	0757-0458	7		RES·STOR 51.1K 1% .125W F TC=0±100	24546	C4-1/8-T0-5112-F
A8R53	2100-2514	1		RES·STOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	30983	ET50W203
A8R54	2100-2514	1		RES·STOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	30983	ET50W203
A8R55	2100-2514	1		RES·STOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	30983	ET50W203
A8R56	0757-1094	9		RES·STOR 1.47K 1% .125W F TC=0±100	24546	C4-1/8-T0-147-F
A8R57	0757-0438	3		RES·STOR 5.11K 1% .125W F TC=0±100	24546	C4-1/8-T0-5111-F
A8R58	0757-0438	3		RES·STOR 5.11K 1% .125W F TC=0±100	24546	C4-1/8-T0-5111-F
A8R59	0698-3260	9		RES·STOR 464K 1% .125W F TC=0±100	28480	0698-3260
A8R60	0757-0466	7		RES·STOR 1.00K 1% .125W F TC=0±100	24546	C4-1/8-T0-1003-F
A8R61	0698-7260	7		RES·STOR 10K 1% .05W F TC=0±100	24546	C3-1/8-T0-1002-G
A8R62				NOT ASSIGNED		
A8R63	0698-3248	1	1	RES·STOR 3.16K 1% .05W F TC=0±100	24546	C3-1/8-T0-3161-G
A8R64	0698-7212	9		RES·STOR 100 1% .05W F TC=0±100	24546	C3-1/8-T0-100R-G
A8R65	0698-3452	1	1	RES·STOR 147K 1% .125W F TC=0±100	24546	C4-1/8-T0-1473-F
A8R66	0698-7236	7		RES·STOR 1K 1% .05W F TC=0±100	24546	C3-1/8-T0-1001-G
A8R67	2100-2514	1		RES·STOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	30983	ET50W203
A8R68	0698-3447	4		RES·STOR 422 1% .125W F TC=0±100	24546	C4-1/8-T0-4220-F
A8J1P1-4	1251-0600	0	10	CONNECTOR-SGL CONT PIN .114-MM-BSC-SZ	28480	1251-0600
A8U1	1820-0306	0	2	IC DIFF AMPL TO-99	01921	CA3028A
A8U2	1820-0475	4	1	IC COMPARATOR HS TO-99	27014	LM308H
A8U3	1820-0306	0		IC DIFF AMPL TO-99	01928	CA3028A
A8U4	1826-0811	4	1	IC SWITCH	28480	1826-0811
A8U5	1826-0610	1		IC MULTIPLXR 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	2104472
A8VR1				NOT ASSIGNED		
A8VR2	1902-0025	4	1	DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.06%	28480	1902-0025
A8Y1	0410-0594	8	1	CRYSTAL-QUARTZ 50.000 MHZ	28480	0410-0594
A9	**83525-60010**	**2**	**1**	**BOARD ASSEMBLY-TRANSISTOR HEAT SINK**	**28480**	**83525-60010**
A9C1	0180-0291	7	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
A9E3	83525-20034	8	1	BACKING PAD	28480	83525-20034
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

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
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 REG TR TO-3	07263	LM309K
A9R1	0811-1056	1	1	RESISTOR-125 OHM 12W	28480	0811-1056
A10	**83522-60001**	1	1	**BOARD ASSEMBLY-MOTHER**	**28480**	**83522-60001**
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
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 28-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-A10MP5	1251-1115	4	5	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
A10W1	8159-0005	0	1	WIRE JUMPER	28480	8159-0005
A10XA1				NOT ASSIGNED		
A10XA2				NOT ASSIGNED		
A10XA3	1251-1365	6	6	CONNECTOR-PC EDGE 22-CONT/ROW 2-ROWS	28480	1251-1365
A10XA4	1251-1365	6		CONNECTOR-PC EDGE 22-CONT/ROW 2-ROWS	28480	1251-1365
A10XA5	1251-1365	6		CONNECTOR-PC EDGE 22-CONT/ROW 2-ROWS	28480	1251-1365
A10XA6	1251-1365	6		CONNECTOR-PC EDGE 22-CONT/ROW 2-ROWS	28480	1251-1365
A10XA7	1251-1365	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
A11				**NOT ASSIGNED**		
A12	**5086-7331**	1	1	**OSCILLATOR-3.8-8.2 GHZ**	**28480**	**5086-7331**
A12	5086-6331	9		EXCHANGE 5086-7331 OSCILLATOR	28480	5086-6331
A12E1	5001-1559	5	1	INSULATOR	28480	5001-1559
A12MP1	7121-0554	4	1	LABEL-IDOSC 7332AA	28480	7121-0554
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		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A1E3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A1E4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A1E5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A1E8	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
A12A1MP2	1251-3172	7	10	CONNECTOR-SGL CONT SKT .03-IN-BSC-SZ BND	28480	1251-3172
A12A1R1*						
A12A1R2*						
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 5K 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		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
A12A1W1	8151-0013	4	1	WIRE JUMPER	28480	8151-0013

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

Table 6-3. Replaceable Parts

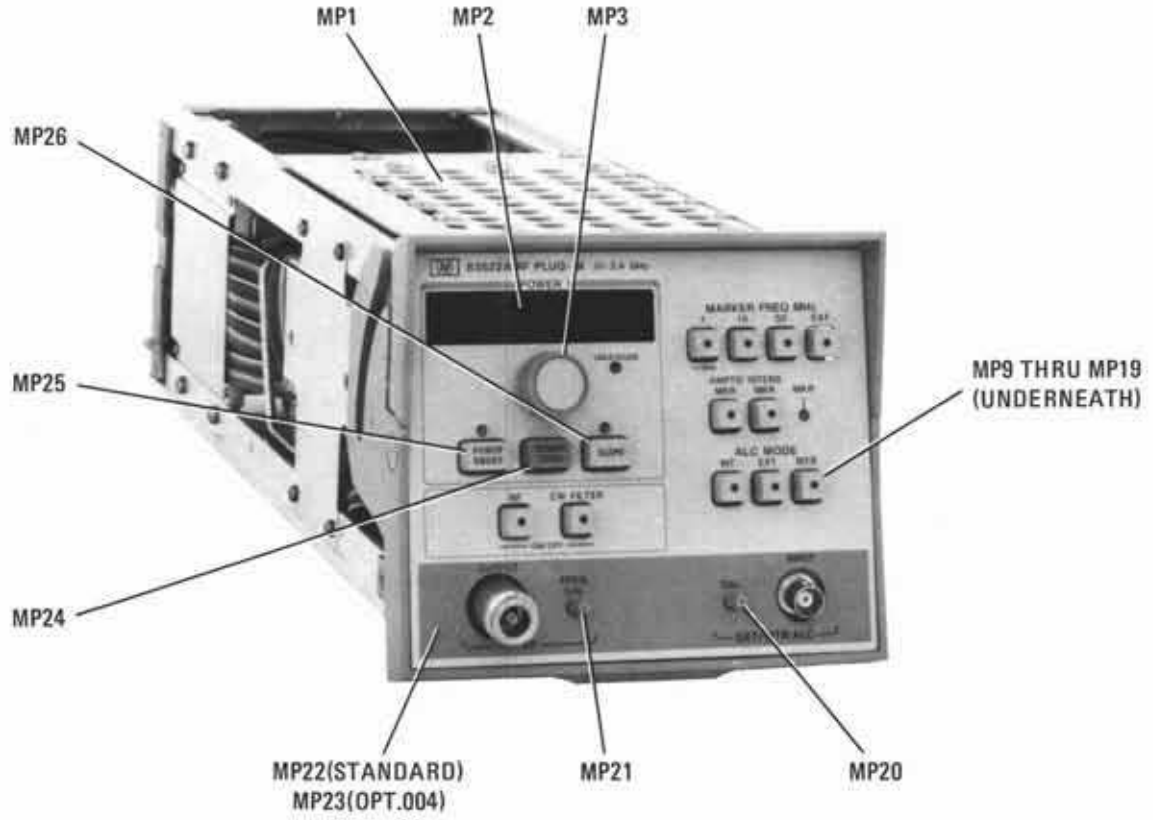
Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A14	**5086-7217**	**2**	**1**	**AMPLIFIER-01-2.4 GHZ**	**28480**	**5086-7217**
A14	5086-6217	0		EXCHANGE 5086-7217 AMPLIFIER	28480	5086-6217
A15	**5086-7238**	**7**	**1**	**DC RETURN**	**28480**	**5086-7238**
A16	**86222-60007**	**7**	**1**	**CAVITY OSCILLATOR**	**28480**	**86222-60007**
A16C1	0180-2216	8	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
CR1				NOT ASSIGNED		
CR2	1901-0033	2	2	DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
CR3	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
DC1	5086-7220	7	1	DIRECTIONAL DETECTOR	28480	5086-7220
E1	5040-0345	7	2	INSULATOR-CONNECTOR	28480	5040-0345
E2	5040-0345	7		INSULATOR-CONNECTOR	28480	5040-0345
J1	86290-60005	7	1	CONNECTOR ASSEMBLY-TYPE N	28480	86290-60005
				NOTE **SEE FIGURE 8-4 FOR EXPLODED VIEW OF J1.**		
J2	1250-0212	8	1	CONNECTOR-RF BNC FEM SGL-HOLE-FR 50 OHM (INPUT EXT MTR/ALC)	28480	1250-0212
J3				PART OF W23 (EXT MKR)		
J4	1250-0118	3	2	CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM (TWIGHT)	28480	1250-0118
J5	1250-0118	3		CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM (PULSE IN)	28480	1250-0118
				NOTE **SEE FIGURE 5-1 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	KNOB 3/4 JGK .25-IN-ID	28480	0370-3023
MP4 THRU MP8				NOT ASSIGNED		
MP9 THRU MP19	5041-0285	8	11	KEY CAP-QUARTER LITE PIPE	28480	5041-0285
MP20	5040-8823	2	2	KNOB-JADE GRAY	28480	5040-8823
MP21	5040-8823	2		KNOB-JADE GRAY	28480	5040-8823
MP22	83522-00001	2	1	PANEL DRESS	28480	83522-00001
MP23	83522-00002	3	1	PANEL DRESS (OPT 004 ONLY)	28480	83522-00002
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	83525-20055	1	1	CASTING-AS FRAME (RR)	28480	83525-20055
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	8	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				NOT ASSIGNED		
MP45				NOT ASSIGNED		
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	1	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
MP51	3030-0330	7	2	SET SCREW	28480	3030-0330
MP52	83525-20033	5		LATCH-SCREW	28480	83525-20033
MP53	3030-0330	7		SET SCREW	28480	3030-0330
MP54	83525-20040	4	1	LATCH	28480	83525-20040
MP55	83525-00012	6	2	HOLD-DOWN BRACKET	28480	83525-00012
MP56	83525-00011	7	1	BRACKET-ATTEN (OPT 002 ONLY)	28480	83525-00011
MP57	83525-20029	9	2	SIDE RAIL-UP LT	28480	83525-20029
MP58	83525-00010	6	1	GUARD	28480	83525-00010
MP59	83525-00013	9		WIRE HOLDER	28480	83525-00013

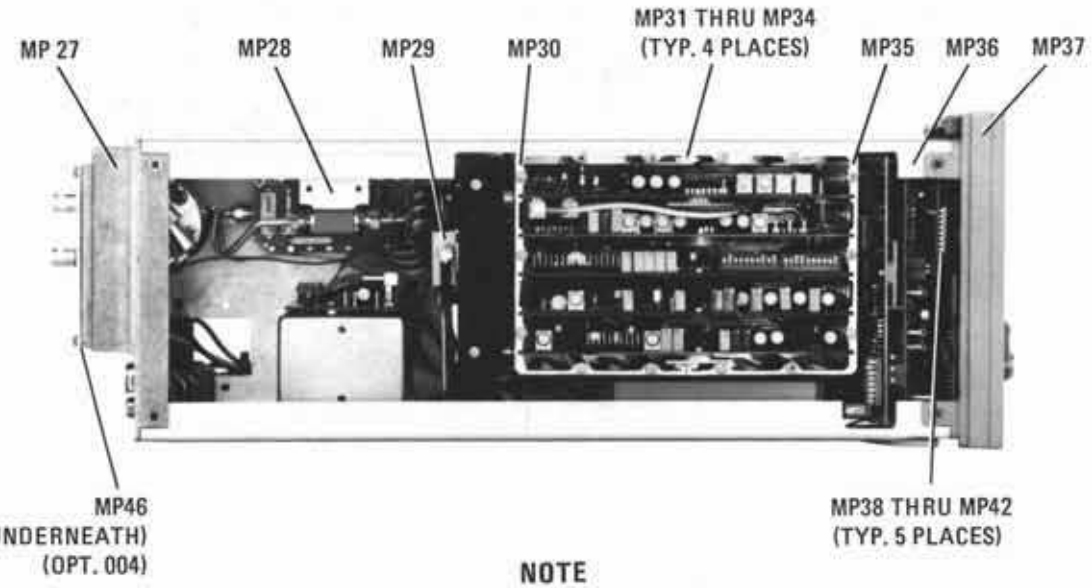
See introduction to this section for ordering information
* Indicates factory selected value

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
MP60	83525-20032	4	1	SIDE RAIL-LR RT	28480	83525-20032
MP61	83525-20022	2	1	CASTING-RF	28480	83525-20022
MP62	83525-00003	7	1	REAR PANEL	28480	83525-00003
MP63	0960-0046	8	1	PLUG-HOLE COMB-HD FOR .688-D-HOLE BRS	28480	0960-0046
MP64	5021-0906	6	3	SLEEVE-RF PIN POS	28480	5021-0906
MP65	5021-0906	6		SLEEVE-RF PIN POS	28480	5021-0906
MP66	5021-0906	6		SLEEVE-RF PIN POS	28480	5021-0906
MP67	0960-0001	7	1	PLUG-HOLE DOME-HD FOR .375-D-HOLE STL	28480	0960-0001
MP68	11869-20020	4	1	ALIGNMENT PIN	28480	11869-20020
MP69	0510-0089	8	1	LOCK RING	28480	0510-0089
W1				NOT ASSIGNED		
W2	83522-20013	8	1	CABLE-DETECTOR/RF OUT	28480	83522-20013
W3	83525-60031	7	1	CABLE ASSY-RIBBON, FRONT PANEL	28480	83525-60031
W3	83525-60054	4		CABLE ASSY-RIBBON, FRONT PANEL (OPT 004)	28480	83525-60054
W4				NOT ASSIGNED		
W5	83522-60013	2	1	WIRE ASSEMBLY-RF PATH	28480	83522-60013
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				NOT ASSIGNED		
W10	83525-20017	5	1	CABLE-RF DC RETURN/DIRECTIONAL DETECTOR	28480	83525-20017
W11				NOT ASSIGNED		
W12	83525-60028	2	1	CABLE ASSY-COAX, BLUE, FM OUTPUT	28480	83525-60028
W13				NOT ASSIGNED		
W14				NOT ASSIGNED		
W15	83525-20016	4	1	CABLE-RF AMPLIFIER/DC RETURN	28480	83525-20016
W16				NOT ASSIGNED		
W17	83522-60016	5	1	CABLE ASSY-RIBBON RF PATH	28480	83522-60016
W18				NOT ASSIGNED		
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				NOT ASSIGNED		
W25	83525-20015	3	1	CABLE-RF MODULATOR/AMPLIFIER	28480	83525-20015
W26				NOT ASSIGNED		
W27				NOT ASSIGNED		
W28	83525-20019	7	1	CABLE-RF OSCILLATOR/MODULATOR	28480	83525-20019
W29				NOT ASSIGNED		
W30				NOT ASSIGNED		
W31	83525-60024	6	1	CABLE ASSY-POWER SUPPLY	28480	83525-60024
W32	83525-60056	9	1	CABLE ASSY-REAR CONNECTOR	28480	83525-60056
W33	83525-20027	7	1	CABLE-ATTEN/OUTPUT (OPT 002 ONLY)	28480	83525-20027
W34				NOT ASSIGNED		
W35				NOT ASSIGNED		
W36				NOT ASSIGNED		
W37	83522-20015	0	1	CABLE-REAR PANEL RF OUT (OPT 004 ONLY)	28480	83522-20015
W38	83522-20016	1	1	CABLE-RF DETECTOR/ATTENUATOR (OPT 002/002 AND 004)	28480	83522-20016
W39	83522-20017	2	1	CABLE-ATTENUATOR/REAR PANEL RF OUT (OPT 002 and 004)	28480	83522-20017
W40	83522-20014	9	1	CABLE-YO/MOD-MIX	28480	83522-20014
				OPTION 002 (70 DB STEP ATTENUATOR)		
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
W38	83522-20016	1	1	CABLE-DIR DETECTOR/ATTENUATOR	28480	83522-20016
				NOTE		
				DELETE CABLE W2(83522-20013) FOR OPT. 002.		
				OPTION 004 (REAR PANEL RF OUT)		
MP23	83522-00002	6	1	PANEL DRESS (OPT. 004 ONLY)	28480	83522-00002
MP45	83525-00009	3	1	REAR CONNECTOR BRACKET	28480	83525-00009
W37	83522-20015	0	1	CABLE-REAR PANEL RF OUT	28480	83522-20015
W3	83525-60054	4	1	CABLE ASSY-FRONT PANEL (OPT. 004)	28480	83525-60054
				NOTE		
				DELETE W2 (83522-20013) AND DRESS PANEL (83522-00001) FOR OPT. 004 ONLY		
				OPTION 002 AND 004		
				ALL OPT 002 & 004 PARTS + THE FOLLOWING		
W39	83522-20017	2	1	CABLE-RF ATTENUATOR/REAR OUTPUT	28480	83522-20017
				NOTE		
				DELETE CABLES W2 (83522-20013), W33 (83525-20027) AND W37 (83522-20015) FOR OPT. 002 AND 004.		

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

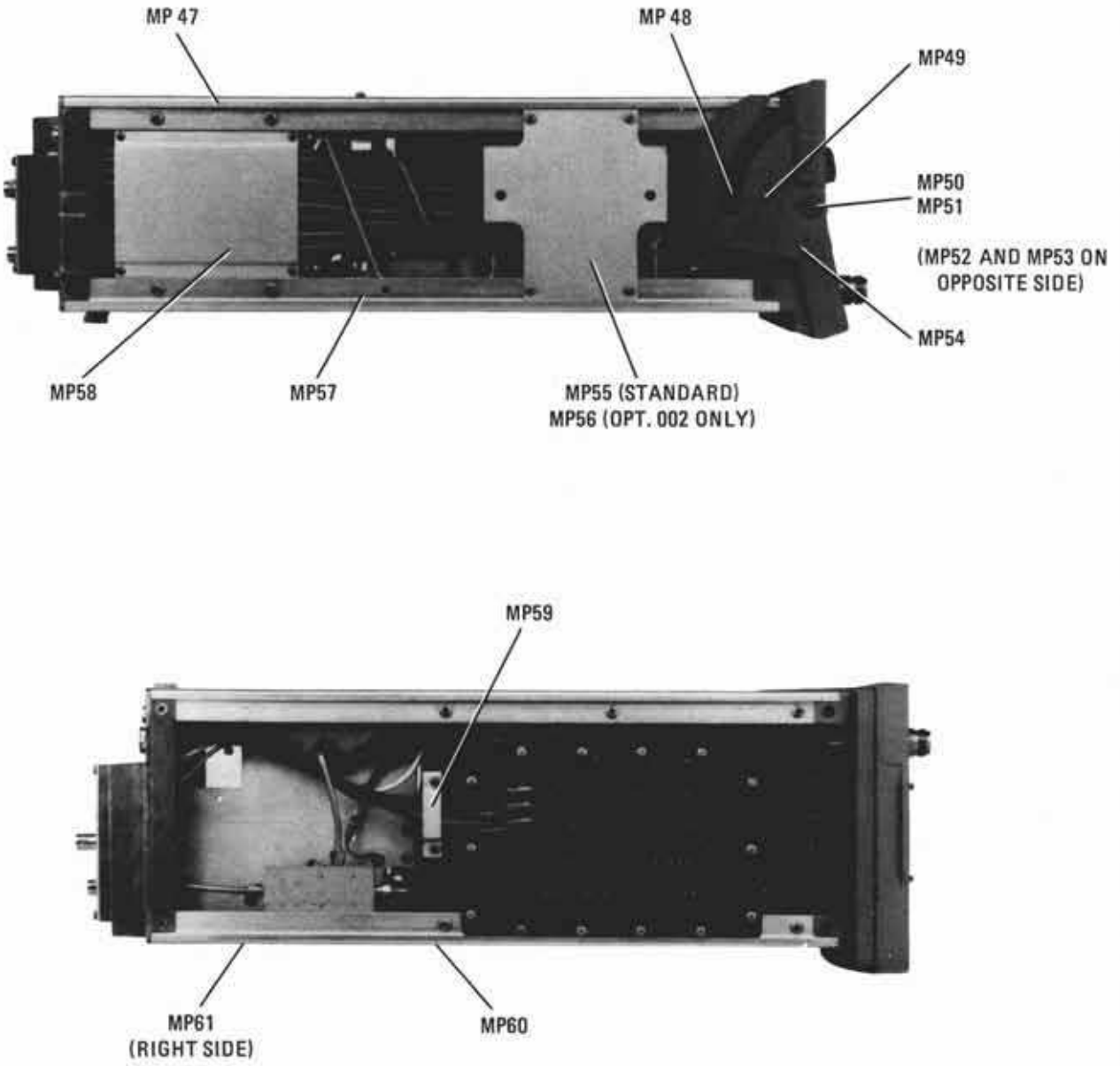




NOTE

Refer to Table 6-3 for mechanical parts listings.

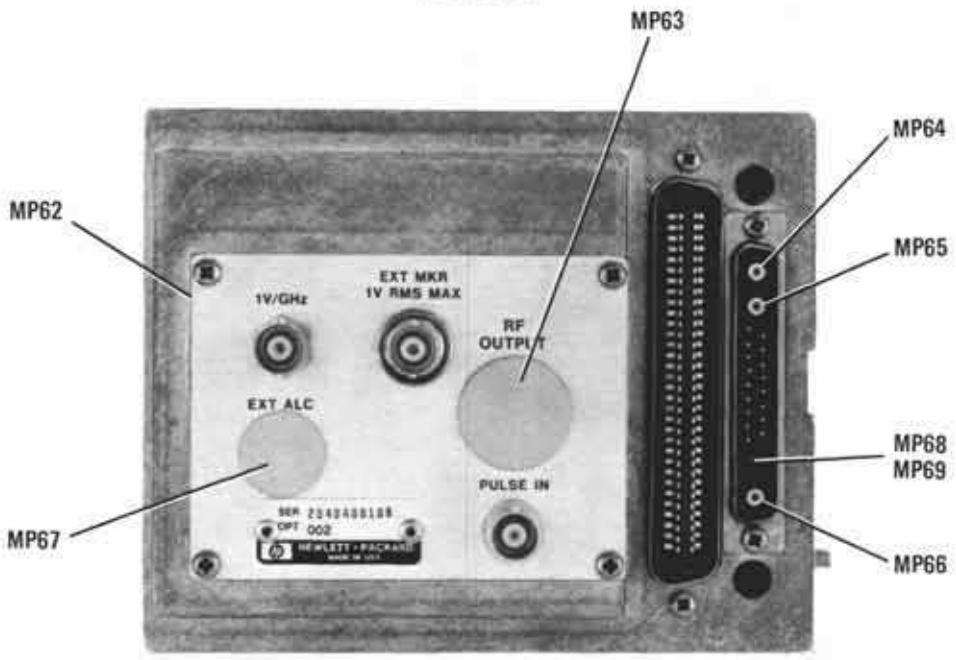
Figure 6-1. Major Mechanical Parts (1 of 3)



NOTE

Refer to Table 6-3 for mechanical parts listings.

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



NOTE

Refer to Table 6-3 for mechanical parts listings.

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

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				ATTACHING HARDWARE		
				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 DEC	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)

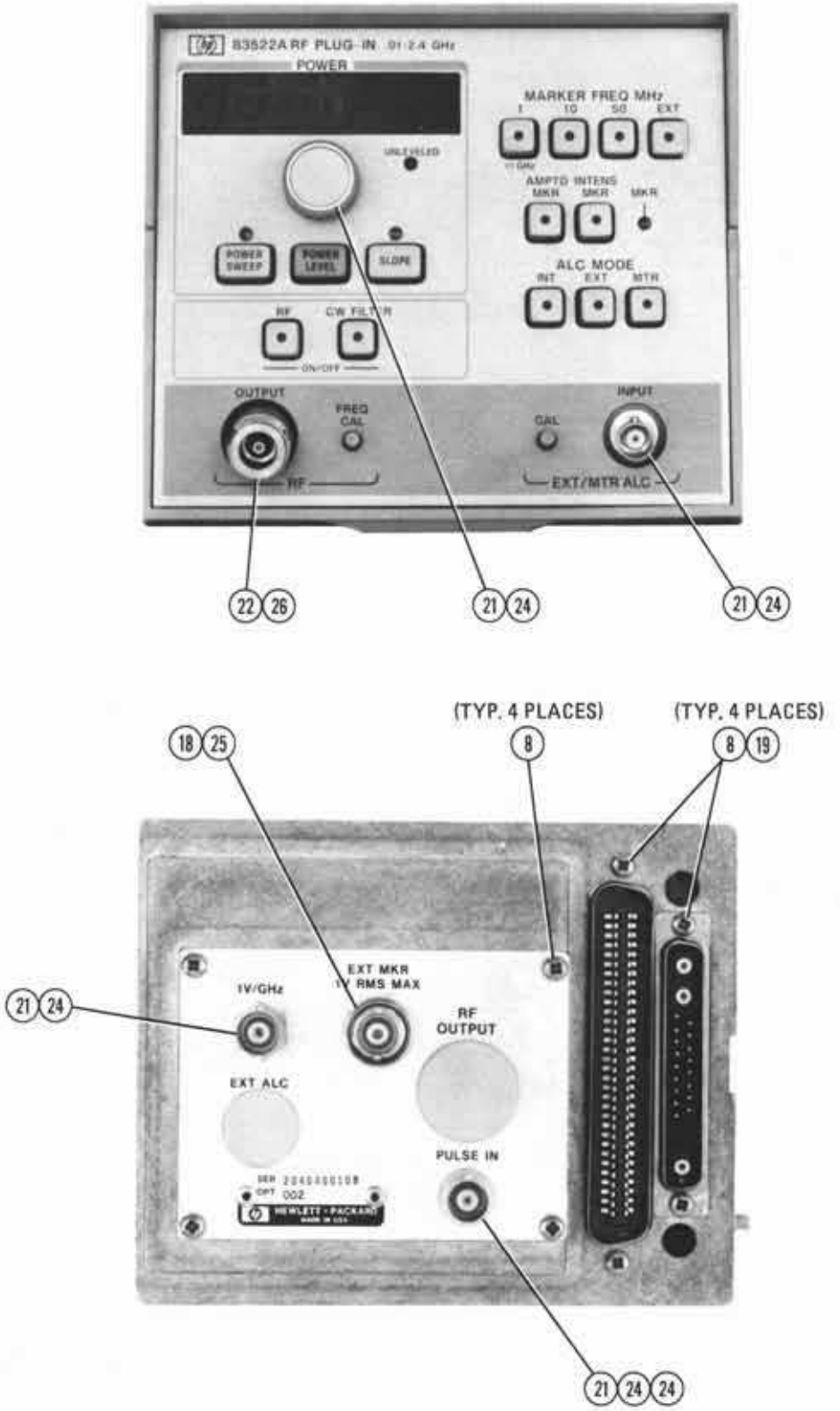


Figure 6-2. Attaching Hardware (2 of 4)

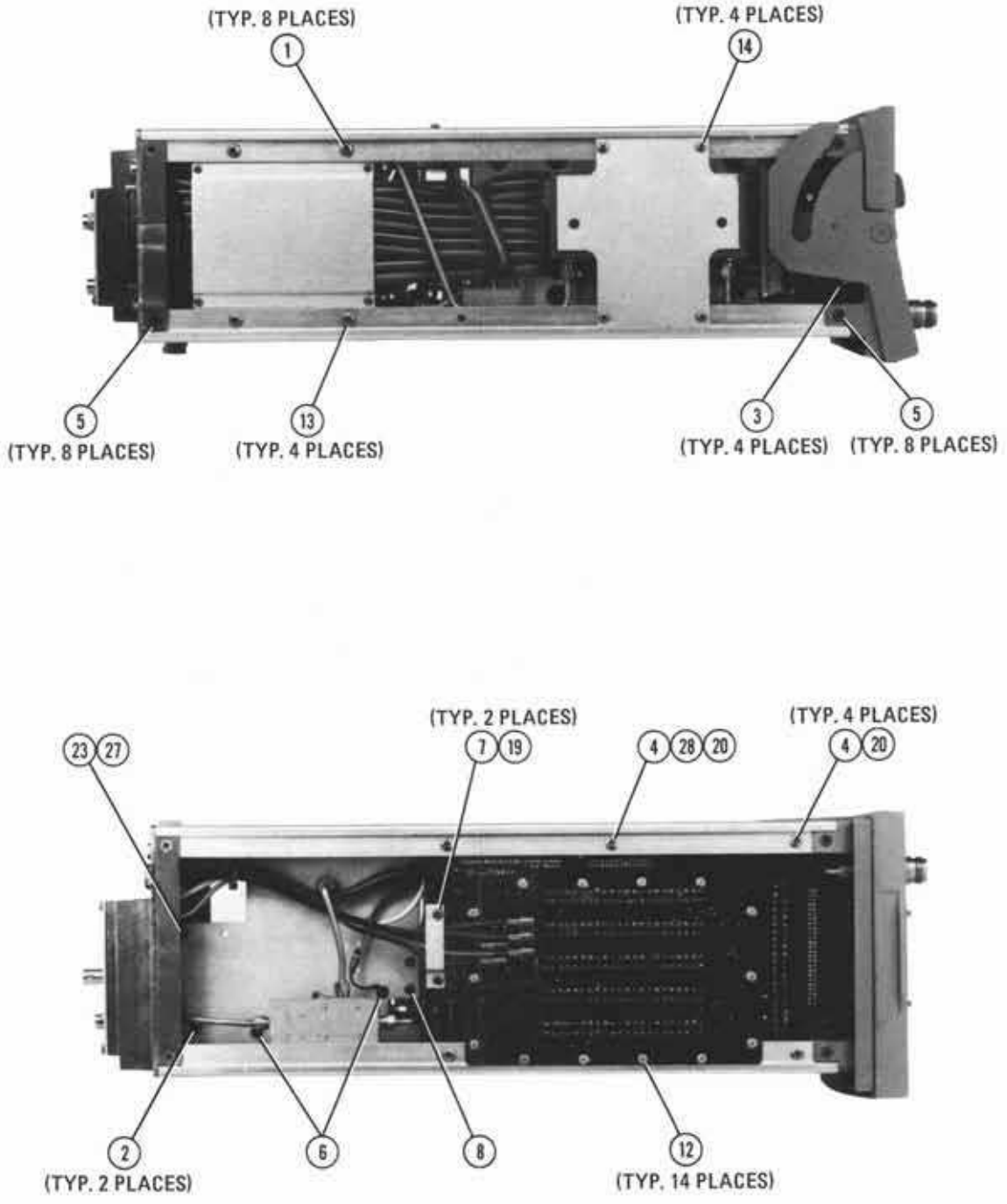


Figure 6-2. Attaching Hardware (3 of 4)

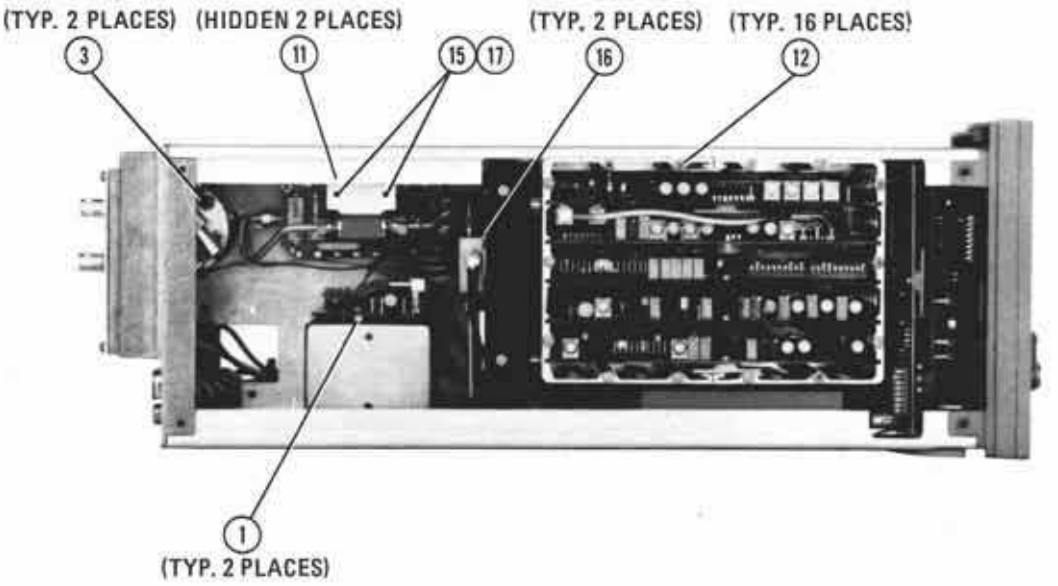


Figure 6-2. Attaching Hardware (4 of 4)

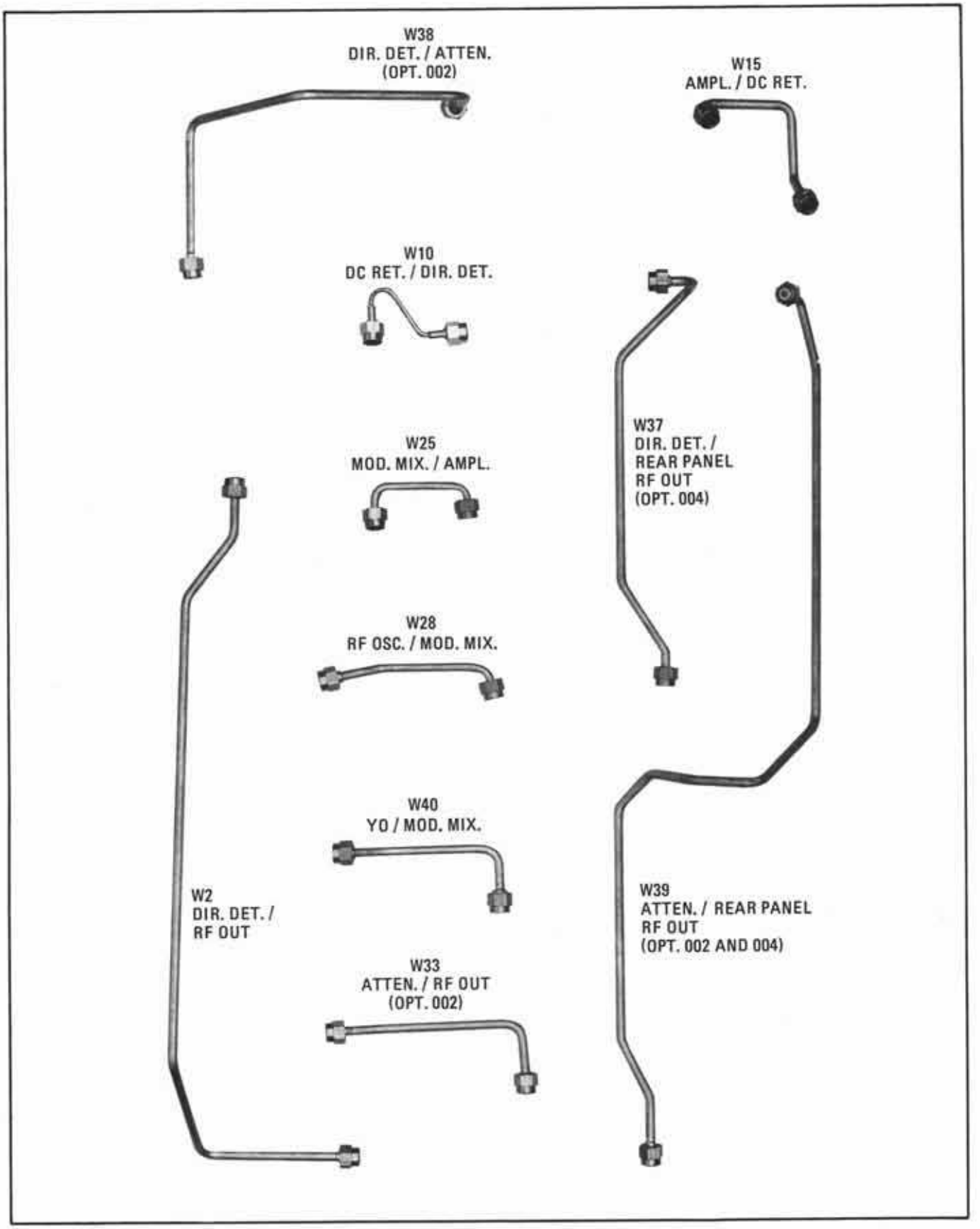
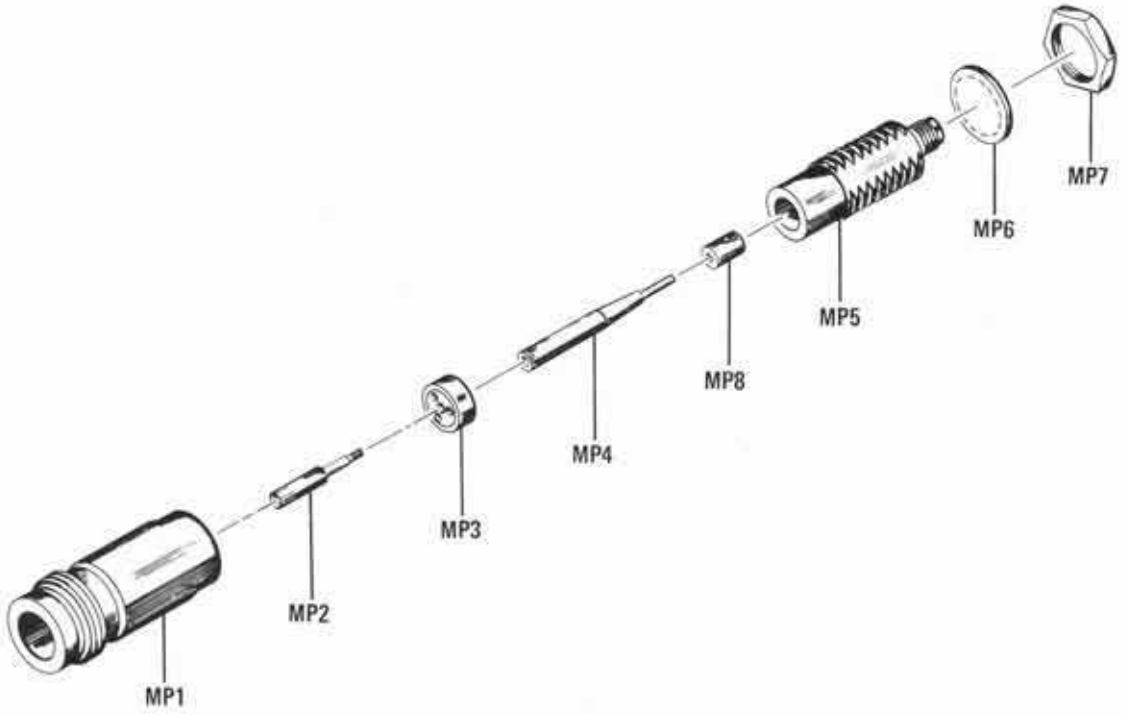


Figure 6-3. Cables in RF Section



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 6-4. RF Output Connector J1 Exploded View

VII – Manual Backdating

SECTION VII
MANUAL BACKDATING CHANGES

7-1. INTRODUCTION

7-2. This manual has been written for and applies directly to instruments with serial numbers prefixed as indicated on the title page. Earlier versions of the instrument (serial number prefixes lower than the one indicated on the title page) may be slightly different in design or appearance. The purpose of this section is to document these differences. With the information provided in this section, this manual can be corrected so that it applies to any earlier version or configuration of the instrument. Later versions of the instrument (serial number prefixes higher that the one indicated on the title page) are documented in a yellow Manual Changes Supplement.

7-3. Since there are no earlier versions of the HP Model 83522A RF Plug-in, there is no change information provided here. This manual applies directly to instruments with serial numbers prefixed as indicated on the title page. If your instrument serial number is different than the one listed on the title page, it will be documented in a yellow Manual Changes Supplement. Complimentary copies of this supplement can be obtained from your nearest Hewlett-Packard office. Refer to INSTRUMENTS COVERED BY MANUAL in Section I for more information about serial number coverage.

MANUAL CHANGES

NOTE

Manual change supplements are revised as often as necessary to keep manuals as current and accurate as possible. Hewlett-Packard recommends that you periodically request the latest edition of this supplement. Free copies are available from all HP offices. When requesting copies, quote the manual identification information from your supplement, or the model number and print date from the title page of the manual.

MANUAL IDENTIFICATION

HP Number: HP 83522A
Date Printed: July 1981
Part Number: 83522-90003

This supplement contains important information for correcting manual errors and for adapting the manual to instruments containing improvements made after the printing of the manual.

Two types of information are included:

UPDATES - APPLY TO ALL SERIAL NUMBERS.

NUMBERED CHANGES - UPDATES THAT ARE SERIAL NUMBER PREFIX RELATED.

The information is in the following order: UPDATES, NUMBERED CHANGES in sequential order with applicable illustrations as close as possible to each numbered change.

To use this supplement, make all UPDATES and all appropriate serial number related CHANGES indicated in the following tables.

▶ = NEW ITEM

NOVEMBER 26, 1986

HEWLETT PACKARD

Printed in U.S.A.

▶ = NEW ITEM

HP 83522A

Serial Prefix or Number	Make Manual Changes
2147A	1
2202A	1, 2
2205A, 2222A	1-3
2233A, 2244A	1-4
2307A	1-5
2323A	1-6
2339A	1-7
2411A	1-3, 5-9
2528A	1-3, 5-11
▶ 2647A	1-3, 5-12

▶ = NEW ITEM

Numbered Changes Index

Serial Prefix Number	Change Number	Assemblies Affected	New Assembly Part Number	Manual Sections Affected
2147A	1	W32	N/A	None
2202A	2	A5	83525-60043	Replaceable Parts Service
2205A and 2222A	3	A2	83525-60060	Replaceable Parts Service
2233A and 2244A	4	A4	83522-60061	Replaceable Parts Service
2307A	5	A3	83525-60068	Operation Replaceable Parts Service
2323A	6	A10	83522-60062	Replaceable Parts Service
2339A	7	A2	83525-60072	Replaceable Parts Service
2411A	8 and 9	A4 A3	83522-60077 83525-60080	General Information Operation Adjustments Replaceable Parts Service
2528A	10 and 11	Mechanical Parts A7	N/A 83525-60092	Replaceable Parts Service
▶ 2647A	12	A4 A10	83522-60098 83522-60084	Replaceable Parts Service

UPDATES

Inside Cover:

Replace the warranty statement with the following warranty statement:

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 delivery, or, in the case of certain major components listed in section six of this Operating and Service manual, for the specified period. 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.

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.

UPDATES

Page 1-2:
After paragraph 1-9 add the following:

Manufacturer's Declaration

NOTE

This is to certify that this product meets the radio frequency interference requirements of Directive FTZ 1046/1984. The German Bundespost has been notified that this equipment was put into circulation and has been granted the right to check the product type for compliance with these requirements.

Note: If test and measurement equipment is operated with unshielded cables and/or used for measurements on open set-ups, the user must insure that under these operating conditions, the radio frequency interference limits are met at the border of his premises.

Model **HP 83522A**

NOTE

Hiermit wird bescheinigt, dass dieses Gerät/System in Übereinstimmung mit den Bestimmungen von Postverfügung 1046/84 funkentstört ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes/Systems angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

Zusatzinformation für Mess- und Testgeräte:

Werden Mess- und Testgeräte mit ungeschirmten Kabeln und/oder in offenen Messaufbauten verwendet, so ist vom Betreiber sicherzustellen, dass die Funk-Entstörbestimmungen unter Betriebsbedingungen an seiner Grundstücksgrenze eingehalten werden.

Page 1-3, Table 1-1:
Under "**Power Variation**, Internally Leveled," add the following specification:
"With Option 002: ±0.35 dB (in 0 dB attenuation step)."
Delete all references to Stability With Time (in a 10 minute period after one hour warmup).

Page 1-4, Table 1-2:
Add the following typical characteristic:
Power Variation
Internally Leveled (Option 002): ±0.5 dB (in 10 dB to 70 dB attenuation steps).
Add STABILITY WITH TIME (in a 10 minute period after one hour warmup at the same frequency setting):
< ± 100 kHz.

Page 4-4, Table 4-2:
Under "**4-14. Output Amplitude**, Internally Leveled: ±.25 dB," add the following:
"Opt. 002: ±0.35 dB."

Page 4-5, Table 4-2, Section 4-15:
Delete all references to Time (10 minutes): specifications.

Page 5-1, Paragraph 5-11:
Replace Paragraph 5-12 with the following:
Adjustment procedures are given in the proper sequence to allow for interrelated adjustments. However, perform Paragraph 5-22 before Paragraph 5-21, all other adjustments should be done in order of appearance. Adjustments having to do with the leveling loop (paragraph 5-20 through 5-24) are interactive and should be performed as a group.

UPDATES

Page 5-14, Paragraph 5-16:
Replace A6R30 "G" in Step 16 with A6R11 "G."

Page 5-28, Paragraph 5-21:
Replace the first NOTE in Paragraph 5-21 with the following:
Perform Paragraph 5-22 before Paragraph 5-21, all other adjustments should be done in order of appearance. Deviation from this routine may cause improper leveling and/or flatness problems.

Page 5-29, Paragraph 5-21:
Add "Set power level to +6 dBm," to the end of Step 1.

Page 5-30, Paragraph 5-22:
Replace the first NOTE in Paragraph 5-22 with the following:
Perform Paragraph 5-22 before Paragraph 5-21, all other adjustments should be done in order of appearance. Deviation from this routine may cause improper leveling and/or flatness problems.

Page 5-34, Paragraph 5-24:
Delete Paragraph 5-24 on pages 5-34 through 5-36 and replace with Paragraph **5-24. ALC GAIN ADJUSTMENT (UPDATES)** contained in this document.

Page 5-42, Paragraph 5-27:
Delete Paragraph 5-27 on pages 5-42 through 5-46 and replace with **5-27. MARKER AND SAMPLER ADJUSTMENTS (UPDATES)**contained in this document.

Page 5-46:
Add Paragraph **5-27a. MARKER GAIN (FINE TUNE) ADJUSTMENT (UPDATES)**contained in this document.

Page 5-46, Paragraph 5-28:
Delete Paragraph 5-28 on pages 5-46 through 5-48 and replace with **5-28. EXTERNAL MARKER ADJUSTMENT (UPDATES)** contained in this document.

Page 6-1, Paragraph 6-7:
Add the following after paragraph 6-7:

Two Year Warranty and Restored Exchange Parts

The microcircuit parts listed in Table 6.0 are provided with either a two-year warranty from the date of purchase and/or a restored exchange parts program.

A two-year warranty applies to both an original component and to one that is purchased as a replacement part either new or restored through the support life of the instrument. The restored exchange parts program allows a defective component to be exchanged for a factory-restored part which provides a substantial reduction in replacement cost. In addition, if the original component is covered by a two-year warranty, the exchanged component will also have a two-year warranty from the date of purchase. Table 6-0 below identifies the components within the instrument that have a two-year warranty as well as those that are available as restored exchange parts.

Table 6-0. Two-Year Warranty and Restored Exchange Parts

Reference Designation	Description	Two-Year Warranty	Restored Exchange Part
A12	YIG Oscillator	Yes	Yes
A14	RF Amplifier	Yes	Yes
A17	Modulator Mixer	Yes	Yes
DC1	Detector	Yes	No

UPDATES, (Cont'd)

Page 6-5, Table 6-3:
Change A1J1 HP and Mfr. Part Number 1251-5926 CD 3 (recommended replacement).
Change A1RPG1 part number to 0960-0683, CD 1 (recommended replacement).

Page 6-6, Table 6-3:
Change A2J1 and A3J1 HP and Mfr. Part Number to 1251-5926 CD 3 (recommended replacement).
Change A3 to 83525-60080 CD 6, DIGITAL INTERFACE ASSEMBLY does not include A3U1 and A3U2).

Page 6-7, Table 6-3:
Change A3U1 to A3U1/A3U2 (not separately replaceable), part number 83525-60074 CD 8, EPROM Replacement Kit (recommended replacement).
Change A3XU1 and A3XU2 to part number 1200-0541 CD 1, SOCKET-IC 24-CONT DIP DIP-SLDR.

Page 6-8, Table 6-3:
Change A4R50 to HP Part Number 0698-7274 CD 3, RESISTOR 38.3K, Mfr. Part Number C3-1/8-TO-3832-G.

Page 6-15, Table 6-3:
Change A7R48 to HP and Mfr. Part Number 0698-3457, CD 6, 316K (recommended replacement).

Page 6-18, Table 6-3:
Change A10J3 to HP and Mfr. Part Number 1251-3196, CD 5.

Page 6-19, Table 6-3:
Change MP2 Part Number to 83522-20028, CD 5.
Change MP27 to HP and Mfr. Part Number 0050-2032, CD 9.

Page 6-20, Table 6-3:
Change the CD number to W32 to 6.

Page 6-20, Table 6-3:
Change A19 to HP and Mfr. Part Number 83525-60096, CD 4.

Page 8-35:
Add *Table 8-8* from this document, adjacent to Figures 8-22 and 8-23.

Page 8-45, Figure 8-35:
In Block **E LOG AMPLIFIER** change the value of R50 to 38.3K.

Page 8-63, Figure 8-60:
Change Block I U11A PIN 13 voltage supply to +15VF.
Delete the "OW" in (LOW = −10V) in block J at P1-40.

5-24. ALC GAIN ADJUSTMENT (UPDATES)

NOTE

Complete adjustment of the leveling loop requires several procedures to be performed in the order prescribed, from Paragraph 5-20 through 5-24. Deviation from this routine may cause improper leveling and/or flatness problems.

REFERENCE:

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

DESCRIPTION:

A4R15 in the input leg of A4U9 adjusts the gain of the Main ALC Amplifier. A4R15 is adjusted for maximum possible gain without producing oscillations.

EQUIPMENT

Function Generator	HP 3312A
Oscilloscope	HP 1740A
Detector	HP 8473C
10 dB Attenuator	HP 8491A Option 010

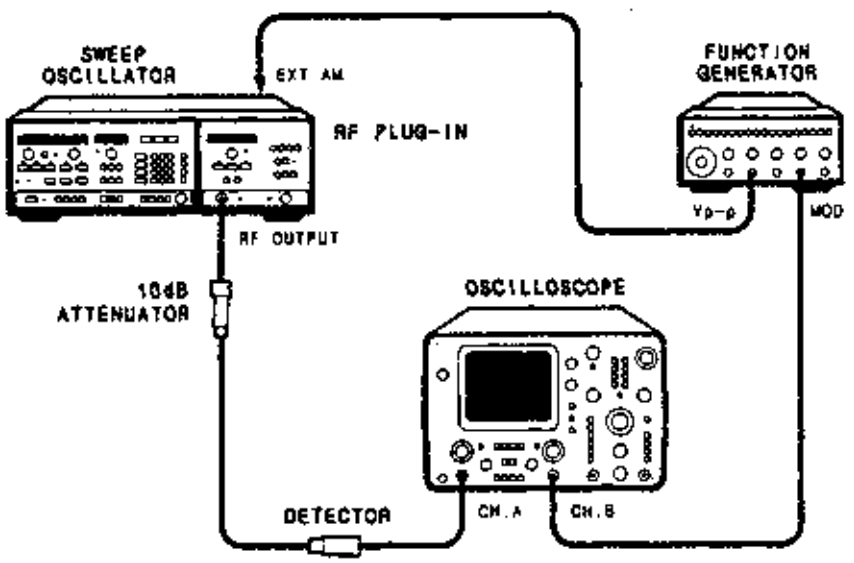


Figure 5-25. ALC Gain Adjustment Test Setup

5-24. ALC GAIN ADJUSTMENT (UPDATES) (Cont'd)

NOTE

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

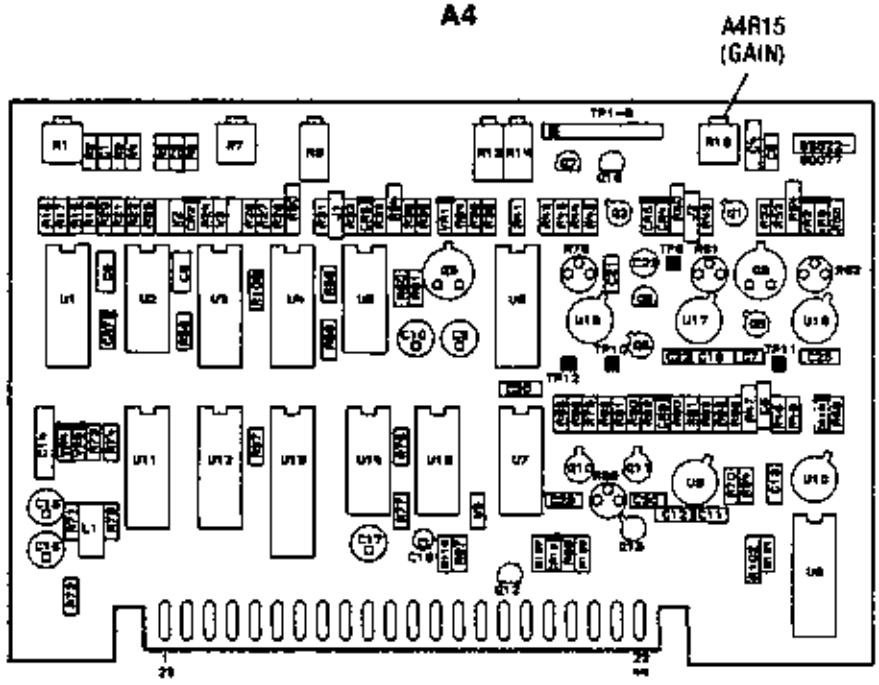


Figure 5-26. ALC Gain Adjustment Location

PROCEDURE:

1. Connect Vp-p output on HP 3312A to 1740 CHANNEL A INPUT.
2. Set instrument controls as follows:

8350A/B SWEEP OSCILLATOR

START ..... 10 MHz
STOP ..... 8.4 GHz
SWEEP MODE ..... MANUAL

83522A RF PLUG-IN

POWER LEVEL ..... −2 dB
ALC ..... INT

3312A FUNCTION GENERATOR

MODULATION ..... SWP
MODULATION RANGE Hz (KNOB) 0
VERNIER 0
FUNCTION ..... [~]
RANGE Hz (BUTTON) 100K
FREQUENCY 5
AMPLITUDE 1
VERNIER 1

5-24. ALC GAIN ADJUSTMENT (UPDATES) (Cont'd)

1740A OSCILLOSCOPE

MODE ..... MAIN
CHANNEL A INPUT ..... AC
CHANNEL A V/DIV ..... ½V
CHANNEL B INPUT ..... DC
CHANNEL B V/DIV 1V
DISPLAY ..... A

3. Adjust 1740A vertical and horizontal position knobs for waveform at the center of oscilloscope CRT. Adjust START knob, below SWP button, for 10 kHz as displayed on oscilloscope. Turn MODULATION RANGE Hz to 100 and VERNIER to 10K.
4. Connect equipment as shown in Figure 5-25.
5. On 1740A select A vs B MODE and set CHANNEL A to .005/DIV.
6. Adjust the far left side of the signal for 2 divisions pk-pk by using the CAL on the CHANNEL A knob.
7. While monitoring CHANNEL A, manually sweep the entire plug-in frequency range and adjust the ALC "GAIN" (A4R15) for 4 divisions of peaking at the plug-in frequency where the highest gain peaking occurs. (See Figure 5-26a)

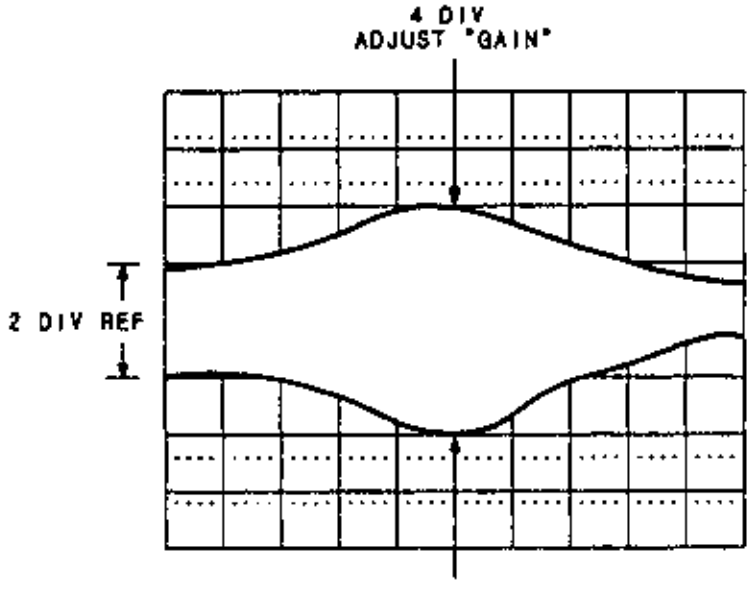


Figure 5-26a. ALC Gain Adjusted Correctly (Worst Case)

5-27. MARKER AND SAMPLER ADJUSTMENTS (UPDATES)

NOTE

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

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.

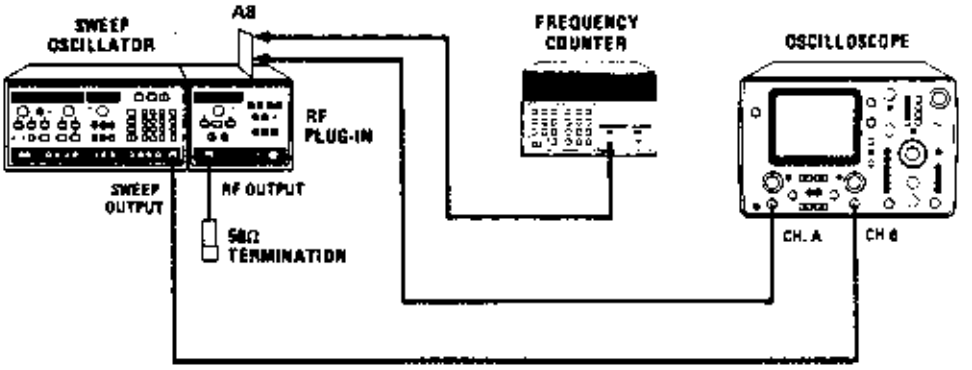


Figure 5-32. Marker Adjustments Test Setup

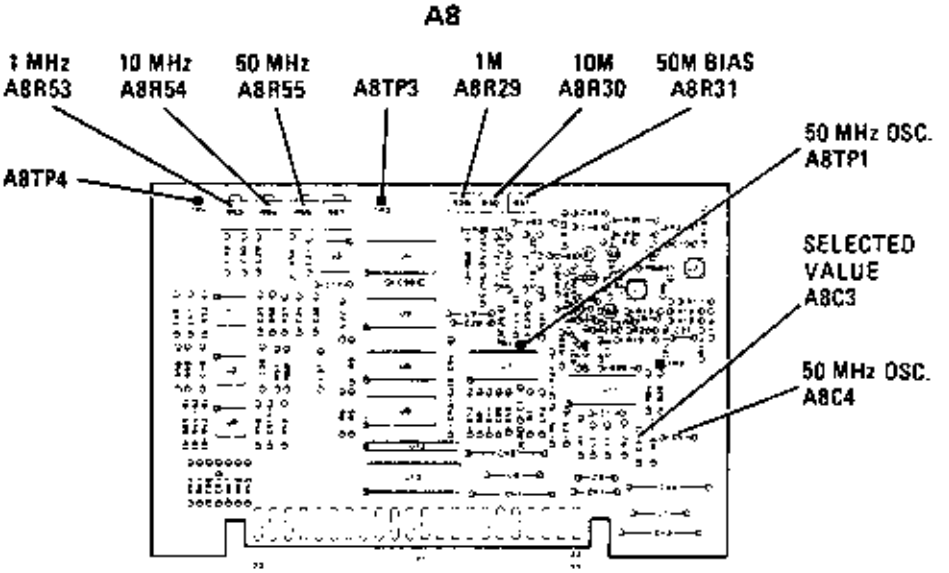


Figure 5-33. Marker Adjustments on A8

5-27. MARKER AND SAMPLER ADJUSTMENTS (UPDATES) (Cont'd)

EQUIPMENT:

FREQUENCY COUNTER	HP 536A
OSCILLOSCOPE	HP 436A

PROCEDURE:

NOTE

Turn ac power off when removing or installing PC boards.

1. Place A8 assembly on extender board. Connect equipment as shown in Figure 5-32. For all adjustments and test point locations refer to Figure 5-33 Marker Adjustments on A8 or Figure 5-36 Marker Adjustments on A7. Terminate 83522A RF output in 50 Ohms. Set 1740A oscilloscope to A vs B sweep mode to obtain horizontal deflection as a function of the 8350A/B SWEEP OUT.

2. Set 8350A/B START/STOP sweep for 10 MHz to 2.0 GHz. Select 83522A AMPTD MARKERS. Connect counter with 1:1 capacitive probe to A8TP1. Adjust A8C4 start for frequency counter indication of 50 MHz ±250Hz. 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 100ms Sweep Time. Connect oscilloscope with 1:1 capacitive probe to A8TP4. Set 8350A/B power to +13 dBm and select 1 MHz Markers. Adjust A8R29 for the flattest envelope height (See Figure 5-34). Select 10 MHz Markers. Adjust A8R30 for the flattest envelope height. Select 50 MHz Markers. (This waveform appears like a comb.) Adjust A8R31 for the flattest envelope height. (Optimum setting for these adjustments will be ones that provide the most uniform height across the band. Especially note height at the high-frequency end and set the adjustment just before the slight rise drops off.)

4. Set RF POWER to 0 dBm. Adjust IF gain potentiometers for each marker frequency to an average envelope height of 1.5 V p-p.

5. Adjust oscilloscope Channel B vernier for a horizontal deflection of exactly 10 divisions. Set 8350A/B CF=1GHz, ΔF=10 MHz. Select 50 MHz Markers. Center the birdie envelope on the screen with plug-in front panel FREQ CAL control. (See Figure 5-35.) Then select 10 MHz Markers. Change ΔF to 1 MHz. Recenter birdie. Display is now calibrated for 100 kHz/Division.

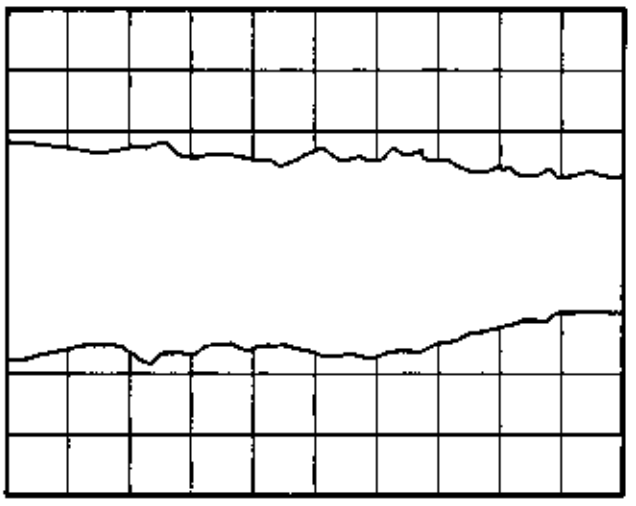


Figure 5-34. 10 MHz Marker Envelope at A8TP4

5-27. MARKER AND SAMPLER ADJUSTMENTS (UPDATES) (Cont'd)

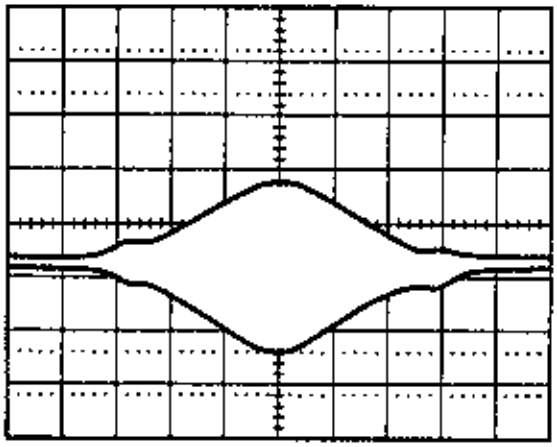


Figure 5-35. 50 MHz Birdie

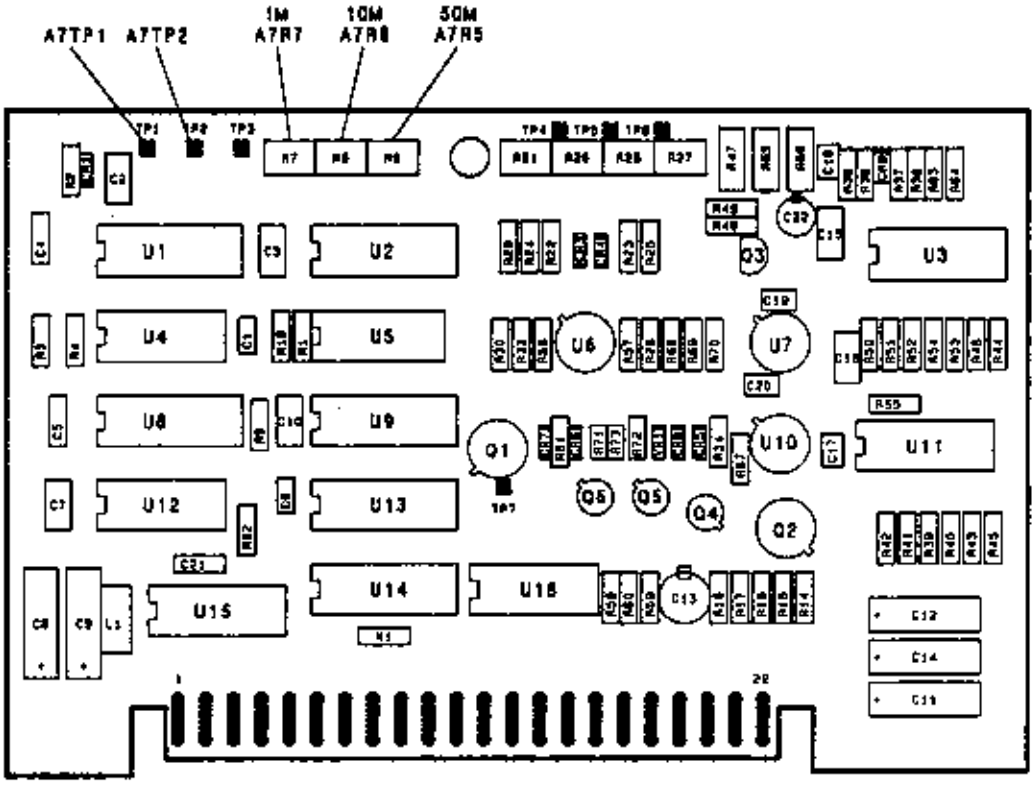


Figure 5-36. Marker Adjustments on A7

5-27. MARKER AND SAMPLER ADJUSTMENTS (UPDATES) (Cont'd)

6. Connect scope probe to A7TP1. Adjust A7 marker threshold potentiometers for the proper pulse width of each marker as follows:

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 5-37.) 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 5-38 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.)

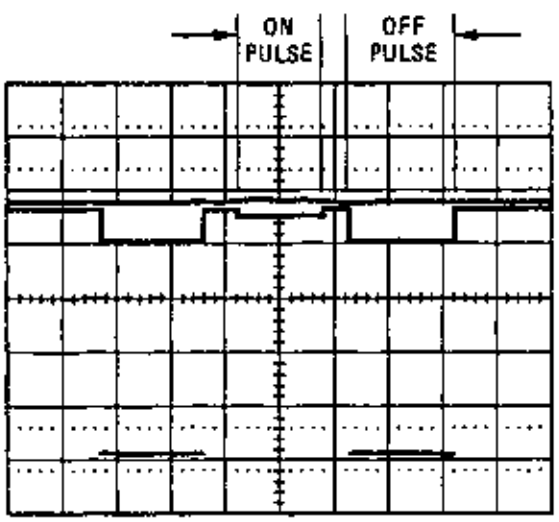


Figure 5-37. On/Off Pulse of Correctly Adjusted Circuit

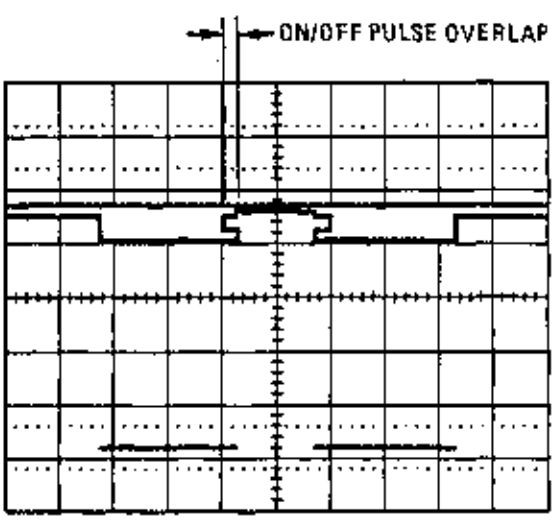


Figure 5-38. On/Off Pulse of Misadjusted Circuit Showing Overlap

5-27A. MARKER GAIN ADJUSTMENT (Fine Tune) (UPDATES)

REFERENCE:

SERVICE SHEET: A8.

DESCRIPTION:

Fine tune adjustments of gain peak markers and eliminate unwanted glitches between markers.

EQUIPMENT:

Function Generator	HP 3312A
Swept Amplitude Analyzer	HP 8755C
Detector	HP 11664B
10 dB Attenuator	HP 8491B Opt. 010
Oscilloscope	HP 1740A

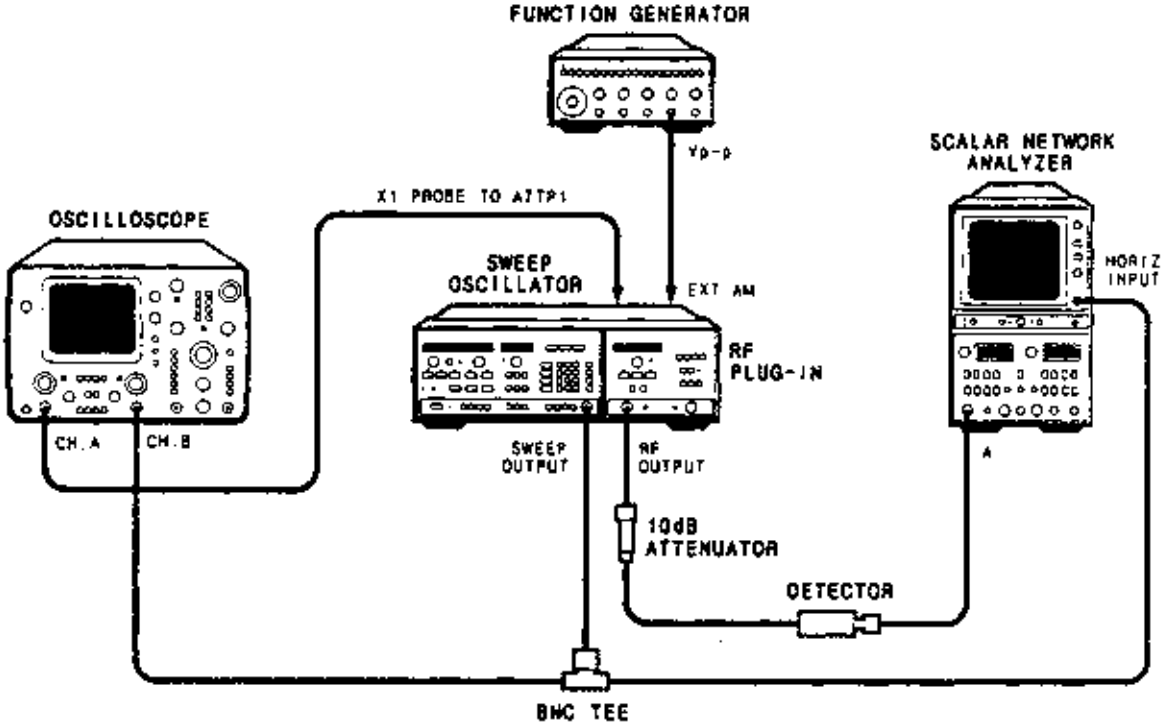


Figure 5-38a. Marker Gain (Fine Tune) Adjustments Test Setup

PROCEDURE:

1. Connect equipment as shown in Figure 5-38a.
2. Set instrument controls as follows:

8350A/B SWEEP OSCILLATOR

CF	15 MHz
CF STEP SIZE	10 MHz
ΔF	10 MHz
[⊔⊓MOD]	ON
SWEEP TIME	17 ms

83522A RF PLUG-IN

POWER LEVEL	9 dBm
MARKERS	AMPTD 1 MHz

5-27A. MARKER GAIN ADJUSTMENT (Fine Tune) (UPDATES) (Cont'd)

3312A FUNCTION GENERATOR

SINE WAVE ..... ON
AMPLITUDE ..... 10 V P-P
FREQUENCY ..... 5 Hz

8755C SWEPT AMPLITUDE ANALYZER

DB/DIV ..... 5 dB
REFERENCE LEVEL ..... −2 dB
VERNIER ..... OFF

PROCEDURE:

3. On the HP 8755C, observe the 1 dB markers riding on a varying power level. Press CF ↑ to step through the band (10 MHz-2.0 GHz). If the markers seem weak, ragged, or start flashing between markers (see Figure 5-38b), adjust gain (A8R53). However, be aware that these adjustments can create double markers or degradation of off pulses. (1 MHz markers are only specified to 1 GHz CF, ie., correctly adjusted, they may start disappearing or having double markers beyond 1 GHz).
4. Iterate Step 3 for 10 MHz markers with CF = 60 MHz, CF STEP SIZE = 100 MHz, ΔF = 100 MHz and the gain adjustment of A8R54.
5. Reiterate Step 3 for 50 MHz markers with CF = 260 MHz, CF STEP SIZE = 500 MHz, ΔF = 500 MHz and the gain adjustment of A8R55.

HP 8755C Display of 1 MHz MKR's

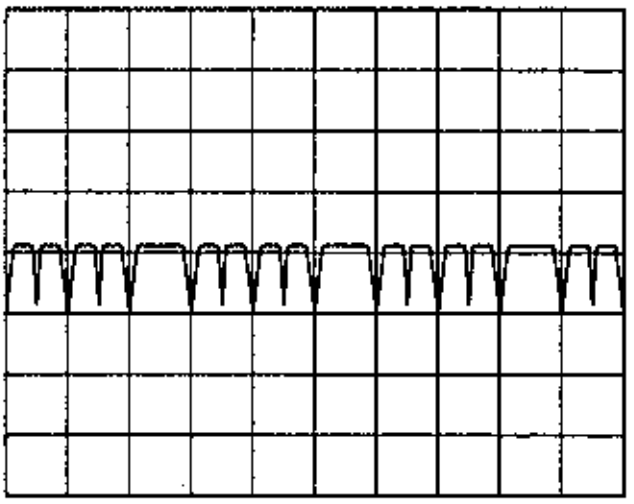


Figure 5-38b. Markers incorrectly adjusted

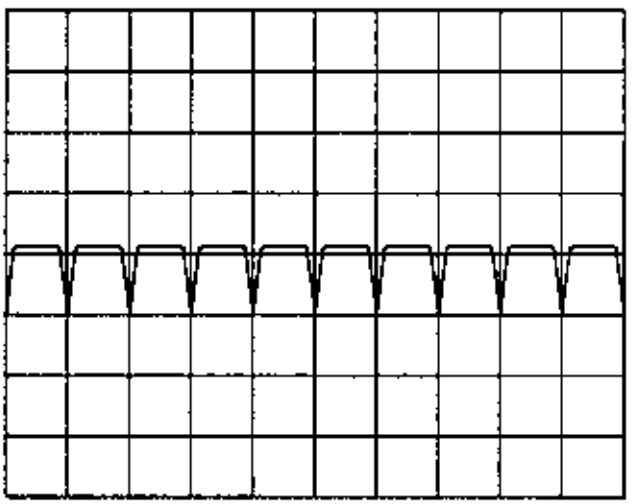


Figure 5-38c. Markers correctly adjusted

5-28. EXTERNAL MARKER ADJUSTMENT (UPDATES)

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 HP 8755C with external markers, factory select resistor A8R28 reduces the feedthrough, but degrades internal markers.

EQUIPMENT:

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

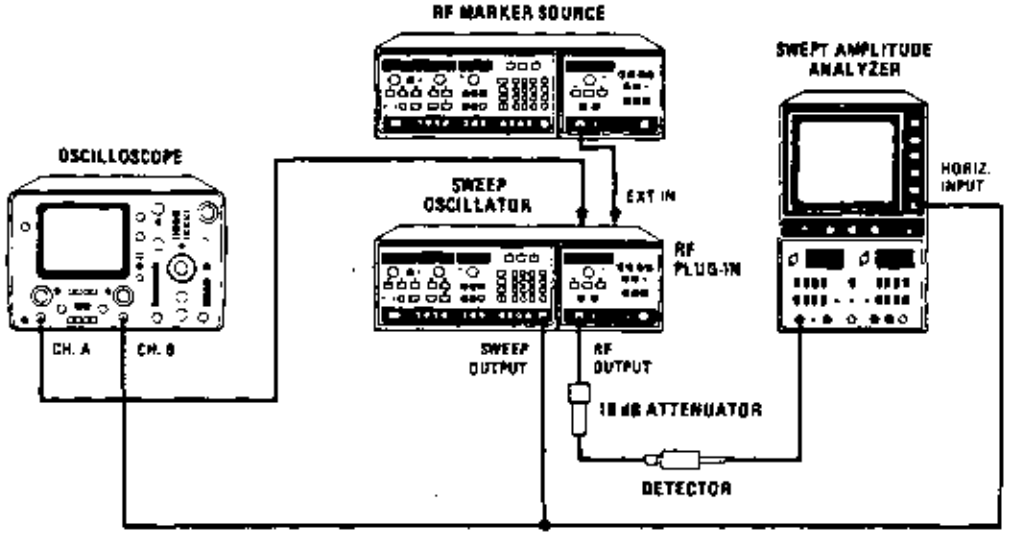


Figure 5-39. External Marker Adjustments Test Setup

PROCEDURE:

NOTE

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

1. Connect the equipment as shown in Figure 5-39. Set external marker source to a CW frequency of 150 MHz. Press AMPTD MKR. Set power level between −10 and +10 dBm.

5-28. EXTERNAL MARKER ADJUSTMENT (UPDATES) (Cont'd)

2. Set RF plug-in to be adjusted in EXT and AMPTD MKR MODES. On the 8350A/B select a START frequency = 50 MHz, STOP frequency = 250 MHz, and a sweep speed = 17 ms.

3. Connect oscilloscope probe to A8TP4 (Figure 5-40). Observe the birdie amplitude and adjust EXT GAIN (A8R67) for 1.5V p-p.

4. Turn HP 8350A/B ⊔⊓ MOD on and check for a single marker on the HP 8755C. The 27.8 kHz feedthrough signal at the output of A8Q2 may cause a problem in detecting a marker. If the marker does not appear on the HP 8755C, go to step 5.

5. 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/B 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.

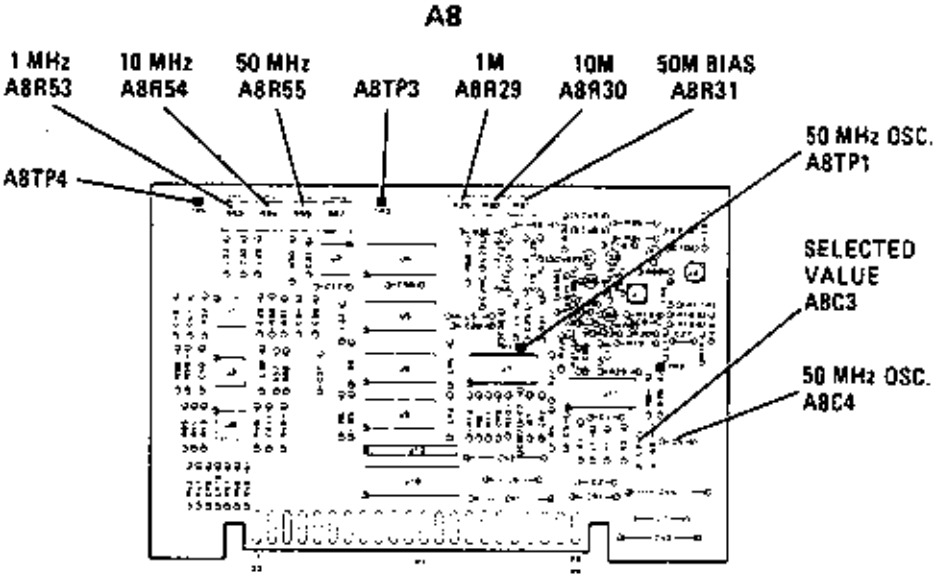


Figure 5-40. External Marker Adjustments Location

CHANGE 1

The 64-pin rear connector cable assembly W32 is now soldered (instead of crimped, to minimize the possibility of intermittent open contacts. The part number remains unchanged.

CHANGE 2

This change replaces the A5 FM Driver assembly.

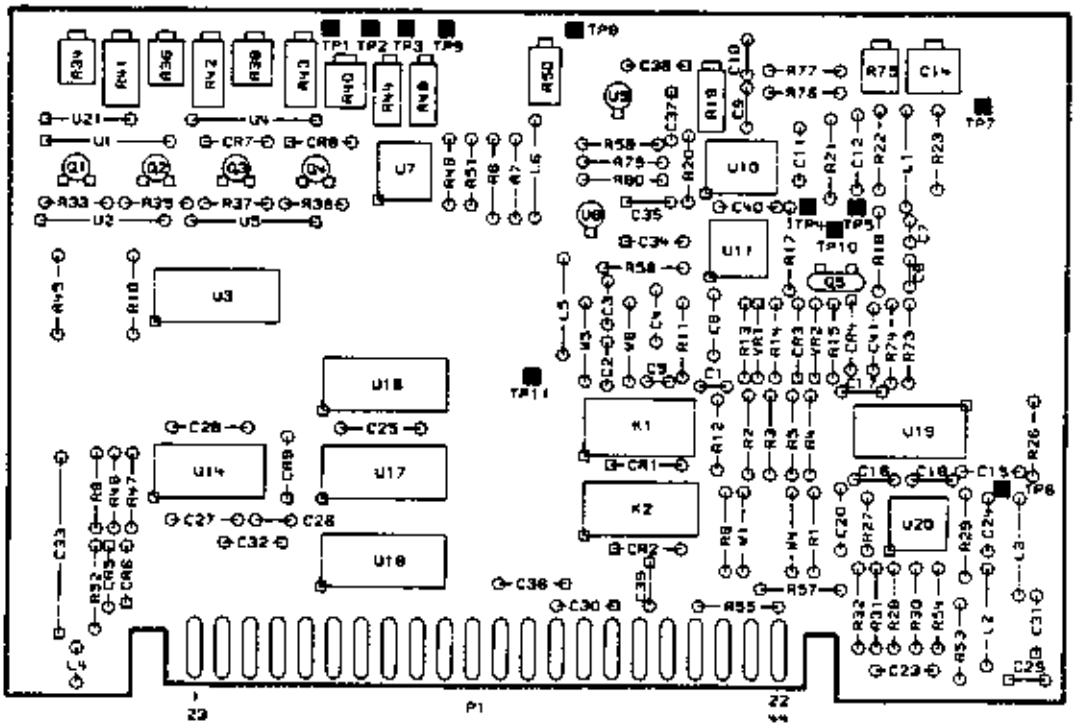
Page 6-9, Table 6-3:
Change the A5 Assembly HP and Mfr. Part Number to 83525-60043, CD 1.

Page 6-11, Table 6-3:
Add A5R79, HP Part Number 0757-0403, CD 2, RESISTOR 121 1% .125W F TC=0 ± 100, Mfr. Code 24546, Mfr. Part Number C4-1/8-TO-121 R-F.
Add A5 R80, HP Part Number 0698-0082, CD 7, RESISTOR 464 1% .125W F TC=0 ± 100, Mfr. Code 24546, Mfr. Part Number C4-1/8-TO-4640-F.

Page 8-51, Figure 8-40:
Replace Figure 8-40 with *A5 FM Driver, Component Locations (CHANGE 2)* from this document.

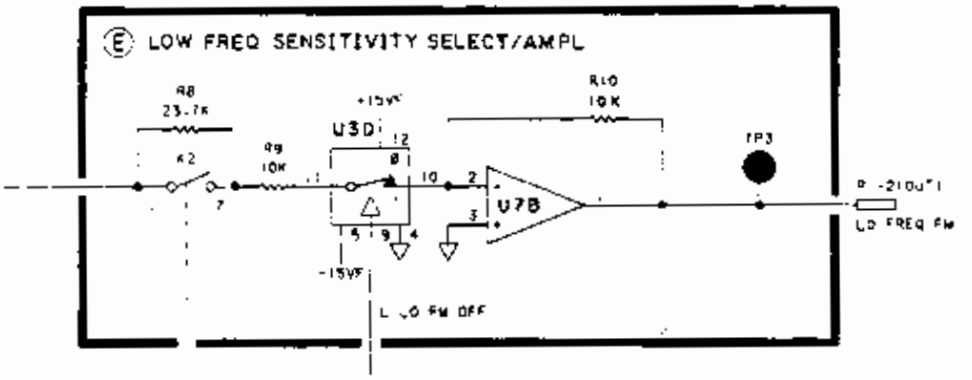
Page 8-51, Figure 8-43:
Change the A5 FM DRIVER part number in the top left-hand corner of the A5 Schematic to 83525-60043.
Change the SERIAL PREFIX in the bottom left-hand corner of the page to 2202A.
Replace blocks E and J with blocks E and J labeled *P/O A5 FM Driver, Schematic Diagram (CHANGE 2)* from this document.

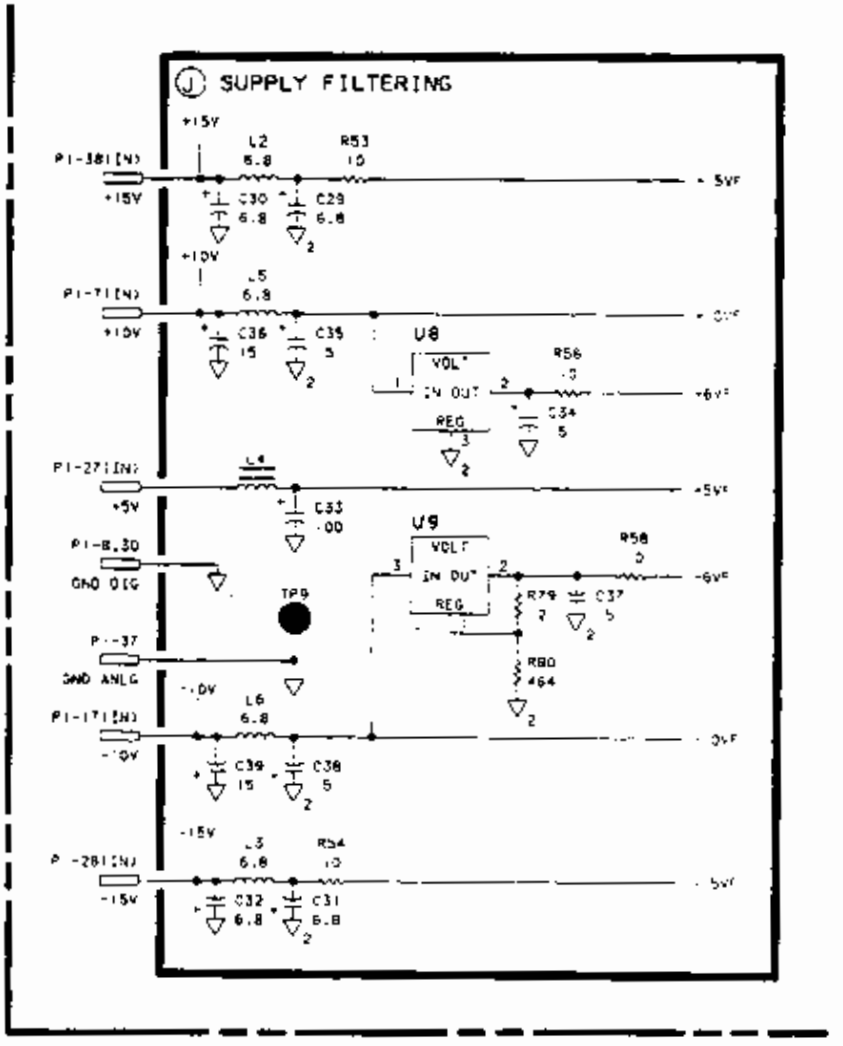
A5



HP P/N 83525-60043

A5 FM Driver, Component Locations (CHANGE 2)





SERIAL PREFIX: 2202A

P/O A5 FM Driver, Schematic Diagram (CHANGE 2)

CHANGE 3

This change replaces the A2 Front Panel Interface.

Page 6-5, Table 6-3:
Change A2 to HP and Mfr. Part Number 83525-60060, CD 2.

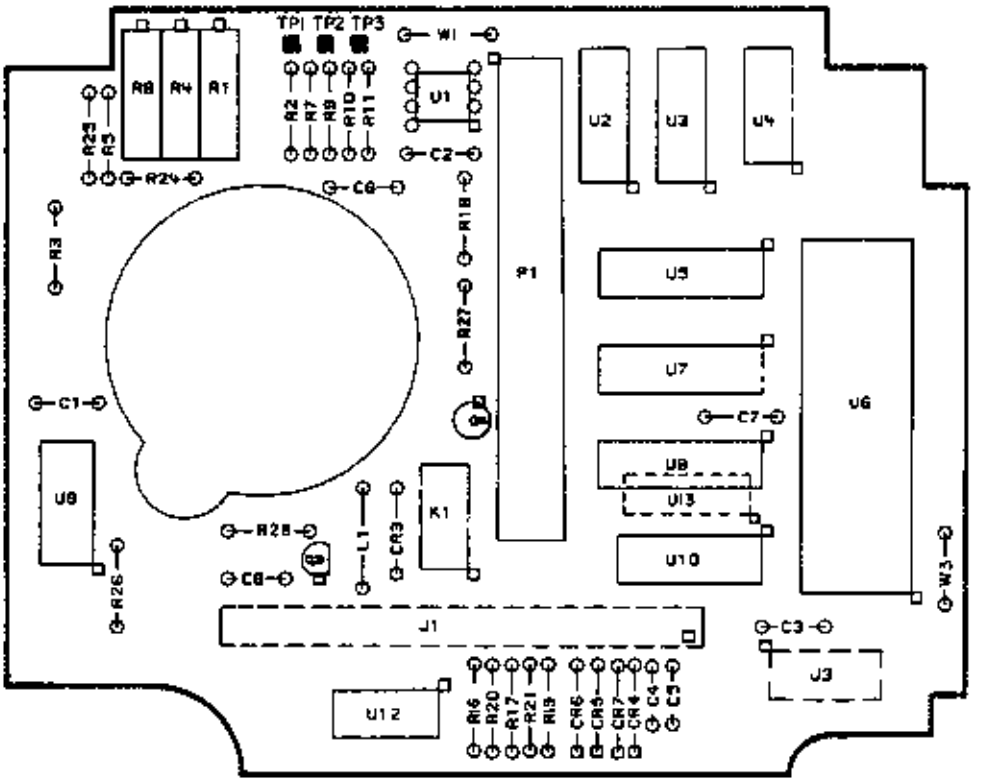
Page 6-6, Table 6-3:
Change A2J1 to HP and Mfr. Part Number 1251-5926, CD 3.
Add A2C8, 0160-3875, Qty 1, CD 3, CAPACITOR-FXD 22PF ±5% 200VDC CER 0±30, 28480, 0160-3875.
Add A2Q4, 1854-0477, Qty 1, TRANSISTOR NPN SI CHIP FT=1.3 GHZ, 02037, SMCS1005.
Add A2R26, 0698-7229, CD 8, Qty 1, RESISTOR 511 1% .05 W F TC=0±100, 24546, C3-1/8-TO-511R-G.
Add A2R27, 0698-7260, CD 7, RESISTOR 10K 1% .05W F TC=0±100, 24546, C3-1/8-TO-1002-G.
Add A2R28, 0698-7205, CD 0, Qty 1, RESISTOR 51.1 OHMS 1% .05W F TC=0±100, 03292, C3-1/8-TO-51R1-F.
Change the Qty for A2U2 to 2.
Change the Qty for A2U5 to 9.
Change A2U8 to 1820-1730, CD 6, IC FF TTL LS D-TYPE POS-EDGE-TRIG COM, 01295, SN74LS273N.
Change A2U10 to 1858-0069, Qty 1, CD 1, TRANSISTOR ARRAY 18-PIN PLSTC DIP, 13606, ULN-2803A.
Add A2W3, 8159-0005, Qty 1, CD 0, RESISTOR-ZERO OHMS 22AWG LEAD DIA, 28480, 8159-0005.

Page 8-31, Figure 8-12:
Replace the FRONT Component Locations diagram with the *A2 Front Panel Interface, Component Locations (CHANGE 3)* diagram from this document.

Page 8-31, Figure 8-13:
Delete the REAR Component Locations diagram.

Note that the potentiometers R1, R4, R6, and R23 have been moved from the circuit side of the board and are now mounted on the component side. J1, J3, and U13 are mounted on the circuit side.

Page 8-31, Figure 8-19:
Change the A2 FRONT PANEL INTERFACE part number in the top left-hand corner of the A2 Schematic to 83525-60060.
Change the SERIAL PREFIX in the bottom left-hand corner of the page to 2205A.
Replace blocks A and G with the partial schematic *P/O A2 Front Panel Interface, Schematic Diagram (CHANGE 3)* from this document.

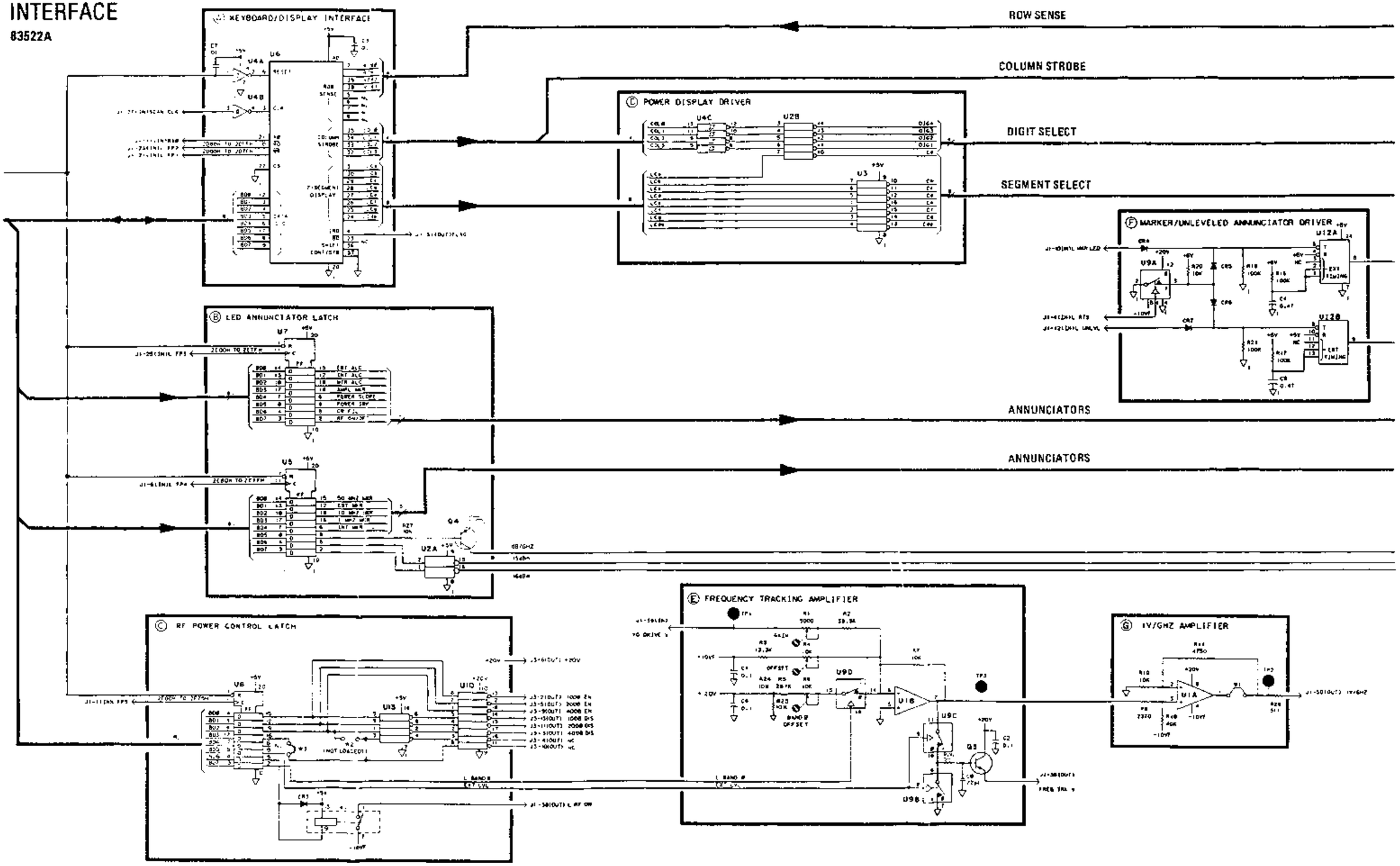


HP P/N 83525-60060

A2 Front Panel Interface Component Location (CHANGE 3)

INTERFACE

83522A



P/O A2 Front Panel Interface, Schematic Diagram (CHANGE 3)

CHANGE 4

This change replaces the A4 ALC Assembly, and documents a change on the Front Panel.

Page 6-5, Table 6-3:
Change A1R3 and A1R4 to HP and Mfr. Part Number 2100-4022, CD 0.

Pages 6-7 to 6-9:
Replace A4 83522-60006 BOARD ASSEMBLY - ALC and its components with the A4 83522-60061 **ALC BOARD ASSEMBLY** parts list in this document.

Page 8-45, Figure 8-30:
Replace the Component Locations Diagram with *Figure 8-30. ALC Component Locations (CHANGE 4)* from this document.

Page 8-45, Figure 8-35:
Replace the A4 Schematic Diagram with *Figure 8-35. A4 ALC Schematic Diagram* from this document.

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A4	83522--60061	0	1	ALC BOARD ASSEMBLY	28480	83522--60061
A4C1	0160--0127	2	2	CAPACITOR--FXD 1UF +20% 25VDC CER	28480	0160--0127
A4C2	0180--0374	3	4	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	3	CAPACITOR--FXD .01UF +20% 100VDC CER	28480	0160--3879
A4C7	0160--4084	8	10	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	1	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		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	1	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		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	2	CAPACITOR--FXD 220PF +20% 100VDC CER	20932	5024EM100RD221M
A4C19	0160--0572	1	1	CAPACITOR--FXD 2200PF +20% 100VDC CER	28480	0160--0572
A4C20	0160--0574	3	1	CAPACITOR--FXD .022UF +20% 100VDC CER	28480	0160--0574
A4C21	0160--0128	3	1	CAPACITOR--FXD 2.2UF +20% 50VDC CER	28480	0160--0128
A4C22	0160--3534	1	1	CAPACITOR--FXD 510 ±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
A4C26	0160--3875	3	1	CAPACITOR--FXD 22PF ±5% 200VDC CER 0±30	28480	0160--3875
A4C27	0160--4084	8		CAPACITOR--FXD .1UF +20% 50VDC CER	28480	0160--4084
A4C29	0160--4084	8		CAPACITOR--FXD .1UF +20% 50VDC CER	28480	0160--4084
A4C33	0160--0570	9		CAPACITOR--FXD 220PF +20% 100VDC CER	20932	5024EM100RD221M
A4CR2	1901--1098	1	9	DIODE--SWITCHING 1N4150 50V 200MA 4NS	9N171	1N4150
A4CR4	1901--0535	9	2	DIODE--SM SIG SCHOTTKY	28480	1901--0535
A4CR5	1901--1098	1		DIODE--SWITCHING 1N4150 50V 200MA 4NS	9N171	1N4150
A4CR6	1901--1098	1		DIODE--SWITCHING 1N4150 50V 200MA 4NS	9N171	1N4150
A4CR7	1901--1098	1		DIODE--SWITCHING 1N4150 50V 200MA 4NS	9N171	1N4150
A4CR9	1901--1098	1		DIODE--SWITCHING 1N4150 50V 200MA 4NS	9N171	1N4150
A4CR11	1901--1098	1		DIODE--SWITCHING 1N4150 50V 200MA 4NS	9N171	1N4150
A4CR12	1901--0535	9		DIODE--SM SIG SCHOTTKY	28480	1901--0535
A4CR16	1901--1098	1		DIODE--SWITCHING 1N4150 50V 200MA 4NS	9N171	1N4150
A4CR17	1901--0518	8	1	DIODE--SM SIG SCHOTTKY	28480	1901--0518

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A4J1	1258--0124	7	2	PIN--PROGRAMING DUMPER .3Ø CONTACT	91506	8136--475G1
A4J2	1258--0124	7		PIN--PROGRAMING DUMPER .3Ø CONTACT	91506	8136--475G1
A4L1	9140--0210	1	2	INDUCTOR RF--CH--MLD 100UH 5% .166DX.385LG	28480	9140--0210
A4L2	9100--2474	9	1	INDUCTOR RF--CH--MLD 5.6UH 1% .166DX.385LG	28480	9100--2474
A4L3	9140--0210	1		INDUCTOR RF--CH--MLD 100UH 5% .166DX.385LG	28480	9140--0210
A4MP1	5040--6848	7	1	BOARD EXTRACTOR--YELLOW	28480	5040--6848
A4MP2	5000--9043	6	1	PIN	28480	5000--9043
A4MP3	1251--4932	9	4	CONNECTOR--SGL CONT SKT .021--IN--BSC--SZ	91506	LSG--1AG14--1
A4MP4	7121--3538	0	1	LABEL--IN 83525	28480	7121--3538
A4MP5	7121--3315	1	1	LABEL--IN 60063	28480	7121—3315
A4Q1	1855--0420	2	1	TRANSISTOR J--FET 2N4391 N--CHAN D--MODE	01295	2N4391
A4Q2	1854--0295	7	2	TRANSISTOR--DUAL NPN PD=400MW	28480	1854--0295
A4Q3	1855--0414	4	1	TRANSISTOR J--FET 2N4393 N--CHAN D--MODE	04713	2N4393
A4Q6	1854--0295	7		TRANSISTOR--DUAL NPN PD=400MW	28480	1854—0295
A4Q7	1855--0423	5	5	TRANSISTOR MOSFET N--CHAN E--MODE	17856	VN10KM
A4Q8	1855--0423	5		TRANSISTOR MOSFET N--CHAN E--MODE	17856	VN10KM
A4Q9	1853--0451	5	2	TRANSISTOR PNP 2N3799 SI TO--18 PD=360MW	01295	2N3799
A4Q13	1854--0404	8	1	TRANSISTOR NPN SI TO--18 PD=360MW	28480	1854--0404
A4Q14	1853--0007	7	1	TRANSISTOR PNP 2N3251 SI TO--18 PD=360MW	04713	2N3251
A4Q15	1855--0423	5		TRANSISTOR MOSFET N--CHAN E--MODE	17856	VN10KM
A4Q17	1855--0423	5		TRANSISTOR MOSFET N--CHAN E--MODE	17856	VN10KM
A4R1	2100--2633	5	2	RESISTOR--TRMR 1K 10% C SIDE--ADJ 1—TRN	30983	ET50X102
A4R2	2100--2516	3	1	RESISTOR--TRMR 100K 10% C SIDE--ADJ 1--TRN	32997	3329W--1--104
A4R4	2100--2489	9	1	RESISTOR--TRMR 5K 10% C SIDE--ADJ 1—TRN	30983	ET50X502
A4R6	2100--3611	1		RESISTOR--TRMR 50K 10% C SIDE--ADJ 17--TRN	32997	3292X--1--503
A4R7	2100--0670	6	2	RESISTOR--TRMR 10K 10% C SIDE--ADJ 17--TRN	32997	3292X--1--103
A4R9	2100--3749	6	1	RESISTOR--TRMR 5K 10% C SIDE--ADJ 17--TRN	28480	2100--3749
A4R10	0757--0416	7	1	RESISTOR 511 1% .125W F TC=0+100	24546	C4--1/8--T0--511R--F
A4R11	2100-2489	9		RESISTOR-TRMR 5K 10% C SIDE-ADJ 1-TRN	32997	3329W-1-502
A4R12	0698--7257	2	2	RESISTOR 7.5K 1% .05W F TC=0+100	24546	C3--1/8--T0--7501--F
A4R13	0698—7258	3	2	RESISTOR 8.25K 1% .05W F TC=0+100	24546	C3--1/8--T0--8251--F
A4R14	0698--7251	6	2	RESISTOR 4.22K 1% .05W F TC=0+100	24546	C3--1/8--T0--4221--F
A4R15	0698--7236	7	2	RESISTOR 1K 1% .05W F TC=0+100	24546	C3--1/8--T0--1001--F
A4R16	0698--7268	5	2	RESISTOR 21.5K 1% .05W F TC=0+100	24546	C3--1/8--T0--2152--F
A4R17	0698--7253	8	3	RESISTOR 5.11K 1% .05W F TC=0+100	24546	C3--1/8--T0--5111--F
A4R18	0698--7268	5		RESISTOR 21.5K 1% .05W F TC=0+100	24546	C3--1/8--T0--2152--F
A4R19	0698--7260	7	4	RESISTOR 10K 1% .05W F TC=0+100	24546	C3--1/8--T0--1002--F
A4R20	0698--7263	0	1	RESISTOR 13.3K 1% .05W F TC=0+100	24546	C3--1/8--T0--1332--F
A4R21	0698--7274	3	1	RESISTOR 38.3K 1% .05W F TC=0+100	24546	C3--1/8--T0--3832--F
A4R22	0698--7261	8	2	RESISTOR 11K 1% .05W F TC=0+100	24546	C3--1/8--T0--1102--F
A4R23	0757--0464	5	1	RESISTOR 90.9K 1% .125W F TC=0+100	24546	C4--1/8--T0--9092--F

A4 Replaceable Parts (CHANGE 4) (2 of 5)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A4R24	0698--7266	3	1	RESISTOR 17.8K 1% .05W F TC=0+100	24546	C3--1/8--T0--1782--F
A4R27	0698--7260	7		RESISTOR 10K 1% .05W F TC=0+100	24546	C3--1/8--T0--1002--F
A4R28	0698--7227	6	1	RESISTOR 422 1% .05W F TC=0+100	24546	C3--1/8--T0--422R--F
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		RESISTOR 10K 1% .05W F TC=0+100	24546	C3--1/8--T0--1002--F
A4R31	0837--0119	7	1	THERMISTOR 5K OHM TC+.7%	28480	0837--0119
A4R32	0698--7259	4	3	RESISTOR 9.09K 1% .05W F TC=0+100	24546	C3--1/8--T0--9091--F
A4R33*	0698--7272	1	2	RESISTOR 31.6K 1% .05W F TC=0+100	24546	C3--1/8--T0--3162--F
A4R34	0698--7233	4	1	RESISTOR 750 1% .05W F TC=0+100	24546	C3--1/8--T0--750R--F
A4R35	0698--7243	6	5	RESISTOR 1.96K 1% .05W F TC=0+100	24546	C3--1/8--T0--1961--F
A4R38	0698--7212	9		RESISTOR 100 1% .05W F TC=0+100	24546	C3--1/8--T0--100R--F
A4R39	0698--7243	6		RESISTOR 1.96K 1% .05W F TC=0+100	24546	C3--1/8--T0--1961--F
A4R40	0698--7243	6		RESISTOR 1.96K 1% .05W F TC=0+100	24546	C3--1/8--T0--1961--F
A4R41	0698--7283	4	1	RESISTOR 98.9K 1% .05W F TC=0+100	24546	C3--1/8--T0--9892--F
A4R42	0698--7267	4	1	RESISTOR 19.6K 1% .05W F TC=0+100	24546	C3--1/8--T0--1962--F
A4R43	0698--7272	1		RESISTOR 31.6K 1% .05W F TC=0+100	24546	C3--1/8--T0--3162--F
A4R44	0698--7275	4	1	RESISTOR 42.2K 1% .05W F TC=0+100	24546	C3--1/8--T0--4222--F
A4R46	0698--7197	9	1	RESISTOR 23.7 1% .05W F TC=0+100	24546	C3--1/8--T0--23R7--F
A4R47	2100--2030	6	3	RESISTOR--TRMR 20K 10% C TOP--ADJ 1--TRN	73138	82PR20K
A4R48	0757--0421	4	1	RESISTOR 825 1% .125W F TC=0+100	24546	C4--1/8--T0--825R--F
A4R50	0698--7268	5	1	RESISTOR 21.5K 1% .05W F TC=0+100	24546	C3--1/8--T0--2152--F
A4R51	0698--7282	3	1	RESISTOR 82.5K 1% .05W F TC=0+100	24546	C3--1/8--T0--8252--F
A4R52	0698--7243	6		RESISTOR 1.96K 1% .05W F TC=0+100	24546	C3--1/8--T0--1961--F
A4R53	0698--7254	9	1	RESISTOR 5.62K 1% .05W F TC=0+100	24546	C3--1/8--T0--5621--F
A4R55	0698--7257	2		RESISTOR 7.5K 1% .05W F TC=0+100	24546	C3--1/8--T0--7501--F
A4R56	2100--2030	6		RESISTOR--TRMR 20K 10% C TOP--ADJ 1--TRN	73138	82PR20K
A4R57	0757--0280	3	3	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--F
A4R61	0698--7259	4		RESISTOR 9.09K 1% .05W F TC=0+100	24546	C3--1/8--T0--9091--F
A4R62	0698--7270	9	1	RESISTOR 26.1K 1% .05W F TC=0+100	24546	C3--1/8--T0--2612--F
A4R63	0757--0447	4	1	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--F
A4R66	0757--1094	9	1	RESISTOR 1.47K 1% .125W F TC=0+100	24546	C4--1/8--T0--1471--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--F
A4R69	0698--3440	7	4	RESISTOR 196 1% .125W F TC=0+100	24546	C4--1/8--T0--196R--F
A4R70	0698--7269	6	1	RESISTOR 23.7K 1% .05W F TC=0+100	24546	C3--1/8--T0--2372--F
A4R71	0698--0085	0	1	RESISTOR 2.61K 1% .125W F TC=0+100	24546	C4--1/8--T0--2611--F

A4 Replaceable Parts (CHANGE 4) (3 of 5)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A4R72	0757--0278	9	1	RESISTOR 1.78K 1% .125W F TC=0+100	24546	C4--1/8--T0--1781--F
A4R73	0698--7277	6	1	RESISTOR 51.1K 1% .05W F TC=0+100	24546	C3--1/8--T0--5112--F
A4R74	0698--7251	6		RESISTOR 4.22K 1% .05W F TC=0+100	24546	C3--1/8--T0--4221--F
A4R75	0698--3151	7	1	RESISTOR 2.87K 1% .125W F TC=0+100	24546	C4--1/8--T0--2871--F
A4R76	0698--3440	7		RESISTOR 196 1% .125W F TC=0+100	24546	C4--1/8--T0--196R--F
A4R77	0757--0274	5	1	RESISTOR 1.21K 1% .125W F TC=0+100	24546	C4--1/8--T0--1211--F
A4R78	0698--7234	5	1	RESISTOR 825 1% .05W F TC=0+100	24546	C3--1/8--T0--825R--F
A4R79	0757--0394	0	1	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	1	RESISTOR 6.81K 1% .05W F TC=0+100	24546	C3--1/8--T0--6811--F
A4R88	0698--7262	9	1	RESISTOR 12.1K 1% .05W F TC=0+100	24546	C3--1/8--T0--1212--F
A4R91	0698--7276	5	1	RESISTOR 46.4K 1% .05W F TC=0+100	24546	C3--1/8--T0--4642--F
A4R93	0698--7212	9		RESISTOR 100 1% .05W F TC=0+100	24546	C3--1/8--T0--100R--F
A4R94	0698--7253	8		RESISTOR 5.11K 1% .05W F TC=0+100	24546	C3--1/8--T0--5111--F
A4R95	0698--7222	1	1	RESISTOR 261 1% .05W F TC=0+100	24546	C3--1/8--T0--261R--F
A4R96	0698--3157	3	2	RESISTOR 19.6K 1% .125W F TC=0+100	24546	C4--1/8--T0--1962--F
A4R98	0837--0085	6	1	THERMISTOR ROD 680--OHM TC=+.7%/C--DEG	28480	0837--0085
A4R100	0757--0419	0	1	RESISTOR 681 1% .125W F TC=0+100	24546	C4--1/8--T0--681R--F
A4R104	0698--7253	8		RESISTOR 5.11K 1% .05W F TC=0+100	24546	C3--1/8--T0--5111--F
A4TP1	1251--4672	4	10	CONNECTOR 10--PIN M POST TYPE	28480	1251--4672
A4TP2	1251--4672	4		CONNECTOR 10--PIN M POST TYPE	28480	1251--4672
A4TP3	1251--4672	4		CONNECTOR 10--PIN M POST TYPE	28480	1251--4672
A4TP4	1251--4672	4		CONNECTOR 10--PIN M POST TYPE	28480	1251--4672
A4TP5	1251--4672	4		CONNECTOR 10--PIN M POST TYPE	28480	1251--4672
A4TP6	1251--4672	4		CONNECTOR 10--PIN M POST TYPE	28480	1251--4672
A4TP7	1251--4672	4		CONNECTOR 10--PIN M POST TYPE	28480	1251--4672
A4TP8	1251--4672	4		CONNECTOR 10--PIN M POST TYPE	28480	1251--4672
A4TP9	1251--4672	4		CONNECTOR 10--PIN M POST TYPE	28480	1251--4672
A4TP10	1251--4672	4		CONNECTOR 10--PIN M POST TYPE	28480	1251--4672
A4TP11	0360--0535	0	4	TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A4TP12	0360--0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
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 PKG	28480	1826--0261
A4U2	1826--0417	6	2	IC SWITCH ANLG QUAD 16--DIP--C PKG	27014	LF13333D
A4U3	1826--0616	7	1	IC OP AMP PRCN QUAD 14--DIP--C PKG	06665	OP--11EY
A4U4	1826--0610	1	2	IC MULTIPLXR 4--CHAN--ANLG DUAL 16--DIP--C	06665	MUX24FQ
A4U5	1826--0319	7	2	IC OP AMP LOW--BIAS--H--IMPD TO--99 PKG	04713	LF356G
A4U6	1826--0610	1		IC MULTIPLXR 4--CHAN--ANLG DUAL 16--DIP--C	06665	MUX24FQ
A4U7	1826--0447	2	1	IC OP AMP WB TO--99 PKG	27014	LF257H

A4 Replaceable Parts (CHANGE 4) (4 of 5)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A4U8	1826--0021	8	1	IC OP AMP GP TO--99 PKG	27014	LM310H
A4U9	1826--0417	6		IC SWITCH ANLG QUAD 16--DIP--C PKG	27014	LF13333D
A4U10	1820--1197	9	1	IC GATE TTL LS NAND QUAD 2--INP	01295	SN74LS00N
A4U11	1826--0319	7		IC OP AMP LOW--BIAS--H--IMPD TO--99 PKG	04713	LF356G
A4U12	1820--1216	3	1	IC DCDR TTL LS 3--TO--8--LINE 3--INP	01295	SN74LS138N
A4U13	1820--1730	6	1	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 PKG	24355	AD7542BD
A4U15	1826--0026	3	1	IC COMPARATOR PRCN TO--99 PKG	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--3070	5	2	DIODE--ZNR 4.22V 5% DO--35 PD=.4W	28480	1902--3070
A4VR5	1902--3070	5		DIODE--ZNR 4.22V 5% DO--35 PD=.4W	28480	1902--3070
A4W1	8159--0005	0	3	RESISTOR--ZERO OHMS 22 AWG LEAD DIA	28480	8159--0005
A4W2	8159--0005	0		RESISTOR--ZERO OHMS 22 AWG LEAD DIA	28480	8159--0005
A4W3	8159--0005	0		RESISTOR--ZERO OHMS 22 AWG LEAD DIA	28480	8159--0005

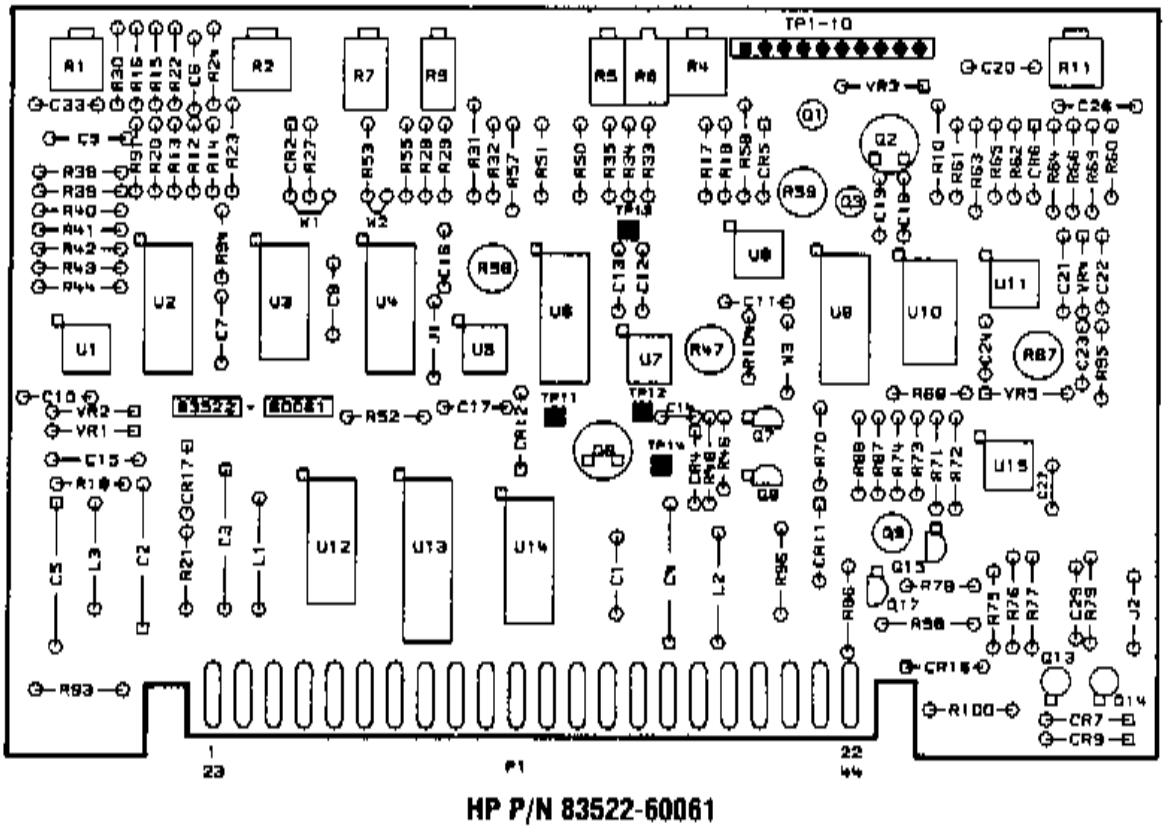
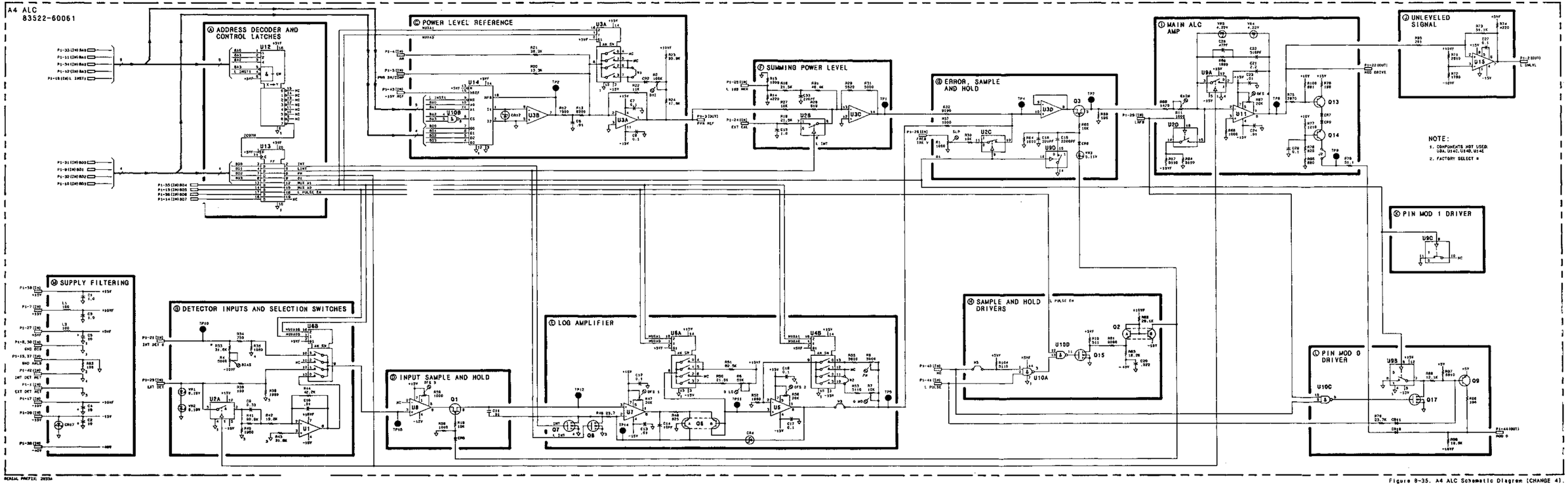


Figure 8-30. ALC Component Locations (CHANGE 4)



8CAIAL PREFIX: 2933A

Figure 8-35. A4 ALC Schematic Diagram (CHANGE 4).

CHANGE 5

This change adds two new SHIFT functions and updates the A3 Digital Interface Board with revised firmware (Revision 3).

Page 3-5, Figure 3-3, Front Panel Features:

Change step 18 to read:

"POWER SWEEP allows setting an increase in power per sweep (db/SWP). SHIFT POWER SWEEP (Option 002) latches the Step Attenuator at its current setting. Power level changes are controlled by the ALC loop."

Change step 20 to read:

"SLOPE allows setting of the frequency slope compensation in dB/GHz (for lossy devices). SHIFT SLOPE (Option 002) latches the ALC loop at its current reference level. Power level changes are controlled by the Step Attenuator in 10 dB steps."

Page 6-6, Table 6-3:

Change A3 Board Assembly-Digital Interface to HP and Mfr. Part Number 83525-60068, CD 0.

Page 6-7, Table 6-3:

Change A3U1 to HP and Mfr. Part Number 5081-8176, CD 4.

Change A3U2 to HP and Mfr. Part Number 5081-8177, CD 5.

Page 8-35, Table 8-8:

Replace Table 8-8 with *Table 8-8. Configuration Switch on A3 Digital Interface Board (CHANGE 5)* contained in this document.

Page 8-35, Figure 8-24:

Change the A3 DIGITAL INTERFACE part number in the top left-hand corner of the schematic to 83525-60068.

Change the SERIAL PREFIX in the bottom left-hand corner of the schematic to 2307A.

Table 8-8. Configuration Switch on A3 Digital Interface Board (CHANGE 5)

Description		Switch Number 1	2	3	4	5	6	7	8
Plug-In:	83522A	0	0	0	x	x	x	x	x
	83525A	1	0	0	x	x	x	x	x
	83540A	0	1	0	x	x	x	x	x
	83545A	1	1	0	x	x	x	x	x
	83570A	0	0	1	x	x	x	x	x
*No RF Power 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 (Note 2)		x	x	x	x	x	1	x	x
Cross-Over Coupled FM		x	x	x	x	x	0	x	x
Step Attenuator Option		x	x	x	x	x	x	1	x

NOTES

1. 1 = Switch Open = High
   0 = Switch Closed = Low (Ground)
   x = Don't Care

2. When direct-coupled FM is selected, FM sensitivity is –20 MHz/V and switch number 5 is overridden.

*With the configuration switch set for an Instrument Preset condition of "RF Power OFF", bias is removed from A12 YIG Oscillator and A14 Band 0 Amplifier. In addition, the 8350A microprocessor issues a blanking pulse to the plug-in. L RFB (Low = RF Blank) biases the modulator on hard, closing off the RF signal path. When RF power is manually turned on, via the front panel pushbutton, L RFB remains low for a short period to allow the RF micro circuit components to reach full capacity before releasing the ALC amplifier. This prevents the ALC loop from correcting for a large error voltage at initial power up, thus preventing overshoot.

CHANGE 6

This change replaces the A10 Mother Board and several of its cables.

Page 6-18, Table 6-3:
Change A10 BOARD ASSEMBLY-MOTHER to HP and Mfr. Part Number 83522-60062, CD 1.
Change A10J2 to Part Number 1251-6952, CD 7.
Change A10J3 to Part Number 1251-6343, CD 0.
Change A10J4 to Part Number 1251-7784, CD 5.
Add A10J6, 1250-0257, CD 1, CONNECTOR-RF SMB M PC 50-OHM.
Add A10W3, 8159-0005, CD 0, WIRE 22AWG W PVC 1X22 80C.

Page 6-20, Table 6-3:
Add W1, 83592-60021, CD 6, CABLE ASSY-EXT ALC.
Add W1, 83592-60024, CD 9, CABLE ASSY-EXT ALC (OPT. 004).
Change W3 CABLE ASSY-RIBBON, FRONT PANEL to Part Number 83592-60025, CD 0.
Change W3 CABLE ASSY-RIBBON, FRONT PANEL (OPT. 004) to Part Number 83592-60025, CD 0 (same as standard instrument).
Change W5 WIRE ASSEMBLY-RF PATH to Part Number 83522-60067, CD 6.
Change W12 CABLE ASSY-FM OUTPUT to Part Number 83525-60069, CD 1.
Change W31 CABLE ASSY-POWER SUPPLY to Part Number 83525-60066, CD 8.
Under OPTION 004, change W3 to Part Number 83592-60025, CD 0.
Under OPTION 004, add W1, 83592-60024, CD 9, CABLE ASSY-EXT ALC (OPT. 004).

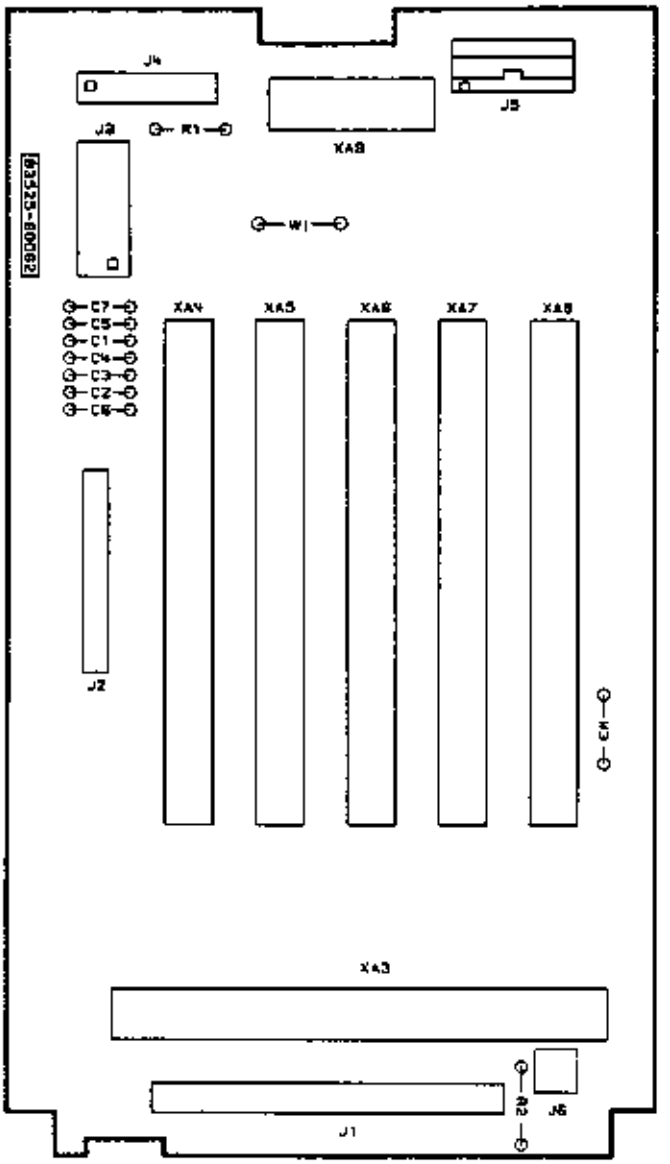
Page 8-63, A7P1 Pin I/O Table:
Change Pin 6 to No Connection.
Change Pin 39 to HI FREQ FM, A5P1, NOT USED.

Page 8-72, Figure 8-68:
Replace Figure 8-68 with *Figure 8-68. A10 Motherboard Component Locations (CHANGE 6)* from this document.

Page 8-74, Table 8-13:
At the cross-reference of **HI FREQ FM** and **Marker A7P1**, add 39.

Page 8-77, Table 8-13:
Replace *Table 8-13. 83522A Motherboard Wiring List (5 of 5)* with *P/O Table 8-13. 83522A Motherboard Wiring List (5 of 5) (CHANGE 6)* in this document.

Page 8-78, Table 8-14:
Add W1 Cable Assembly, Coax, EXT ALC: A10J6-Motherboard, and J2-Front Panel.



HP P/N 83522-60062

Figure 8-68. A10 Motherboard Component Locations (CHANGE 6)

Mnemonic	Signal Source	Mnemonic Description	Power Supply Interface P1	Plug-in Interface P2	Dig Interface A3P1	Dig Interface A3J1	ALC A4P1	FM A5P1	YO A6P1	Marker A7P1	Sampler A8P1	Ref Resistor A9P1	F.P. Interface A10J1	P/O Plug-in Interface A10J2	Power Supply Interface A10J3	RF Wiring Harness A10J4	RF Ribbon Cable A10J5	Miscellaneous
+20V +20V RET +20V RET SENSE +20V SENSE	P1-7 P1-14 P1-6 P1-15	+20V Regulated +20V Return +20V Return Sense +20V Sense	7 14 6 15				16*	16*	16	16*	16*	3,11	42		3 14 6 15	10	9	C7,R1
+15V	P2-29	+15V Regulated		29			38	38	38	38	38			15				C6
+10V +10/−10V RET	P1-8 P1-3, 16	+10V Regulated +/−10V Return	8 3				7	7	7	7	7		46		8 3, 16		5,11	C5
+5V +5VA +5VB	A3P1-6,7 P2-30 P2-18,50 51	+5V Internal for RF Plug-in +5V for 8350A +5V for RF Plug-in		30 18,50,51	6,7	36, 36, 38	27	27	27	27	27*		2					
+5V REG +5V UNREG	A9P1-7 P2 62, 63	+5V Regulated +5V Unregulated		62, 63						44	22	7 12		18,20			7	C4
−10V −10V RET SENSE 10V SENSE −10V UNREG	P1-13 P1-12 P1-4 P1-5	−10V Regulated −10V Return Sense −10V Sense −10V Unregulated	13 12 4 5				17	17	17	17	17		40		13 12 4 5	1	10	C3
15V	P2-28	−15V Regulated		28			28	28	28	28	28			13				C2
−40V −40V RET −40V RET SENSE −40V SENSE	P1-11 P1-1 P1-10 P1 2	−40V Regulated −40V Return −40V Return Sense 40V Sense	11 1 10 2				6*, 39		6, 39		6*, 39*				11 1 10 2		12	C1
GND ANLG	P2-27,58,59	Analog Ground					15, 37	15*,37	19, 37	15, 37	15,37* 40,41,42, 43,44	5	48	10,11,12	1,3,6,10, 12, 14, 16	3 4	1 2, 13	C1-C7,R2,W1 E1 S2, E5 S2
GND DIG	P2 1, 6, 14, 16, 21, 31, 37 46, 48, 49	Digital Ground		1, 6, 14, 16 21, 31, 37 46, 48, 49	4, 5	1,10,11, 17,27,28, 31,32,34 41	8, 30	8, 30	8, 30	8, 30	8*, 30*		8					R2

[1] Coaxial Cable - Center Conductor

[2] Coaxial Cable - Shield

* Not used on this assembly

P/O Table 8-13. Motherboard Wiring List (CHANGE 6)

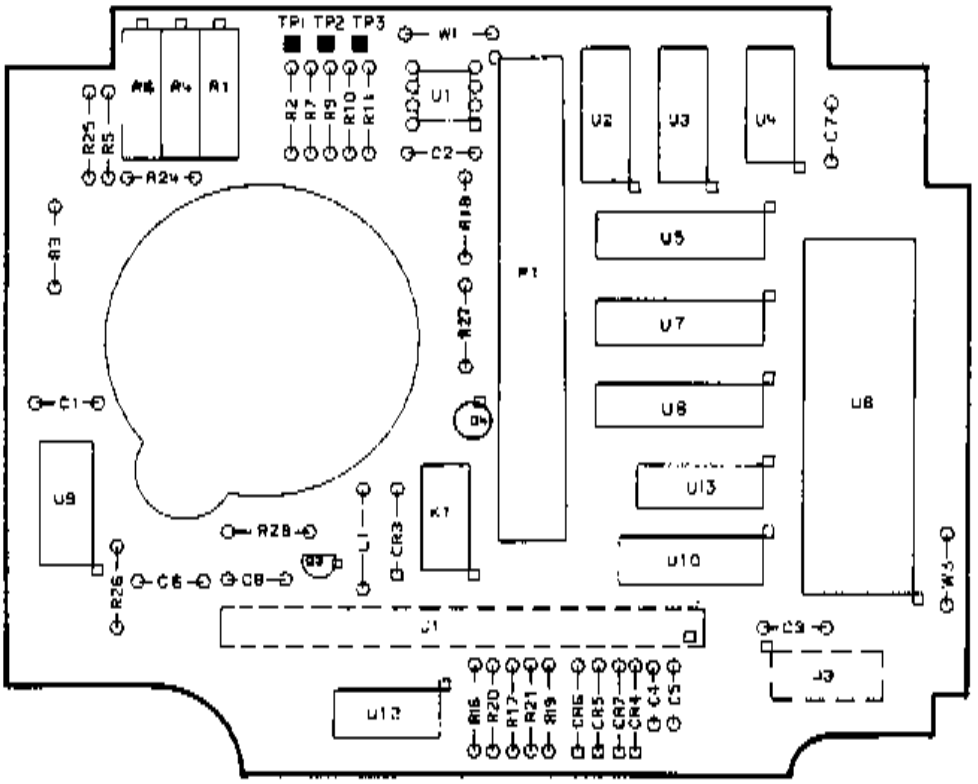
CHANGE 7

(Supersedes CHANGE 3 Board Assembly Part Number.)

New A2 Front Panel Interface.

Page 6-5, Table 6-3:
Change A2 BOARD ASSEMBLY-SUB-PANEL to part number 83525-60072, CD 6.

Page 8-31, Figure 8-12:
Replace the Component Locations Diagram with *A2 Front Panel Interface Component Locations (CHANGE 7)* diagram from this change sheet. Note that U13 is now mounted on the front of the board. Also, the locations of C6, C7, U5, U7 and U8 have been changed. There are no schematic changes.



HP P/N 83525-60072

A2 Front Panel Interface Component Locations (CHANGE 7)

CHANGE 8

(Supersedes CHANGE 4)

This change introduces a new ALC board. The RF plug-in can now be power meter leveled using the HP 436A and HP 438A Power Meters as well as the HP 432A.

Page 1-4, Table 1-1, Note 5:

Replace with the following: "Use the HP 432A/B/C, HP 436A, or HP 438A power meters. Both the HP 436A and 438A must be used on the top three (least sensitive) ranges. However, the HP 438A may also be used on the fourth range by programming the response of the power meter's filter as follows: Set the HP 438A to range two, and press **[MANFILTER] [1] [ENTER]**. See the HP 438A Operating and Service Manual for further instructions. Sweep time ≥50 seconds."

Page 1-8, Paragraph 1-42:

Replace the first sentence with the following: "The RF output can be externally leveled using HP Model 432A/B/C, 436A, or 438A power meters or negative polarity output crystal detectors."

Delete the note below the paragraph.

Page 1-10, Table 1-4:

In the first listing for "Power Meter" under **Critical Specifications** delete: "(No substitute when used for external power meter leveling)." Change the Recommended Model to HP 432A/B/C, 436A, 438A.

In the listing for "Thermistor Sensor," delete "(Used with HP 432A)." Under **Recommended Model**, delete HP 8478B, and replace with "Unit compatible with power meter being used."

Delete the second listing for Power Meter.

Delete the listing for Power Sensor.

Page 3-3, Paragraph 3-23:

Add the following: "For power meter leveling **(ALC MODE [MTR])**, the power meter is used in conjunction with the internal leveling loop. Low frequency variations are handled by the power meter, and high frequency variations are handled by the internal leveling loop."

Page 3-5, Figure 3-3, Number 8:

Delete: "(HP 432 only)."

Pages 3-10 to 3-11, Figure 3-7:

Under EQUIPMENT change the Power Meter listing to: "HP 432A/B/C, 436A, 438A." Change the Thermistor Mount listing to: "Any sensor compatible with the power meter being used."

Under the **NOTE**, delete: "The HP 435 and 436 power meters will not power meter level this plug-in. Only an HP 432 may be used." Add: "When using an HP 436A power meter, enable [RANGE HOLD] to lock the power meter in one range."

Under PROCEDURE, step 5, delete "432A."

Page 5-2, Table 5-1:

Add A4C23 (SYM 1). Under **Description**, add "Minimizes square wave overshoot."

Change A4R2 to A4R7.

Change A4R4 to A4R14.

Change A4R6 to A4R13.

Change A4R7 to A4R9.

Delete the line beginning with A4R9.

Change A4R11 to A4R15.

Change A4R47 to A4R81. Under **Description**, change U7-Q6 to U17-Q9.

Change A4R56 to A4R82. Under **Description**, change U5 to U18.

Change A4R59 to A4R78. Under **Description**, change U8-Q1 to U16-Q6.

Delete the line beginning with A4R67.

Add A4R99 (SYM 2). Under **Description**, add "Minimizes square wave overshoot."

Page 5-7, Table 5-5:

Delete "5-23. Power Meter Leveling Calibration."

CHANGE 8 (Cont'd)

Pages 5-26 to 5-28, Paragraph 5-20:
Replace Paragraph 5-20 on pages 5-25 to 5-28 with **5-20. ALC ADJUSTMENT PROCEDURE (CHANGE 8)** from this document.

Pages 5-31 to 5-32, Paragraph 5-22:
Replace the PROCEDURE and Figure 5-22 with **5-22. POWER CALIBRATION PROCEDURE (CHANGE 8)** from this document.

Pages 5-33 to 5-34:
Delete Paragraph **5-23. POWER METER LEVELING CALIBRATION**, Figure 5-23,and Figure 5-24.

Pages 5-34 to 5-36, **ALC GAIN ADJUSTMENT**:
Replace all reference to A4R11 with A4R15.
In DESCRIPTION, change A4U11 to A4U9.
Under EQUIPMENT change the Power Meter listing to: "HP 432A/B/C, 436A, 438A." Change the Thermistor Mount listing to: "Any sensor compatible with the power meter being used."
Replace Figure 5-26 with *Figure 5-26. ALC Gain Adjustment Location (CHANGE 8)* from this document.

Pages 6-7 to 6-9, Table 6-3:
Replace the parts list for the A4 Assembly with *A4 Replaceable Parts (CHANGE 8)* from this document.

Page 8-18, **A4 ALC Assembly**:
Add the following paragraph at the end of the A4 ALC assembly description:
"In the ALC MODE [MTR], the A4 assembly uses both the power meter and the internal leveling loop to level the power. Each loop has a separate log amplifier. The output of the 'internal log amplifier is sent through a high pass R-C filter and combined with the output of the power meter log amplifier. This composite signal represents the actual RF power. The power meter leveling loop responds to low frequency variations, while the internal loop responds to high frequency variations."

Page 8-36, **A4 AUTOMATIC LEVELING CONTROL (ALC), CIRCUIT DESCRIPTION**:
Replace pages 8-36 to 8-44 with *A4 ALC CIRCUIT DESCRIPTION AND TROUBLESHOOTING (CHANGE 8)* from this document.

Page 8-45, A4 Service Sheet

Figure 8-30:
Replace with *Figure 8-30. A4 ALC Component Locations (CHANGE 8)* from this document.

Table 8-10:
Replace with *Table 8-10. Leveling Control Lines (CHANGE 8)* from this document.

A4P1 Pinout Table:
Replace with *A4P1 Pinout Table (CHANGE 8)*from this change sheet.

Figure 8-33:
Under **NOTE**, change the middle paragraph to read: "Adjustment of the EXT/MTR ALC CAL screw will affect the waveforms at TP8 and TP5 Adjust the CAL screw until the correct waveforms are obtained."

Figure 8-34:
Replace with *Figure 8-34. Open Loop Waveforms (CHANGE 8)* from this document.

Figure 8-35:
Replace with *Figure 8-35. A4 ALC Schematic Diagram (CHANGE 8)* from this document.

5-20. ALC ADJUSTMENT (CHANGE 8)

NOTE

Complete adjustment of the ALC leveling loop requires procedures to be performed in the order prescribed, from Paragraph 5-20 through 5-27. Deviation from this routine may cause improper leveling and/or power variation problems.

REFERENCE:

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

DESCRIPTION:

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

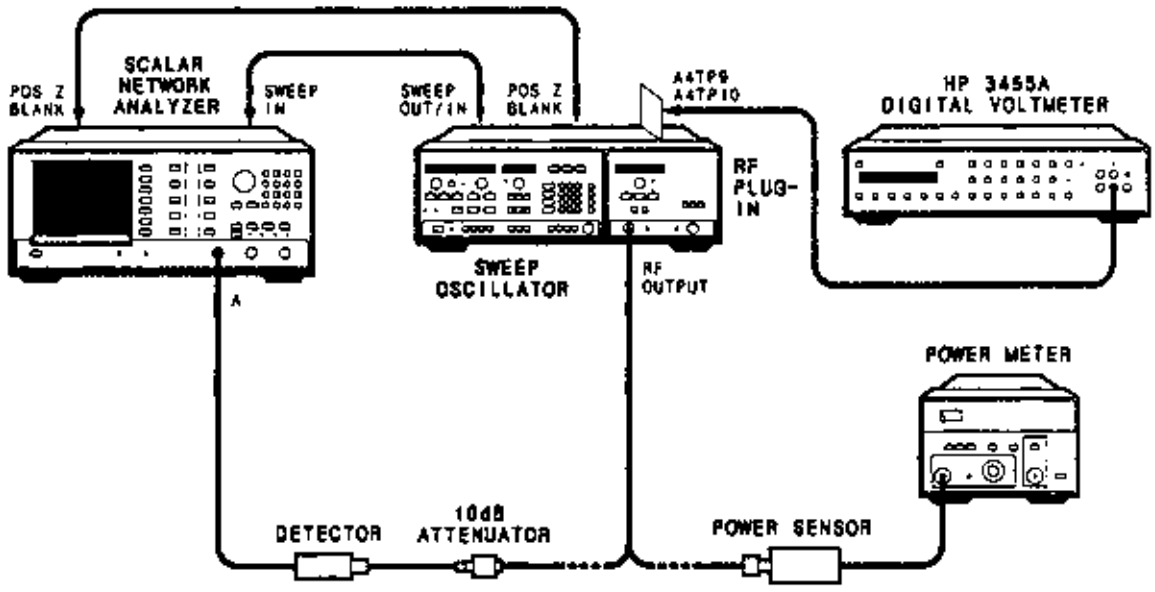


Figure 5-17. ALC Adjustment Test Setup

EQUIPMENT:

Digital Voltmeter	HP 3455A
Power Meter	HP 436A
Thermistor Mount	HP 8485A
Scalar Network Analyzer	HP 8756A
Detector	HP 11664B
Extender Board	HP 08350-60031
10 dB Attenuator	HP 8493C-010
Sweep Oscillator	HP 8350A

5-20. ALC ADJUSTMENT (CHANGE 8) (Cont'd)

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. Remove the A5 FM Drive board. Put the A4 assembly on an extender board. Press **[INSTR PRESET] [CW]**. Sweep the full range of the plug-in at any leveled power. Preset the following adjustments as indicated:

A4R81 (OFS 1)	Midrange
A4R82 (OFS 2)	Midrange
A4R78 (OFS 3)	Midrange
A4R15 (GAIN)	Midrange
A4R7 (0 HI)	Fully CW
A4R14 (BIAS)	Midrange
A4R1 (SLP)	Midrange

2. Float the ground on the Digital Voltmeter and measure the voltage between A4TP9 and A4TP10. Refer to Figure 5-18 for adjustment locations. Adjust A4R81 (OFS 1) for 0.000 ± 0.001 Vdc.

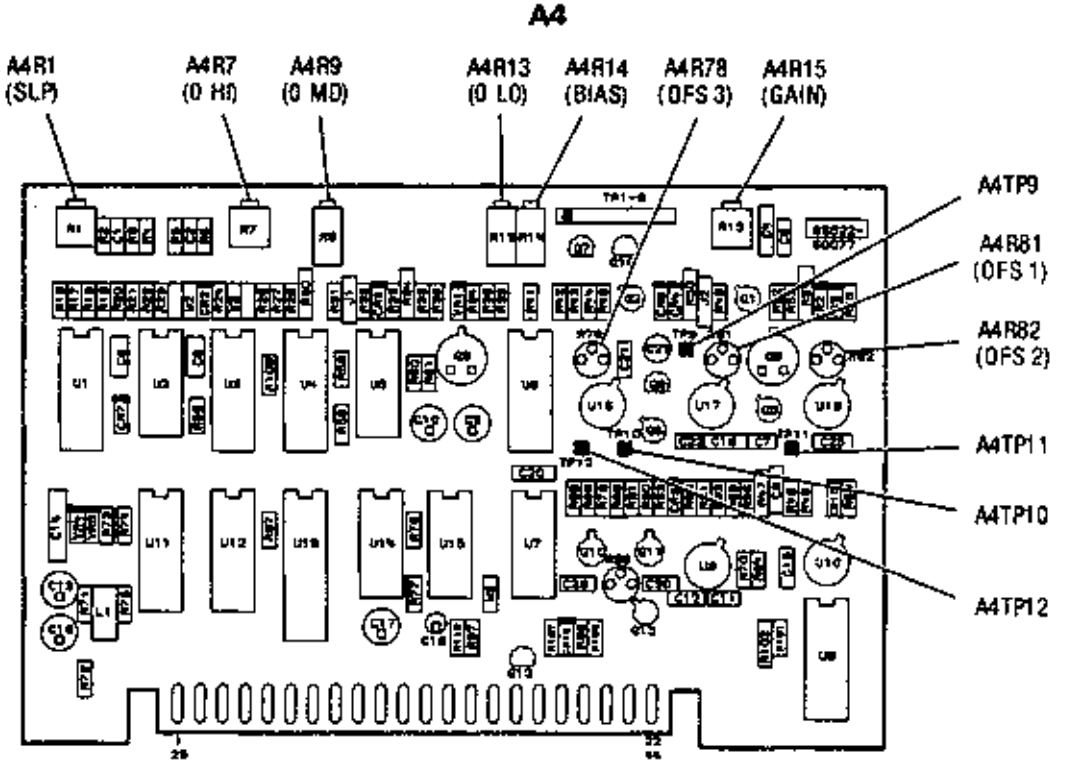


Figure 5-18. ALC Adjustment Locations

5-20. ALC ADJUSTMENT (CHANGE 8) (Cont'd)

3. Attach a jumper from A4TP11 to ground. Connect the DVM to A4TP4 (reference to ground) and adjust A4R82 (OFS 2) for a DVM reading of 0.000 ± 0.001 Vdc. Remove the jumper.

4. Connect the DVM between A4TP12 and A4TP9 (floating ground). Adjust A4R78 (OFS 3) for a DVM reading of 0.000 ± 0.001 Vdc.

5. On the HP 8350A/B, press **[CW] [5] [0] [MHz]**. Turn OFF the HP 83522A RF power. Connect the DVM to A4TP7 (ground to P1 pin 42) and adjust A4R14 (BIAS) for a DVM reading of 0.000 ± 0.001 Vdc. Turn ON the HP 83522A RF power.

6. Set the HP 8350A/B LINE power to OFF. Remove the A4 assembly from the extender board and reinsert the A4 assembly directly into the instrument. Set the HP 8350A/B LINE power to ON and press **[CW] [5] [0] [MHz]**. Connect the Power Meter to the HP 83522A RF OUTPUT.

7. Set the HP 83522A for a POWER reading of −2 dBm. Adjust A4R13 (0 LO) for an RF output power at the HP 83522A connector of −2 ± 0.1 dBm.

8. Set the HP 83522A for a POWER reading of +6 dBm. Adjust A4R9 (0 MD) for an RF output power at the HP 83522A connector of +6 ± 0.1 dBm.

9. Iterate between steps 7 and 8 until both low and midpower ranges are calibrated and no readjustment is necessary.

10. Set the HP 83522A for a POWER reading of +13 dBm. Adjust A4R7 (0 HI) for an RF output power at the HP 83522A connector of +13 ± 0.1 dBm.

11. Disconnect the Power Meter and monitor the RF output with the HP 8756A Scalar Network Analyzer. Press HP 8350A/B **[INSTR PRESET]** to sweep the full range of the plug-in. Press HP 8350A/B **[⊔⊓ MOD]** for compatibility with the HP 8756A. Set the HP 83522A for a POWER reading of 0dBm. Press **[RF BLANK] [SAVE] [1]**.

12. Adjust A4R1 (SLP) for best overall flatness from 10 MHz to 2.4 GHz as observed on the HP 8756A.

13. Reinstall the A5 FM board assembly.

5-22. POWER CALIBRATION PROCEDURE (CHANGE 8)

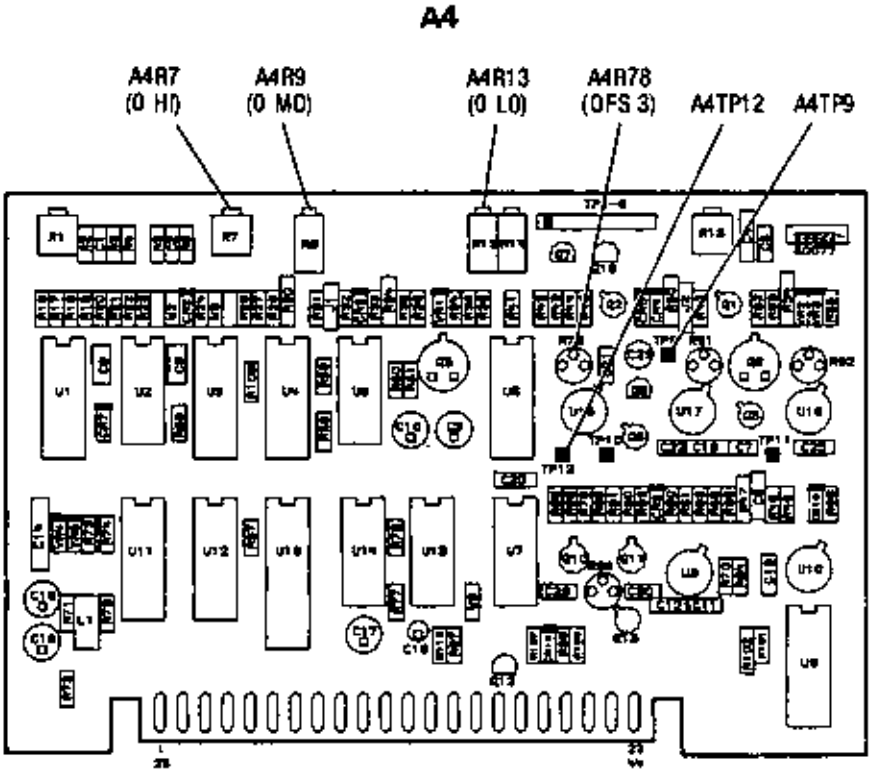


Figure 5-22. Power Calibration Adjustment Locations (CHANGE 8)

PROCEDURE:

NOTE

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

If the following steps result in A4R13 and R9 being adjusted near the stops, connect DVM low to A4TP12 (floating ground) and connect DVM high to A4TP9. Adjust A4R78 for −2mV ±0.1mV.

1. Connect power meter to RF output.
2. On the 8350A/B select a CW frequency of 1.1 GHz.
3. Set the power to −2 dBm as indicated on the plug-in display. Adjust "0 LO" (A4R13) for a measured power of −2 dBm.
4. Set the power to +6 dBm as indicated on the plug-in display. Adjust "0 MD" (A4R9) for a measured power of +6 dBm.
5. Set the power to −2 dBm and note the power meter reading, then set the power to +2 dBm and note the power meter reading. The deviation from the power levels set should be equal and opposite. If note, readjust "0 LO" (A4R13).

5-22. POWER CALIBRATION PROCEDURE (CHANGE 8) (Cont'd)

6. Set the power level to +6 dBm, readjust "0 MD" (A4R9) to equal +6 dBm measured power.
7. Iterate between steps 5 and 6 until both low and midpower ranges are calibrated and no readjustment is necessary.
8. Set the power to +13 dBm as indicated on the plug-in display. Adjust "0 HI" for a measured power of +13 dBm.
9. Step the RF power in 1 dB intervals from −2 to +13 dBm. The RF power at the 83522A connector as read on the power meter should equal the indicated front panel ±.1 dBm. If necessary, readjust "0 LO," "0 MID," and "0 HI" to calibrate power.

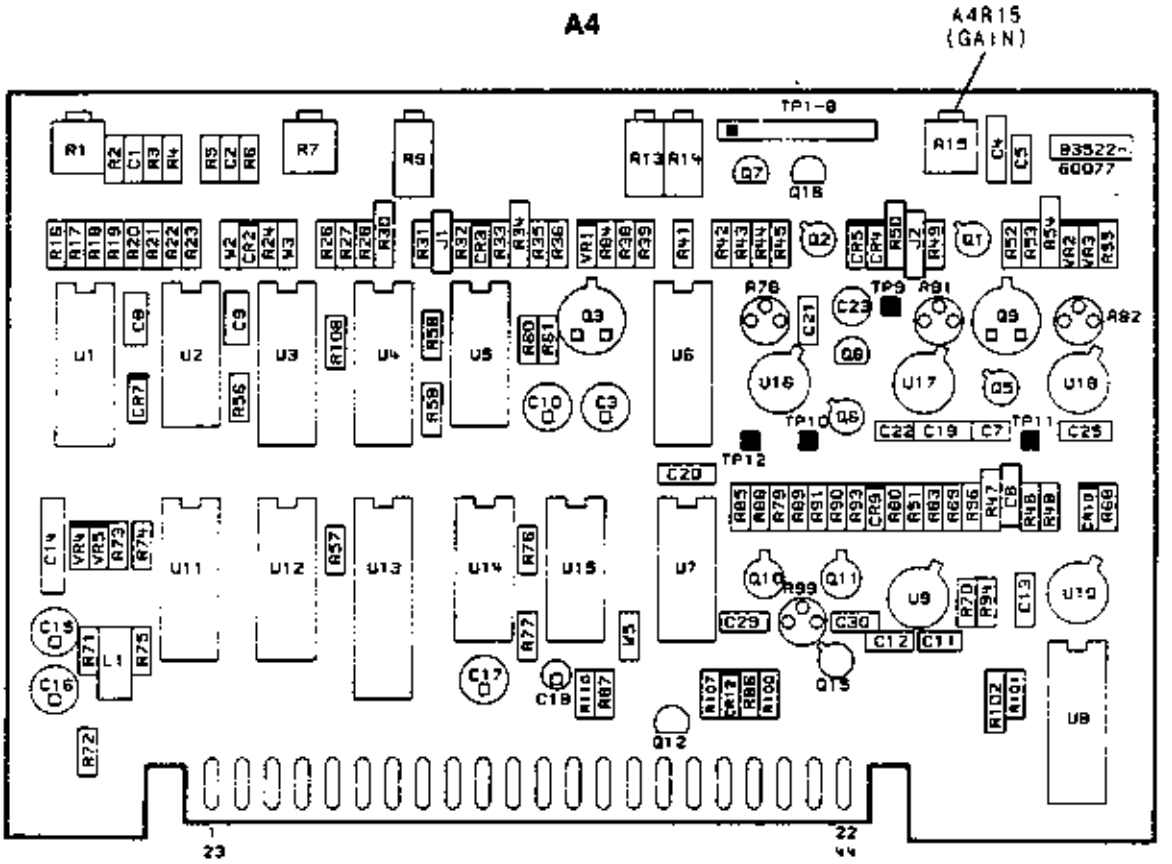


Figure 5-26. ALC Gain Adjustment Location (CHANGE 8)

Table 6-3. Replaceable Parts (1 of 3) (CHANGE 8)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A4	83522-60077	8	1	BOARD ASSEMBLY - AMMONATIC LEVELING CONTROL	28480	83522-60077
A4C1	0160-3879	7	4	CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A4C2	0160-0570	9		CAPACITOR-FXD 220PF ±20% 100VDC CER	28480	0160-0570
A4C3	0180-2617	1	1	CAPACITOR-FXD 6.8UF±10% 35VDC TA	25088	D6R8GS1E35K
A4C4	0160-0945	2	1	CAPACITOR-FXD 910PF ±5% 100VDC MICA	28480	0160-0945
A4C5	0160-4387	4		CAPACITOR-FXD 47PF ±5% 200 VDC CER 0±30	28480	0160-4387
A4C6	0160-4084	8	7	CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A4C7	0160-3874	2	2	CAPACITOR-FXD 10PF ±.5PF 200VDC CER	28480	0160-3874
A4C8	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A4C9	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A4C10	0180-2697	7	4	CAPACITOR-FXD 10UF±10% 25VDC TA	28480	0180-2697
A4C11	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A4C12	0160-3879	7		CAPACITOR-FXD .01UF ±20% 100VDC CER	28480	0160-3879
A4C13	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A4C14	0160-0127	2	1	CAPACITOR-FXD 1UF ±20% 25VDC CER	28480	0160-0127
A4C15	0180-2697	7		CAPACITOR-FXD 10UF±10% 25VDC TA	28480	0180-2697
A4C16	0180-2697	7		CAPACITOR-FXD 10UF±10% 25VDC TA	28480	0180-2697
A4C17	0180-2697	7		CAPACITOR-FXD 10UF±10% 25VDC TA	28480	0180-2697
A4C18	0180-2661	5	1	CAPACITOR-FXD 1UF±10% 50VDC TA	25088	D1R0GS1A50K
A4C19	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A4C20	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A4C21	0160-0573	2	2	CAPACITOR-FXD 4700PF ±20% 100VDC CER	28480	0160-0573
A4C22	0160-3874	2		CAPACITOR-FXD 10PF ±.5PF 200VDC CER	28480	0160-3874
A4C23	0121-0452	4	1	CAP-V TRMR-CER 1.3-3.4PF 63V PC-MTG	28480	0121-0452
A4C25	0160-4084	8		CAPACITOR-FXD .1UF ±20% 50VDC CER	28480	0160-4084
A4C29	0160-3873	1	2	CAPACITOR-FXD 4.7PF ±.5PF 200VDC CER	28480	0160-3873
A4C30	0160-3873	1		CAPACITOR-FXD 4.7PF ±.5PF 200VDC CER	28480	0160-3873
A4CR2	1901-1098	1		DIODE SWITCHING 1N415 50V 200MA 4NS	28480	1901-1098
A4CR3	1901-0535	9	4	DIODE-SM SIG SCHOTTKY	28480	1901-0535
A4CR4	1901-1098	1		DIODE SWITCHING 1N4150 50V 200MA 4NS	28480	1901-1098
A4CR5	1901-1098	1		DIODE SWITCHING 1N4150 50V 200MA 4NS	28480	1901-1098
A4CR7	1901-0535	9		DIODE-SM SIG SCHOTTKY	28480	1901-0535
A4CR9	1901-0535	9		DIODE-SM SIG SCHOTTKY	28480	1901-0535
A4CR10	1901-1098	1		DIODE SWITCHING 1N4150 50V 200MA 4NS	28480	1901-1098
A4CR12	1901-1098	1		DIODE SWITCHING 1N4150 50V 200MA 4NS	28480	1901-1098
A4J1	1258-0124	7	2	PIN-PROGRAMING JUMPER .30 CONTACT	91506	8136-475G1
A4J2	1258-0124	7		PIN-PROGRAMING JUMPER .30 CONTACT	91506	8136-475G1
A4L1	9140-0210	1	1	INDUCTOR RF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210
A4MP2	5040-6848	1	1	BOARD EXTR YELLOW	28480	5040-6848
A4MP3	5000-9043	6	1	PIN	28480	5000-9043
A4MP4	1251-6932	9	1	CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	91506	LSG-1AG14-1
A4MP5	7121-1233	8	1	LABEL-IDENTIFICATION 83522	28480	7121-1233
A4Q1	1853-0007	7	1	TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A4Q2	1854-0404	0	1	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A4Q3	1854-0295	7	2	TRANSISTOR-DUAL NPN PD=400MW	28480	1854-0295
A4Q5	1855-0386	9	2	TRANSISTOR J-FET 2N4392 N-CHAN D-MODE	04713	2N4392
A4Q6	1855-0386	9		TRANSISTOR J-FET 2N4392 N-CHAN D-MODE	04713	2N4392
A4Q7	1855-0423	5	5	TRANSISTOR MOSFET N-CHAN E-MODE	17856	VN10KM
A4Q8	1855-0423	5		TRANSISTOR MOSFET N-CHAN E-MODE	17856	VN10KM
A4Q9	1854-0295	7		TRANSISTOR-DUAL NPN PD=400MW	28480	1854-0295
A4Q10	1853-0316	1	2	TRANSISTOR-DUAL PNP PD=500MW	28480	1853-0316
A4Q11	1853-0316	1		TRANSISTOR-DUAL PNP PD=500MW	28480	1853-0316
A4Q12	1855-0423	5		TRANSISTOR MOSFET N-CHAN E-MODE	17856	VN10KM
A4Q15	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N1799
A4Q16	1855-0423	5		TRANSISTOR MOSFET N-CHAN E-MODE	17856	VN10KM
A4R1	2100-2833	5	1	RESISTOR-TRMR 1K 10% C SIDE-ADJ 1-TRN	30983	ET50X102
A4R2	0698-7267	4	2	RESISTOR 19.6K 1% .05W F TC=0±100	24546	C3-1/8-TO-1962-F
A4R3	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0±100	24546	C3-1/8-TO-4221-F
A4R4	0698-7236	7		RESISTOR 1K 1% .05W F TC=0±100	24546	C3-1/8-TO-1001-F
A4R5	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0±100	24546	C3-1/8-TO-2152-F
A4R6	0698-7276	5		RESISTOR 46.4K 1% .05 W F TC=0±100	24546	C3-1/8-TO-4642-F
A4R7	2100-2516	3	1	RESISTOR-TRMR 100K 10% C SIDE-ADJ 1-TRN	32997	3329W-1-104
A4R9	2100-0670	6	3	RESISTOR-TRMR 10K 10% C SIDE-ADJ 17-TRN	32997	3292X-1-103
A4R13	2100-0544	3	1	RESISTOR-TRMR 100K 10% C SIDE-ADJ 17-TRN	32997	3292X-1-104
A4R14	2100-0670	6		RESISTOR-TRMR 10K 10% C SIDE-ADJ 17-TRN	32997	3292X-1-103
A4R15	2100-2689	9	1	RESISTOR-TRMR 5K 10% C SIDE-ADJ 1-TRN	30983	ET50X502
A4R16	0698-7253	8	2	RESISTOR 5.11K 1% .05W F TC=0±100	24546	C3-1/8-TO-5111-F
A4R17	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0±100	24546	C3-1/8-TO-5111-F
A4R18	0698-7257	2	1	RESISTOR 7.5K 1% .05W F TC=0±100	24546	C3-1/8-TO-7501-F
A4R19	0698-7263	0	2	RESISTOR 13.3K 1% .05W F TC=0±100	24546	C3-1/8-TO-1332-F

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

Table 6-3. Replaceable Parts (2 of 3) (CHANGE 8)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A4R20	0698-7258	3	1	RESISTOR 8.25K 1% .05W F TC=0±100	24546	C3-1/8-T0-8251-F
A4R21	0698-7261	8	3	RESISTOR 11K 1% .05W F TC=0±100	24546	C3-1/8-T0-1102-F
A4R22	0698-7266	3	2	RESISTOR 17.8K 1% .05W F TC=0±100	24546	C3-1/8-T0-1782-F
A4R23	0698-7283	4	1	RESISTOR 90.9K 1% .05W F TC=0±100	24546	C3-1/8-T0-9092-F
A4R24	0698-7262	9		RESISTOR 12.1K 1% .05W F TC=0±100	24546	C3-1/8-T0-1212-F
A4R26	0698-7260	7	9	RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-T0-1002-F
A4R27	0698-7231	2	1	RESISTOR 619 1% .05W F TC=0±100	24546	C3-1/8-T0-619R-F
A4R28	0698-7254	9	2	RESISTOR 5.62K 1% .05W F TC=0±100	24546	C3-1/8-T0-5621-F
A4R30	0837-0119	7	1	THERMISTOR ROD 5K-OHM TC=+.7%/C-DEG	28480	0837-0119
A4R31	0698-7279	8	1	RESISTOR 61.9K 1% .05W F TC=0±100	24546	C3-1/8-T0-6192-F
A4R32	0698-7264	1	1	RESISTOR 14.7K 1% .05W F TC=0±100	24546	C3-1/8-T0-1472-F
A4R33	0698-7247	0	2	RESISTOR 2.87K 1% .05W F TC=0±100	24546	C3-1/8-T0-2871-F
A4R34	0698-3457	6	1	RESISTOR 316K 1% .125W F TC=0±100	28480	0698-3457
A4R35	0698-7260	7		RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-T0-1002-F
A4R36	0698-7260	7		RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-T0-1002-F
A4R38	0698-7243	6	6	RESISTOR 1.96K 1% .05W F TC=0±100	24546	C3-1/8-T0-1961-F
A4R39	0698-7282	3	1	RESISTOR 82.5K 1% .05W F TC=0±100	24546	C3-1/8-T0-8252-F
A4R41	0698-8615	8	1	RESISTOR 75K 1% .05W F TC=0±100	24546	C3-1/8-T0-7503-F
A4R42	0698-7256	1	4	RESISTOR 6.81K 1% .05W F TC=0±100	24546	C3-1/8-T0-6811-F
A4R43	0698-7272	1	2	RESISTOR 31.6K 1% .05W F TC=0±100	24546	C3-1/8-T0-3162-F
A4R44	0698-7233	4	1	RESISTOR 750 1% .05W F TC=0±100	24546	C3-1/8-T0-750R-F
A4R45	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0±100	24546	C3-1/8-T0-1961-F
A4R46	0698-7234	5	2	RESISTOR 825 1% .05W F TC=0±100	24546	C3-1/8-T0-825R-F
A4R47	0837-0085	6	1	THERMISTOR ROD 680-OHM TC=+.7%/C-DEG	28480	0837-0085
A4R48	0698-7238	9	1	RESISTOR 1.21K 1% .05W F TC=0±100	24546	C3-1/8-T0-1211-F
A4R49	0698-7205	0	3	RESISTOR 51.1 1% .05W F TC=0±100	24546	C3-1/8-T0-51R1-F
A4R50	0698-3440	7	1	RESISTOR 196 1% .125W F TC=0±100	24546	C4-1/8-T0-196R-F
A4R51	0698-7236	7	1	RESISTOR 1K 1% .05W F TC=0±100	24546	C3-1/8-T0-1001-F
A4R52	0698-7229	8	2	RESISTOR 511 1% .05W F TC=0±100	24546	C3-1/8-T0-511R-F
A4R53	0698-7232	1	2	RESISTOR 681 1% .05W F TC=0±100	24546	C3-1/8-T0-681R-F
A4R54	0698-3151	7	1	RESISTOR 2.87K 1% .125W F TC=0±100	24546	C4-1/8-T0-2871-F
A4R55	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0±100	24546	C3-1/8-T0-1961-F
A4R56	0698-7260	7		RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-T0-1002-F
A4R57	0698-7249	2		RESISTOR 3.48K 1% .05W F TC=0±100	24546	C3-1/8-T0-3140-F
A4R58	0698-7254	1		RESISTOR 6.81K 1% .05W F TC=0±100	24546	C3-1/8-T0-6811-F
A4R59	0698-7229	8		RESISTOR 511 1% .05W F TC=0±100	24546	C3-1/8-T0-511R-F
A4R60	0698-7247	0	2	RESISTOR 2.87K 1% .05W F TC=0±100	24546	C3-1/8-T0-2871-F
A4R61	0698-7219	6	1	RESISTOR 196 1% .05W F TC=0±100	24546	C3-1/8-T0-196R-F
A4R66	0698-7222	1	1	RESISTOR 261 1% .05W F TC=0±100	24546	C3-1/8-T0-261R-F
A4R69	0698-7277	6	1	RESISTOR 51.1K 1% .05W F TC=0±100	24546	C3-1/8-T0-5112-F
A4R70	0698-7246	9	1	RESISTOR 2.61K 1% .05W F TC=0±100	24546	C3-1/8-T0-2611-F
A4R71	0698-7268	5	1	RESISTOR 21.5K 1% .05W F TC=0±100	24546	C3-1/8-T0-2152-F
A4R72	0698-7212	9		RESISTOR 100 1% .05W F TC=0±100	24546	C3-1/8-T0-100R-F
A4R73	0698-7212	9		RESISTOR 100 1% .05W F TC=0±100	24546	C3-1/8-T0-100R-F
A4R74	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0±100	24546	C3-1/8-T0-1961-F
A4R75	0698-7274	3	1	RESISTOR 38.3K 1% .05W F TC=0±100	24546	C3-1/8-T0-3832-F
A4R76	0698-7260	7		RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-T0-1002-F
A4R77	0698-7260	7		RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-T0-1002-F
A4R78	2100-1986	9	1	RESISTOR-TRMR 1K 10% C TOP-ADJ 1-TRN	73138	82PR1K
A4R79	0698-7260	7		RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-T0-1002-F
A4R80	0698-7210	5		RESISTOR 82.5 1% .05W F TC=0±100	24546	C3-1/8-T0-82R5-F
A4R81	2100-2030	6	2	RESISTOR-TRMR 20K 10% C TOP-ADJ 1-TRN	73138	82PR20K
A4R82	2100-2030	6		RESISTOR-TRMR 20K 10% C TOP-ADJ 1-TRN	73138	82PR20K
A4R83	0698-7234	5		RESISTOR 825 1% .05W F TC=0±100	24546	C3-1/8-T0-825R-F
A4R84	0698-7232	3		RESISTOR 681 1% .05W F TC=0±100	24546	C3-1/8-T0-681R-F
A4R85	0698-7260	7		RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-T0-1002-F
A4R86	0698-7256	1	2	RESISTOR 6.81K 1% .05W F TC=0±100	24546	C3-1/8-T0-6811-F
A4R87	0698-7253	0		RESISTOR 5.11K 1% .05W F TC=0±100	24546	C3-1/8-T0-5111-F
A4R88	0698-7264	1	2	RESISTOR 14.7K 1% .05W F TC=0±100	24546	C3-1/8-T0-1472-F
A4R89	0698-7263	0		RESISTOR 13.3K 1% .05W F TC=0±100	24546	C3-1/8-T0-1332-F
A4R90	0698-7264	1		RESISTOR 14.7K 1% .05W F TC=0±100	24546	C3-1/8-T0-1472-F
A4R91	0698-7240	3	1	RESISTOR 1.47K 1% .05W F TC=0±100	24546	C3-1/8-T0-1471-F
A4R93	0698-7260	7		RESISTOR 10K 1% .05W F TC=0±100	24546	C3-1/8-T0-1002-F
A4R94	0698-7242	5	1	RESISTOR 1.78K 1% .05W F TC=0±100	24546	C3-1/8-T0-1781-F
A4R96	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0±100	24546	C3-1/8-T0-4221-F
A4R99	2100-1738	9	1	RESISTOR-TRMR 10K 10% C TOP-ADJ 1-TRN	73138	82PR10K
A4R100	0698-7262	9		RESISTOR 12.1K 1% .05W F TC=0±100	24546	C3-1/8-T0-1212-F
A4R101*	0698-7267	4	4	RESISTOR 19.6K 1% .05W F TC=0±100	24546	C3-1/8-T0-1962-F
A4R102	0698-3440	7	2	RESISTOR 196 1% .125W F TC=0±100	24546	C4-1/8-T0-196R-F
A4R107	0698-7269	6		RESISTOR 23.7K 1% .05W F TC=0±100	24546	C3-1/8-T0-2372-F
A4R108	0698-8827	4	1	RESISTOR 1M 1% .125W F TC=0±100	28480	0698-8827
A4R110	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0±100	24546	C3-1/8-T0-1961-F
A4TP1-8	1251-5618	0	1	CONNECTOR 8-PIN M POST TYPE	28480	1251-5618
A4TP9	0360-0535	0	4	TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION

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

Table 6-3. Replaceable Parts (3 of 3) (CHANGE 8)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A4TP10	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A4TP11	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A4TP12	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A4U1	1826-0417	6	3	IC SWITCH ANLG QUAD 16-DIP-C PKG	27014	LF13333D
A4U2	1826-0616	7	2	IC OP AMP PRCN QUAD 14-DIP-C PKG	06665	OP-11EY
A4U3	1826-0610	1	2	IC MULTIPLXR 4-CHAN-ANLG DUAL 16-DIP-C	06665	MUX24FQ
A4U4	1826-0417	6		IC SWITCH ANLG QUAD 16-DIP-C PKG	27014	LF13333D
A4U5	1826-0616	7		IC OP AMP PRCN QUAD 14-DIP-C PKG	06665	OP-11EY
A4U6	1826-0610	1		IC MULTIPLXR 4-CHAN-ANLG DUAL 16-DIP-C	06665	MUX24FQ
A4U7	1820-1197	9	1	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A4U8	1826-0417	6		IC SWITCH ANLG QUAD 16-DIP-C PKG	27014	LF13333D
A4U9	1826-0319	7	2	IC OP AMP LO-BIAS-HI-INPD TO-99 PKG	A3500	LF356G
A4U10	1826-0026	3	1	IC COMPARATOR PRCN TO-99 PKG	01295	LM311L
A4U11	1826-0752	2	1	IC CONV 12-B-D/A 16-DIP-C PKG	24355	AD7542BD
A4U12	1820-1216	3	1	IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A4U13	1820-1730	6	1	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A4U14	1820-1199	1	1	IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A4U15	1820-1198	0	1	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS03N
A4U16	1826-0021	8	1	IC OP AMP GP TO-99 PKG	27014	LM310H
A4U17	1826-0447	2	1	IC OP AMP WB TO-99 PKG	27014	LF257H
A4U18	1826-0319	7		IC OP AMP LO-BIAS-HI-INPD TO-99 PKG	A3500	LF356G
A4VR1	1902-0041	4	1	DIODE-ZNR 5.11V 5% DO-35 PD=.4W	28480	1902-0041
A4VR2	1902-3070	5	1	DIODE-ZNR 4.22V 5% DO-35 PD=.4W	28480	1902-3070
A4VR3	1902-0111	9	1	DIODE-ZNR LM753A 6.2V 5% DO-7 PD=.4W	28480	1902-0111
A4VR4	1902-0049	2	2	DIODE-ZNR 6.19V 5% DO-35 PD=.4W	28480	1902-0049
A4VR5	1902-0049	2		DIODE-ZNR 6.19V 5% DO-35 PD=.4W	28480	1902-0049
A4W2	8159-0005	0	1	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	28480	8159-0005
A4W3	8159-0005	0	1	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	28480	8159-0005
A4W5	8159-0005	0	1	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	28480	8159-0005

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

A4 AUTOMATIC LEVELING CONTROL (ALC), CIRCUIT DESCRIPTION (CHANGE 8)

The A4 Automatic Leveling Control (ALC) assembly is part of a closed loop power leveling function, designed to control the amplitude of the RF output power. The **General** section below describes loop operation, including some components external to the A4 assembly. The rest of this operational theory is devoted to detailed description of the circuits found on the A4 assembly.

General

The circuits which accomplish power control and power leveling can be divided into two categories: internal loop circuitry, and external components of the loop. Figure 8-25 illustrates this theme.

The Power Level Reference leg of the ALC establishes the desired power level. This is accomplished by pressing the plug-in **[POWER LEVEL]** pushbutton and rotating the RPG or entering the desired reference on the Model 8350A/B front panel DATA ENTRY keys. This leg of the ALC is not an interdependent part of the loop, as shown in Figure 8-25.

The Detector leg of the ALC loop samples the actual RF output power and produces a voltage proportional to RF amplitude. This voltage is converted to log scale and compared with the Power Level Reference signal. If the voltages at the summing junction are not of equal magnitude an error voltage is generated. This error voltage is amplified and converted to a current drive for the RF modulators, which vary the transmitted RF power to correct the error and achieve the desired RF power level.

Address Decoder and Control Latches A

U12 is a 3-to-8 decoder, selecting address 2C07H when it is present on the address bus. This address serves as a chip enable for octal latch U13. Information on the data bus is then latched into U13 and used throughout the A4 assembly. U14 and U15 have been added to provide the proper outputs for all 3 ALC leveling modes.

Detector Inputs and Selection Switches B

Control lines MUX A0B and MUX A1B are encoded with leveling mode and band selection information. The lines are decoded in Table 8-10. U6 decodes these control lines to select the proper detector input for the desired operating mode.

R43 and R14 BIAS adjustment offset the Band 0 internal detector so that 0 volts at TP7 corresponds to no RF power.

EXT/MTR ALC input provides external crystal leveling capability within the -10 to -200 mV range and power meter leveling capability within the 0 to $+1$V range. VR4 and VR5 provide protection against transients. Two Schottky diodes, CR1 and CR2, are mounted between the EXT/MTR ALC connector and the front panel casting for similar protection.

When **MTR** (power meter) leveling is selected, the power meter (HP 432A/B/C, 436A, or 438A) is used in conjunction with the internal leveling detector. U1A routes the power meter signal to a separate POWER METER LOG AMPLIFIER. The internal leveling detector is routed through U6B and the input sample and hold to the main log amplifier. The internal leveling detector compensates for the response of the power meter and prevents instability while at the same time permitting reasonable sweep times.

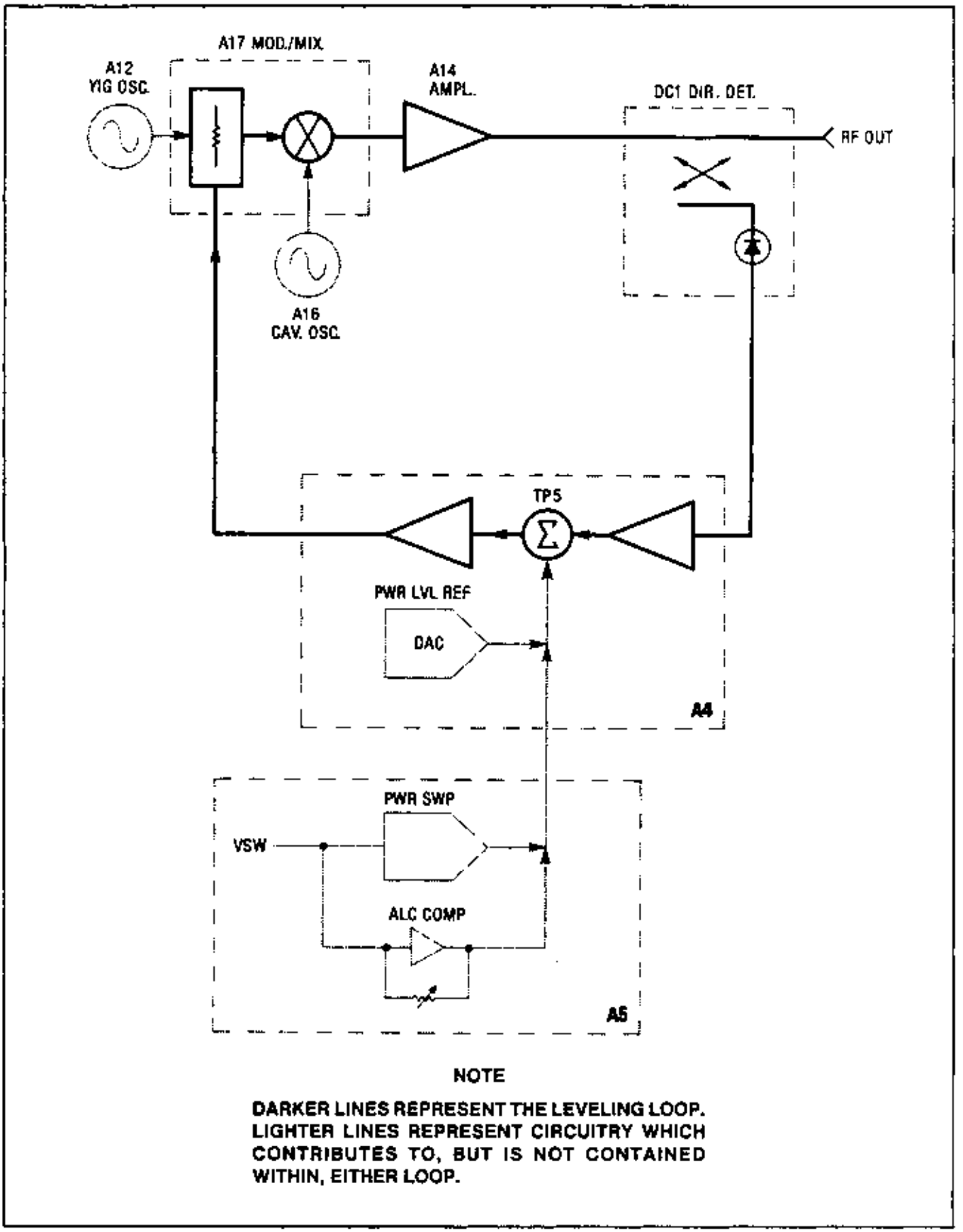


Figure 8-25. Simplified ALC Block Diagram (CHANGE 8)

A4 (ALC), CIRCUIT DESCRIPTION (CHANGE 8) (Cont'd)

Sample and Hold Drivers K

Q10 and Q11 act as complementary pairs, controlling the Input Sample and Hold, and Error Sample-and Hold circuits respectively. The complementary pairs improve action of the sampling FETS Q5 and Q6 by reducing the error signal passed through gate to source capacitance. The sample and hold function of the ALC loop is used in conjunction with pulse and square wave modulation. When L PULSE ENABLE is high, and L PULSE input is low, Q10A and Q11B turn on causing Q10B and Q11A to turn off, thereby initializing the HOLD mode.

The frequency of the sampling mode is dependent on the L PULSE input. When the system is used with the HP 8756A Scalar Network Analyzer, the L PULSE input is a 27.8 kHz square wave, controlling the gates of Q5 (Block I) and Q6 (Block **E**). (Refer to Model 8350A/B Operating and Service Manual, Section V, for 27.8/1 kHz Oscillator adjustment). The sample level is maintained during the OFF pulse, thus preventing saturation of the Log and Main ALC amplifiers.

Input Sample and Hold E

The Input Sample and Hold function prevents the Log Amplifier from saturating during pulse and squarewave modulation.

U16 is a unity gain follower with internal feedback which buffers the detector input. R78 compensates for the offset voltage of the operational amplifier. Q6 and C21 perform the sample and hold function.

Power Meter Log Amplifier F

The Power Meter Log Amplifier is used in conjunction with the Log Amplifier in **ALC MODE [MTR]**. The Power Meter Log Amplifier sets the power level and takes care of low frequency variations, while the Log Amplifier takes care of the high frequency variations.

U5B is a unity gain follower which buffers the input of R5D. Logarithmic scaling is performed by Q3A in the feedback loop of U5D. The base-emitter voltage of Q3A is exponentially related to its collector current, hence the logarithmic action of the amplifier. Q3B compensates the Log Amp over temperature. U5A is a standard non-inverting amplifier, with its gain controlled by R33 and R32. CR3 prevents oscillation in the Log Amplifier.

Log Amplifier G

The logarithmic scaling function is performed by Q9A in the feedback loop of U17. Q9A collector current is proportional to the voltage at TP10 and exponentially related to its base-emitter voltage. Therefore, Q9A emitter voltage is logarithmically related to the input voltage at TP10.

Q9B compensates the Log Amp against changes in reverse saturation current with temperature.

CR9 clamps the output of U18 to 0.6V above the input voltage to U17, preventing oscillations.

A4 (ALC), CIRCUIT DESCRIPTION (CHANGE 8)(Cont'd)

U6A decodes MUX A0B and MUX A1B (Table 8-10) to select the proper offset voltage for power calibration at the low end of the plug-in power range. In EXTernal ALC, the power level calibration is set with the front panel EXT CAL potentiometer.

U18 amplifies the logged output for comparison with the Power Level Summing Signal (Block **H**). R9 adjusts the gain of U18, and calibrates midrange power level.

Guarded-gate FETs Q7, Q8 and Q16 select the appropriate detector return for INTernal, EXTernal, and PM (power meter) leveling.

Power Level Reference C
Power Level Summing H

U11 is a 12-bit microprocessor-compatible digital to analog converter (DAC), which latches data in three 4-bit nibbles. The −10V REF input sets the DAC for a maximum outut (TP2) of +10V. The voltage at TP2 is the product of −10V REF and the fractional binary input of the DAC.

The voltage at TP1 is the sum of several voltages, depending on the operating mode of the plug-in. U2A sums PWR SWP/COMP and AM inputs. In addition, selected feedback resistor R7 reduces gain to compensate for detector deviation from square-law at the upper limits of the plug-in power range.

The EXT CAL input is summed through amplifier U2C. R30, in the feedback loop of U2C, provides temperature compensation for the Log Amplifier and detectors.

Error, Sample and Hold I

The Error, Sample and Hold function prevents the Main ALC Amp from saturating during pulse and square wave modulation.

U2D pin 10 is the summing junction for the Power Level Summing output, Log Amplifier output, and FREQ TRK V is a 0 to +6 volt ramp proportional to the YO DRIVE Voltage. R1 (SLP) adjusts the overall flatness.

Under leveled power conditions, the voltage at U2D pin 10 is zero. A non-zero voltage represents an error and forces a change in modulator current until power is again level.

U2D buffers the error voltage. Q5 and the following integrating circuit (U9) perform the sample and hold. C7 eliminates error due to the gate to source capacitance of Q5.

Log Amplifier Selector J

The Log Amplifier Selector circuit selects through path for the Log Amplifier, or combines its output with that of the Power Meter Log Amplifier (MTR). In MTR, R84 and C3 act as a high pass filter, to shape the output of the Log Amplifier, which is then combined with the Power Meter Log Amplifier output. The combination of the two prevents instability when using certain power meters.

In switch U4: A and B are open, C is closed in INT or EXT DET mode. The opposite is true in MTR mode.

A4 (ALC) CIRCUIT DESCRIPTION (CHANGE 8) (Cont'd)

Main ALC Amp L
Unleveled Signal M

Both inputs to integrator U9 are at virtual ground under leveled power conditions, allowing for immediate response to an input error voltage.

R15 optimizes the speed at which the loop responds to power level changes.

When Model 8350A/B RF BLANK is selected, L RFB goes low during retrace and U1D closes, pulling current through C4, forging TP5 high and turning on the PIN modulator.

Under unleveled conditions, VR2 and VR3 will clamp the output of U9 at approximately +5 and −7 volts, preventing negative or positive saturation. When the output of U9 approaches −2 volts, comparator U10 activates the front panel LED indicating unleveled power.

U8D is not used.

Collector current in common-base transistor Q1 is exponentially related to the base-emitter voltage. The PIN modulator is driven exponentially to maintain constant loop gain.

Emitter-follower Q2, CR5 and CR4 control the gain of the exponential current drive.

PIN Mod 0 Driver O

R101 compensates for the loss of modulator sensitivity with increasing bias current.

Q12 provides squarewave modulation, when selected.

A4 ALC TROUBLESHOOTING (CHANGE 8) (Cont'd)

NOTE

To ensure that Option 002 plug-ins remain in the same attenuator setting during troubleshooting, press [SHIFT] [POWER SWEEP]. This allows full ALC control without changing attenuator settings.

Since the Automatic Leveling Control (ALC) function of the Model 83522A RF Plug-In includes many individual components arranged in a highly interdependent closed loop, the scope of the A4 ALC Troubleshooting section extends well beyond the limits of the A4 assembly. Portions of the A5 FM Driver assembly, and several microcircuit components which contribute to the power leveling function, are discussed below.

The ALC loop is a complex feedback loop which monitors the RF output power and continuously corrects for any deviation from the desired power level. Because it is a closed system, it is difficult to isolate cause from effect when a problem arises. Therefore, the key to troubleshooting is to examine individual components, correlating the expected output for a particular input signal.

This troubleshooting outline is organized into two major sections: Troubleshooting Symptoms, and Troubleshooting Diagnostics. The section entitled "Symptoms" (1) characterizes possible failure modes, (2) provides some general troubleshooting hints, and (3) refers the reader to more detailed procedures found under "Diagnostics."

Troubleshooting Symptoms

The procedures outlined below help to systematically characterize the failure as quickly as possible. The following failure symptoms are discussed:

RPG/POWER DISPLAY FAILURE
UNLEVELED (LED)
FLATNESS/OSCILLATIONS (Power Dropouts)
FULL UNLEVELED POWER
NO POWER
POWER SWEEP/FLATNESS

Evaluating the specific failure may require an HP 432A/B/C, 436A, or 438A Power Meter or the HP 8756A Scalar Network Analyzer with the Model 11664B Detector. (However, a crystal detector with an "A vs B" oscilloscope may often be substituted.) Figure 8-26 configures a typical test setup. Initiate all tests with the **[INSTR PRESET]** condition.

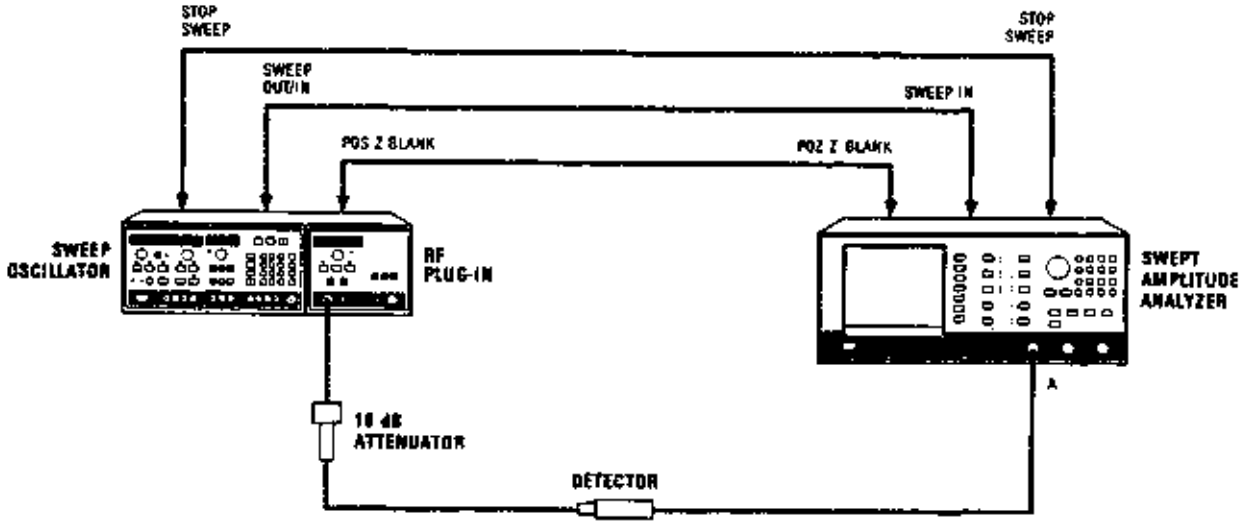


Figure 8-26. Typical ALC Troubleshooting Setup

A4 ALC TROUBLESHOOTING (CHANGE 8) (Cont'd)

RPG / POWER DISPLAY FAILURE

Check that the POWER display changes when either the RPG is rotated or data is entered via the Model 8350A/B keyboard. This verifies that the digital information is reaching the mainframe, is properly processed, and is then displayed.

- If the display is flashing rapidly or showing random patterns, refer to A1/A2 Front Panel or A3 Digital Interface Troubleshooting. If the RPG causes a change in the measured RF power level, but the POWER display remains the same, refer to A1/A2 Troubleshooting. If the RPG produces no response whatsoever, or if the front panel display is blank, refer to A1/A2 Troubleshooting, and trace the problem back to the Model 8350A/B mainframe.

UNLEVELED (LED)

If the UNLEVELED light turns on during the sweep, enter a sweep time of 2.4 seconds (i.e. one second per GHz). Observe the SWP light on the Model 8350A/B Sweep Oscillator, and determine at which times during the sweep the UNLEVELED light turns on.

- If the UNLEVELED light remains lit during retrace, suspect problems in the front panel annunciator drivers. Refer to A1/A2 Troubleshooting.

- If the UNLEVELED light blinks briefly at the beginning of the sweep, the plug-in may be sweeping through 0 Hz and causing an ALC drop-out. Check this by slowly increasing the start frequency. If the UNLEVELED light stops blinking, enter a CW frequency of 50 MHz and adjust the Model 83522A front panel FREQ CAL screw until the MKR light stays on. Press **[INSTR PRESET]** and observe the UNLEVELED light. A frequency counter may be used to check frequency accuracy at 10 MHz or 50 MHz. If necessary, refer to Section V, Adjustments, in this manual, and perform the Frequency Accuracy calibration procedure.

- If the UNLEVELED light flashes briefly during the sweep, but does not imply the above failure modes, check power flatness. See below.

FLATNESS / OSCILLATIONS (Power Dropouts)

Monitor the RF output with the HP 8756A as shown in Figure 8-26.

- If the power level is constant across the sweep within approximately 5 dB, then the plug-in may only require ALC flatness adjustments. Refer to Section V, Adjustments, in this manual, for the Internal Leveled Flatness adjustment procedure.

- If the measured power level lies between +13 and −2 dBm, but cannot be controlled via the front panel, refer to the Digital Control section under Troubleshooting Diagnostics.

- If the trace appears chopped or broken, the loop may be oscillating. Refer to Section V, Adjustments, in this manual, and perform the ALC Gain adjustment procedure.

A4 TROUBLESHOOTING (CHANGE 8) (Cont'd)

FULL UNLEVELED POWER (One or Both Bands)

Set the HP 83522A to sweep the full frequency range.

- Attempt to level the power externally using the HP 432A/B/C, 436A, or 438A Power Meter as shown in Figure 8-27. Select **MTR** leveling, and enter a slow (at least 30 seconds) sweep time. If the RF power is now leveled, the failure is most likely in the detectors or the Detector Selection Switch, A4U6. Refer to the following paragraph. If this does not prove to be the case, the problem may be in the two analog switches U3B and U6A. It may be necessary to perform the ALC adjustments in Section V of this manual.

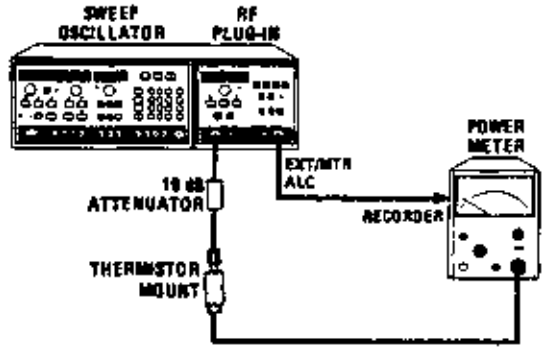


Figure 8-27. Power Meter Leveling Setup

- Check the Detector Selection Switch by entering a CW frequency within the band or leveling mode in question and trace the detector voltage through U6B. If the input to be selected does not match the output, check the MUX A0 and MUX A1 lines (see Table 8-10). Also check U12 and U13 as described under Digital Control.

- Check the voltage at TP5. If it is greater than or equal to +5 Vdc, suspect the Mod Drivers or Modulators. If it is below −2 Vdc, suspect the Detectors and Detector Leg.

NOTE

Turn off LINE switch before removing or installing any assembly.

With the ALC assembly removed from the plug-in, 27.8 kHz squarewave modulation from the Model 8350A/B is not available. However, the HP 8756A 27.8 kHz squarewave can be connected to the rear panel PULSE IN connector to maintain HP 8756A compatibility.

- To check the RF components, remove the A4 ALC assembly from its socket. This removes all bias from the modulator, and should allow maximum power through the RF path in all bands. If full power (over +15 dBm) is then detected, the RF Amplifier A14, the Cavity Oscillator, A16, and the DC Return A15 are verified. Suspect primarily the detector. Also inspect the modulator, as well as the A4 PIN Mod Driver and Detector Selection Switch.

A4 ALC TROUBLESHOOTING (CHANGE 8) (Cont'd)

- If power is still missing, enable the plug-in markers and check that the MKR light flashes. If it does, the failure must be limited to Directional Detector DC1. If the markers do not work, check the A12 YIG Oscillator, A17 Modulator/Mixer, A16 Cavity Oscillator, and A14 Amplifier.

- If removing the A4 assembly causess full unleveled RF power to appear, reinstall the board and check A4TP5. If less than −2 Vdc is present, verify that the voltage across R49 is zero. If A4TP5 is greater than +5 Vdc, suspect any circuitry between the Detector Selection Switch and A4TP5, particularly the Log Amp.

POWER SWEEP / FLATNESS

- If power increases smoothly with frequency, and POWER SWEEP is NOT selected, suspect problems with the A5 FM Driver assembly.

NOTE

Turn off line power before removing or installing any assembly.

Remove the A5 board from the plug-in. If the situation improves, suspect a failure on the A5 assembly.

- If the RF power is leveled within approximately 5 dB, refer to Section V, Adjustments, in this manual, and perform the Internal Leveled Flatness adjustment procedure.

A4 ALC TROUBLESHOOTING (CHANGE 8) (Cont'd)

Troubleshooting Diagnostics

The troubleshooting information below is organized into functional areas:

DIGITAL CONTROL A
REFERENCE POWER LEVEL C H
DETECTORS / DETECTOR SELECTION SWITCH B, DC1
DETECTOR LEG E F G
MODULATOR LEG I L
MOD DRIVER O
MODULATOR / MIXER A17

DIGITAL CONTROL A

Address Decoder U12 and Control Latch U13 control digital switches throughout the A4 assembly. Their operation can be confirmed by performing the Hex Data Rotation Write at address 2C07 Hex. Enter the following keystrokes:

[SHIFT] [0] [0]	Enters Hex Data command
[2] [GHz s] [0] [7]	Address location 2C07 (U13)
[M4]	Hex Data Rotation Write

Check the outputs of U13 for the waveforms shown in Figure 8-2.

- If any output signal is missing or misplaced, check the data lines agains Figure 8-2. If no output is found, look for activity at U13 pin 11. Check for L INST1 and BA3 to pulse low, while BA0, BA1, and BA2 pulse high. If these pulses are missing, trace the problem back to A3 Digital Interface.

If the Digital Control Section is working, the primary outputs of U13 are easily controlled by selecting the appropriate front panel function while in the CW sweep mode. (e.g. selecting [MTR] leveling holds the PM line high, etc.)

REFERENCE POWER LEVEL C H

The Reference Power Level Leg produces a voltage proportional to the desired power level. This signal is a summation of the absolute power reference, AM, RF plug-in amplitude markers, ALC compensation, and power sweep signals.

The ALC compensation and power sweep signals are generated on the A% FM Driver assembly. If an A5 failure is suspected, refer to troubleshooting information on the A5 Service Sheet. Unless A5 is suspect, simplify A4 troubleshooting by turning off the line power and removing the A5 assembly. Although power sweep will be disabled and the power flatness will be lost, the ALC loop should still level without the signals provided by the A5 assembly.

DAC U11 establishes the absolute power level. The −10V REF from the A6 assembly is scaled to yield from 0 Vdc (−2 dBm displayed) to the +10 Vdc (+22 dBm displayed) at TP2. (This breaks down to a voltage step of 0.42 Vdc per 1.0 dB of power over the dynamic range, or 6.25 Vdc at +13 dBm.

A self-test routine is available to exercise the ALC DAC. Enter:

[SHIFT] [5] [0]

A4 ALC TROUBLESHOOTING (CHANGE 8) (Cont'd)

The waveform in Figure 8-32 should be seen at TP2. Note that the exercise routine for the 12-bit DAC yields a staircased waveform with 13 levels. The first step shows the maximum +10 Vdc output with all bits high. The following levels represent the voltage at TP2 with successive bits loaded high in order from the Most Significant Bit to the Least Significant Bit.

- If the waveform at TP2 is not correct, check for −10V REF, and trace any problem back to the A8 assembly. Look for activity on L INST1, BA0, and BA1. BA2 and BA3 should pulse high as each new DAC value is loaded, pulsing the CS line (U14 pin 8) low. If any of these lines, or a data line, appears dead, trace the problem back to the A3 assembly.

U2A adds PWR SWP/COMP and AM, and provides detector flatness compensation at higher power levels with CR2 and CR1. Use the EXT MTR mode to bypass these diodes while troubleshooting.

U2C adds the amplitude markers (L 1 DB MKR), and the front panel amplitude adjustment (EXT CAL) used with external leveling. The following levels should be seen at TP1 with A5 removed and INT leveling selected: +0.3 Vdc for −2 dBm, and +7.0 Vdc for +22 dBm. Amplitude markers produce a 250 mVdc dip when the MKR light is on. An amplitude modulation (AM) signal of f1.k0 V p-p at P1-4 will produce roughly 260 mV p-p at TP1.

DETECTORS / DETECTOR SELECTION SWITCH B, DC1

The detector DC1 is tested simply by checking its output voltage under full leveled power or full unleveled power conditions. The A4 assembly must be installed for troubleshooting as it supplies bias current to the detector.

NOTE

The 27.8 kHz modulation signal required for HP 8756A compatibility is not available from the Model 8350A/B when the A4 assembly is removed from the plug-in, and must be supplied from the HP 8756A through one of its rear panel MODULATOR DRIVE connectors.

- If no power is measured, turn off the line power and remove the A4 assembly. Return power to the instrument. (If there is still no RF power, suspect components of the RF path. Refer to RF Troubleshooting.) If full unleveled RF power is obtained, apply a narrow strip of cellophane tape to the pin-edge connector at P1-44 to isolate the output of the modulator driver from the modulator. Reinstall the A4 board. This removes bias from the modulators, allowing full RF power transmission, while providing detector bias.

- If full leveled power (+13 dBm) or full unleveled power (at least +15 dBm) is measured, sweep the full band and check the voltage at the detector input against the values shown in Table 8-9. (Use high impedance 10:1 probes.)

A4 ALC TROUBLESHOOTING (CHANGE 8) (Cont'd)

Table 8-9. Detector Voltages

	Full Leveled +13 dBm	Full Unleveled +20 dBm
A4P1-21	−150 to −200 mV	−300 to −400 mV

- If the detector is working and the Detector Selection Switch is suspected, sweep the full band and monitor TP12 for the voltages seen at the selected input of U6B.

- If the EXT/MTR ALC INPUT circuits are suspected, select the desired mode and supply a test signal (low-level DC or sine wave) in the front panel BNC connector, and trace it through U6B at A4TP12.

NOTE

Remove any tape applied to edge connector pins in the previous procedure.

DETECTOR LEG E F G

The Detector Leg of the ALC loop includes components between the Detector Selection Switch and the Error Summing Amplifier U2D.

Before troubleshooting the Detector Leg, be sure the Detector and Detector Selection Switch are working correctly. See above.

The Detector Leg can be effectively tested by using the Open Loop method of troubleshooting. This procedure utilizes the external leveling mode (**EXT**) by supplying an external DC voltage or sine wave to the EXT/MTR ALC INPUT connector. This method breaks the ALC Loop and allows waveforms to be checked against known test signals. See Figure 8-33, Open Loop Procedure.

MODULATOR LEG I L

The Modulator Leg includes the Error Sample & Hold and the Main ALC Amp.

U2D is a non-inverting unity-gain summing amplifier. Under leveled conditions, both U2D pin 10 and TP8 should be nearly 0.0 Vdc. Under any conditions (except during "hold"), U2D pin 10 and TP8 should be at the same voltage. If not, suspect U2D, Q5, or the Sample & Hold Driver.

U9 forms an inverting integrator. When TP8 is positive, TP5 should be at −7 Vdc. If not, suspect U1D or U9. When TP8 is negative, TP5 should be at +5 Vdc. If this is not the case, suspect U9.

- The following procedure can be used to check U2D and U9:

  1. Use a jumper to ground A4TP11.
  2. Set power for −2 dBm at any CW frequency.
  3. Press Model 83522A **[EXT]** ALC.

A4 ALC TROUBLESHOOTING (CHANGE 8) (Cont'd)

4. To check U2D, monitor U2D pin 10 and TP8 while adjusting the EXT/MTR ALC CAL screw between the extremes of its range. Both U2D pin 10 and TP8 should vary between approximately +0.5 and −0.5 Vdc.

5. Verify U9 by adjusting the CAL screw as described above and monitoring TP5. Since U9 is an integrator, TP5 should saturate and clamp (due to VR2 and VR3) at −7 Vdc and +5 Vdc, respectively.

6. Remove jumper from A4TP11.

Further troubleshooting of the Modulator Leg can be continued by following the Open Loop procedure outlined in Figure 8-33 and checking for the waveforms provided in Figure 8-34.

MODULATOR DRIVER Q

The voltage-to-current conversion and current gain needed to drive the modulator is provided by Q2 and Q1 on the output of the Main ALC Amplifier. As the voltage increases at TP5 so does the current to the modulators, shunting more RF energy to ground and allowing less to pass through. Since the modulator is essentially current-controlled, the voltages measured at TP6 and P1-44 do not vary much over a wide range of modulator attenuations.

Q2 is an emitter-follower followed by a common-base stage (Q1), with two diodes in between. Check the biases and base-emitter voltages to see if the transistors are damaged.

- To establish a bias level for the Mod Driver state. TP5 can be forced high (+5 Vdc). Jumper A4TP1 to ground. Press Model 8350A/B **[CW]** and select any CW frequency. Select **[EXT]** ALC, and enter an RF power level of −2 dBm via front panel controls. Rotate the EXT/MTR ALC CAL screw fully counterclockwise. Verify a signal level of approximately +5 Vdc at TP5. Remove the jumper from TP11.

MODULATOR / MIXER A17

The internal modulator for this plug-in is housed in a combination microcircuit package: A17 Modulator/Mixer. Figure 8-28 provides a simplified schematic for this positive bias, shunt-type attenuator. As more current is supplied through the modulator bias pin, the shunt turns on harder, sinking more RF power to ground and allowing less to reach the front panel.

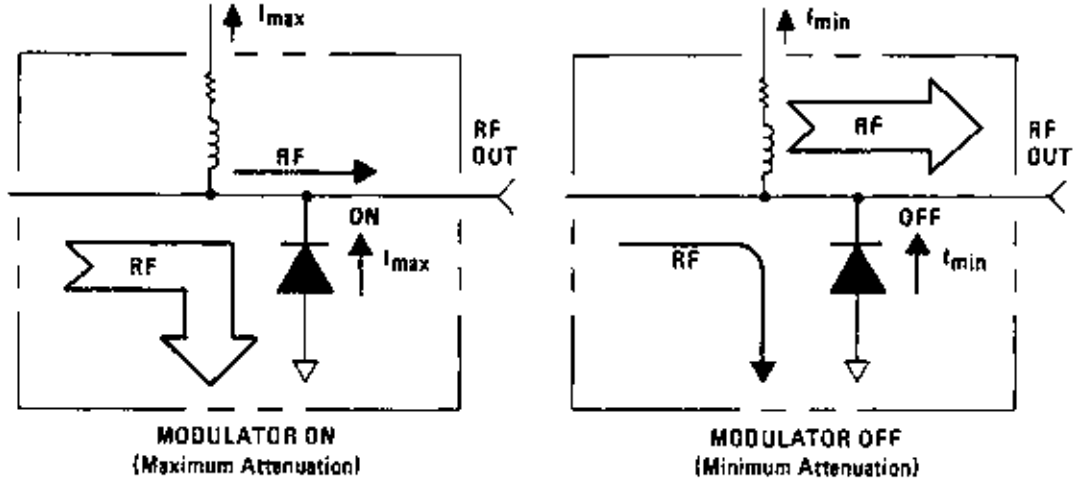


Figure 8-28. Simplified Modulator Schematic

A4 ALC TROUBLESHOOTING (CHANGE 8) (Cont'd)

The modulator is checked simply by noting whether the actual RF attenuation is appropriate to the modulation bias present.

NOTE

Turn off line power before removing or installing any assembly.

- If low or no RF power is observed, remove all modulator bias current simply by removing the A4 assembly from the Motherboard. With no bias current, the RF power should pass through the modulator unhindered. If this is not the case, check the modulator diode as follows:

  1. Select HP 83522A **[EXT]** ALC. Ground TP11. Enter −2 dBm RF power, and select any CW frequency. Rotate the EXT/MTR ALC CAL screw fully clockwise. This should result in −7 Vdc at TP5, essentially removing bias from the modulator. Measure the voltlage across R49. It should be 0V. If this is not the case, isolate the modulator from its drive circuitry by applying a piece of cellophane tape to the pin edge connection, P1-44. If the voltage across R49 now measures 0V, the modulator diode is probably shorted. If the voltage across R49 still does not measure 0V, suspect the band blanking circuitry, U8B and Q15. Remove the jumper from TP11.

NOTE

Remove any tape applied to the pin edge connectors in the previous procedure.

- If the modulator appears to be functioning properly, check the following RF levels with a power meter or spectrum analyzer. When checking power levels internal to the RF signal path, ensure that all critical ports are terminated in 50 ohms.

  2. If power is low, check the RF level directly out of the YFO A12. Refer to the RF Schematic Diagram at the end of Section VIII for the proper levels. Measure the RF levels around the A17 Modulator/Mixer. With no modulation, approximately +13 dBm should be measured at the input of A17, with approximately −10 dBm at the output. If no output is measured, make sure the Cavity Oscillator A16 is yielding at least +8 dBm.

- If maximum unleveled RF power is observed, attempt to achieve maximum attenuation (minimum RF transmitted). Select HP 83522A **[EXT]** ALC. Ground TP11. Enter −2 dBm RF power, and select a CW frequency. Turn the EXT/MTR ALC CAL screw fully counterclockwise. The voltage level at TP5 should be +5 Vdc. Concurrently, the voltage level at the output of the Mod Driver, P1-44, should be approximately +0.6 Vdc to +0.8 Vdc.

  1. If the voltage is significantly higher than this, the modulator diode is probably open.

  2. Check TP6 for approximately +2.0 Vdc. The difference between the test point and the pin-edge connector gives an indication of how much current is flowing to the modulator.

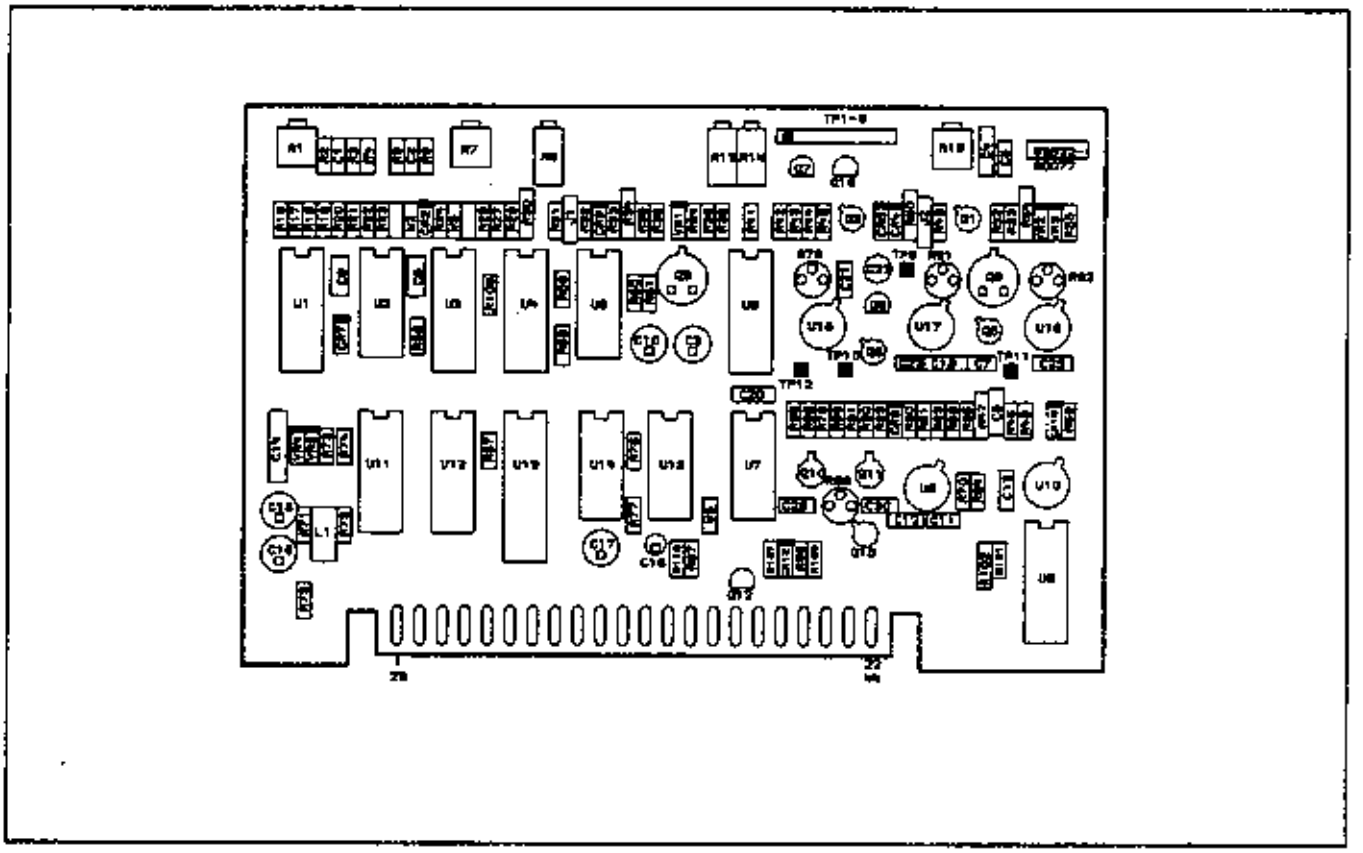


Figure 8-30. A4 Component Locations (CHANGE 8)

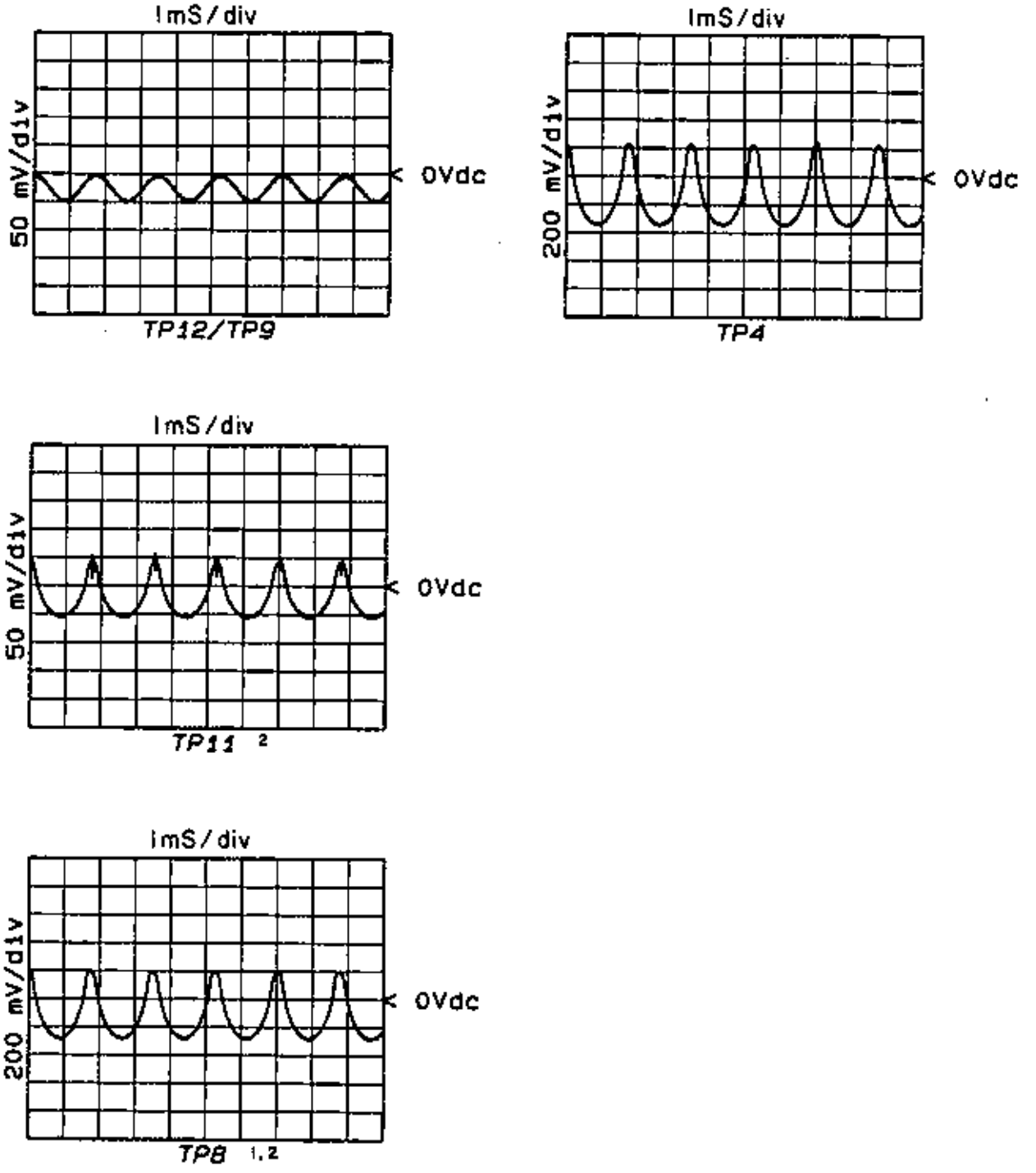
Table 8-10. Leveling Control Lines (CHANGE 8)

DATA BUS					Leveling Mode
Mux A0	Mux A1	Mux A0B	Mux A1B	PM	
H	H	H	H	L	INT 0
L	H	L	H	L	INT 1 (not valid)
H	L	H	L	L	EXT
L	L	H	H	H	PM 0
L	L	L	H	H	PM 1 (not valid)

A4P1 Pinout Table (CHANGE 8)

A4 P1

PIN	SIGNAL	I/O	TO/FROM	FUNCTION
1 23	EXT DET RET EXT DET	IN IN	A10J1-43 A10J1-47	P B
2 24	L UNLVL EXT CAL	OUT IN	A6P1-40, A10J1-12 A10J1-41	M H
3 25	PWR REF L 1 dB MKR	OUT IN	A8P1-26 A7P1-24	C H
4 26	AM FREQ TRK V	IN IN	P1-A4 A10J1-36	C I
5 27	PWR SW/COMP +5V	IN IN	A5P1-23 A3P1-6,7	C P
6 28	—15V	IN	NOT USED P2-28	P
7 29	+10V L RFB	IN IN	P1-8 P2-56	P L, O
8 30	GND DIG GND DIG			P P
9 31	BD1 BD0	IN IN	A3P1-9 A3P1-31	A, C A, C
10 32	BD3 BD2	IN IN	A3P1-10 A3P1-32	A, C A, C
11 33	BA1 BA0	IN IN	A3P1-11 A3P1-33	A, C A, C
12 34	BA3 BA2	IN IN	A3P1-12 A3P1-34	A, C A, C
13 35	BD5 BD4	IN IN	A3P1-13 A3P1-35	A A
14 36	BD7 BD6	IN IN	A3P1-14 A3P1-36	A A
15 37	GND ANLG GND ANLG			P P
16 38	+15V	IN	NOT USED P2-29	P
17 39	—10V —40V	IN IN	P1-13 P1-11	P P
18 40	L INST1 SQ MOD	IN IN	A3P1-8 P2-26	A, C K, O
19 41	MOD 1 L PULSE	IN	NOT USED A7P1-4	K, O
20 42	INT DET 1 INT DET RET	IN IN	NOT USED NOT USED	
21 43	INT DET 0 —10V REF	IN IN	A10-E4 A6P1-5	B C
22 44	MOD DRIVE MOD 0	OUT OUT	NOT USED A10J4-2	L O



1. POWER: 10 dBm. Offset depends on power level and EXT/MTR ALC CAL.
2. CW mode.

Figure 8-34. Open Loop Waveforms (CHANGE 8)

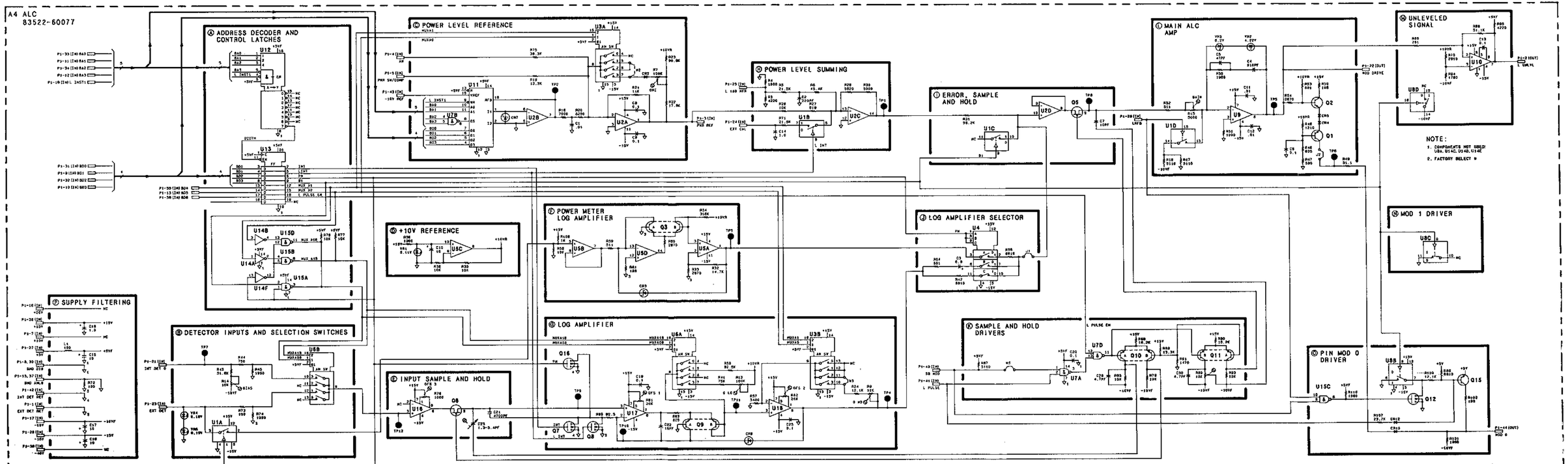


Figure 8-35. A4 ALC Schematic Diagram (CHANGE 8).

SERIAL PREFIX: 2415A

CHANGE 9

(Supersedes CHANGE 5 Board Assembly Part Number.)

This change installs Rev. 6 firmware, making the RF plug-in compatible with the HP 8510 Network Analyzer.

Page 6-6 to 6-7, Table 6-3:

Change A3 to 83525-60080 CD 6, DIGITAL INTERFACE ASSEMBLY (does not include A3U1 and A3U2).
Change A3U1 part number to 5081-8196 CD 8.
Change A3U2 to part number 5081-8197 CD 9.

▶ CHANGE 10

This change documents a new front panel casting and dress panel.

Page 6-19, Table 6-3:

Change MP22, PANEL-DRESS to HP and Mfr. Part Number 83522-00006, CD 7.
Change MP37, CASTING FRONT to HP and Mfr. Part Number 83545-20081, CD 7.
Change MP38 through MP42, RETAINER to HP and Mfr. Part Number 83525-20069, CD 7, Qty 2.
Delete MP51, SET SCREW, HP and Mfr. Part Number 3030-0330, CD 7.
Change MP52, LATCH SCREW, HP and Mfr. Part Number 83525-60029, CD 3.
Delete MP53, SET SCREW, HP and Mfr. Part Number 3030-0330, CD 7.

CHANGE 11

This change documents a revision to the A7 Marker Board assembly.

Page 6-13, Table 6-3:
Change A7 to HP and Mfr. Part Number 83525-60092, CD 0.

Page 6-14, Table 6-3:
Add Q6, HP and Mfr. Part Number 1854-0447, CD 7, TRANSISTOR NPN 2N2222A SI TO-18 PD=500 mw.

Page 6-15, Table 6-3:
Change R48 to HP and Mfr. Part Number 0698-3457, CD 6, RESISTOR 316K 1% .125W F TC=0±100.
Add R71, HP and Mfr. Part Number 0698-7241, CD 4, RESISTOR 1.62K 1% .05W TC=0±100.
Add R72, HP and Mfr. Part Number 0698-7280, CD 1, RESISTOR 68.1K 1% .05W F TC=0±100.
Add R73, HP and Mfr. Part Number 0698-7260, CD 7, RESISTOR 10K 1% .05W F TC=±100.
Add U18, HP and Mfr. Part Number 1820-1197, CD 9, IC GATE TTL LS NAND QUAD 2-INP.
Add VR1, HP and Mfr. Part Number 1902-0025, CD 4.
Add W1, HP and Mfr. Part Number 8159-0005, CD 0, JUMPER WIRE.

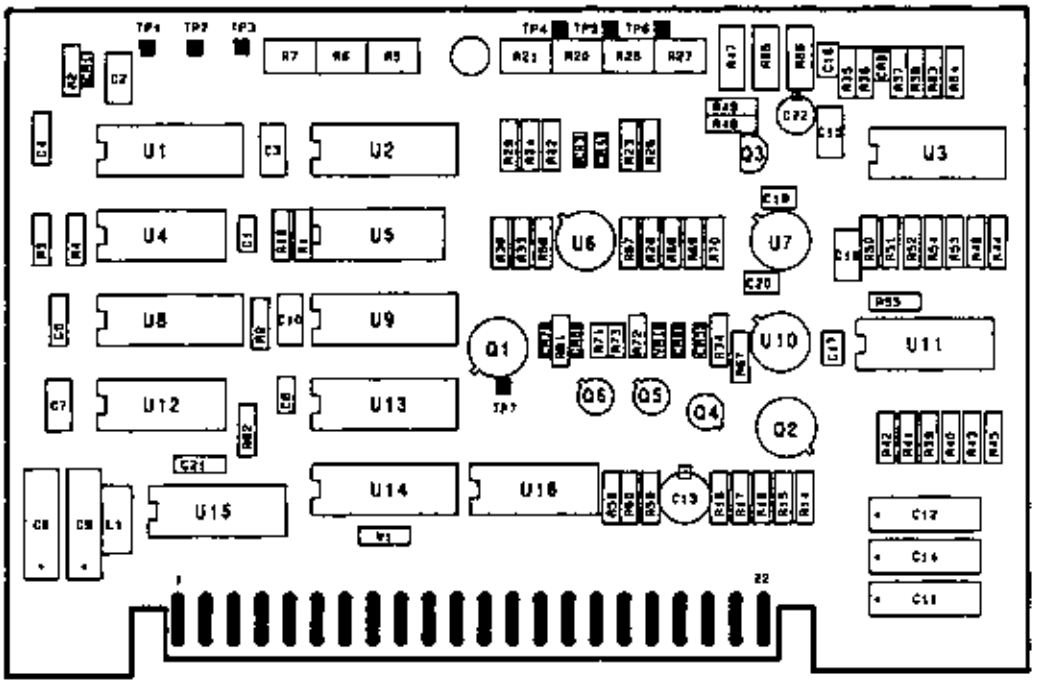
Page 8-63, Figure 8-56:
Replace *Figure 8-56 A7 Marker Component Locations* with *Figure 8-56, A7 Marker Component Locations (CHANGE 11)* contained in this document.

Page 8-63, Figure 8-60:
Replace *Figure 8-60. A7 Marker Schematic* with *Figure 8-60. A7 Marker (CHANGE 11)* contained in this document.

Page 8-63, A7P1 Pin Out Table:
Replace *A7P1 Pin Out Table* with*A7P1 Pin Out Table (CHANGE 11)* contained in this document.

Page 8-76, Table 8-13:
Replace *Table 8-13. 83522A Motherboard Wiring List* with *Table 8-13. 83522A Motherboard Wiring List (CHANGE 11)* contained in this document.

A7



HP P/N 83525-60092

Figure 8-56. A7 Marker, Component Locations (CHANGE 11)

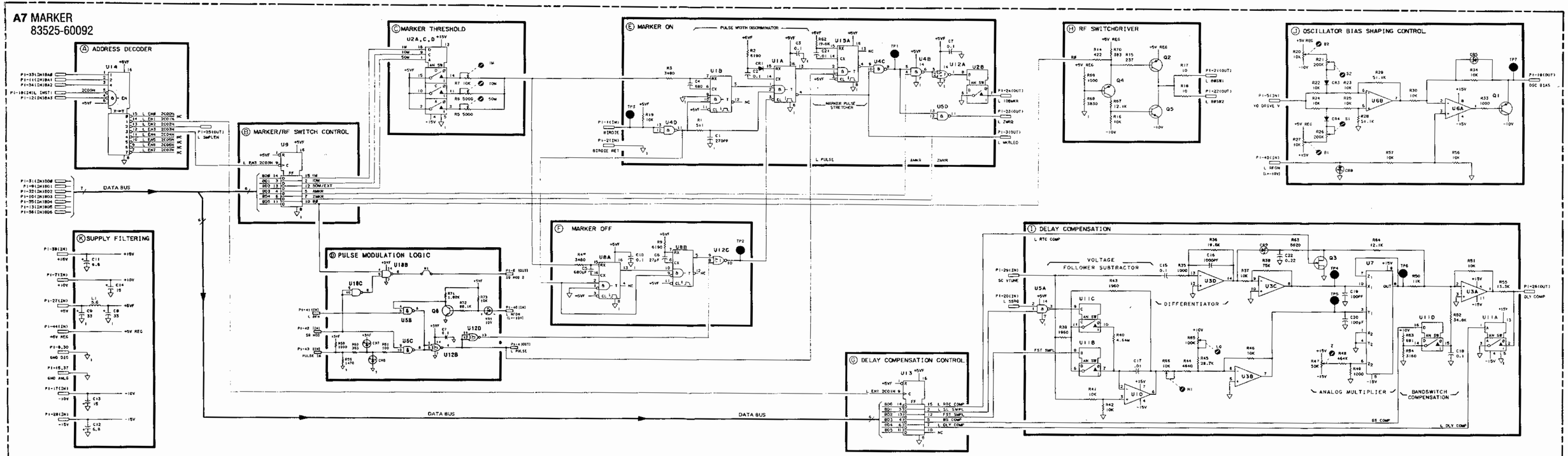


Figure 8-60. A7 Marker, Schematic Diagram (CHANGE 11)

A7PI Pinout Table (CHANGE 11)

A7P1

PIN	SIGNAL	I/O	TO/FROM	FUNCTION
1 23	BIRDIE L ZMRQ	IN OUT	A8P1-1 P2-23	E E
2 24	BIRDIE RET L 10BMKR	OUT OUT	A8P1-2 A4P1-25	E E
3 25	L MKRLED L SMPL EN	OUT OUT	A2J1-10 A8P1-25	E A
4 26	L PULSE DLY COMP	OUT OUT	A8P1-23 A6P1-26	D I
5 27	YO DRIVE V +5V	IN IN	A6P1-42 A3P1-6,7	J K
6 28	SQMOD 2 −15V	OUT IN	P1-6 P2-28	NOT USED K
7 29	+10V SC VTUNE	IN IN	P1-8 A6P1-29	K I
8 30	GND DIG GND DIG			K K
9 31	BD1 BD0	IN IN	A3P1-9 A3P1-31	B,G B
10 32	BD3 BD2	IN IN	A3P1-10 A3P1-32	B,G B,G
11 33	BA1 BA0	IN IN	A3P1-11 A3P1-33	A A
12 34	BA3 BA2	IN IN	A3P1-12 A3P1-34	A A
13 35	BD5 BD4	IN IN	A3P1-13 A3P1-35	B,G B,G
14 36	BD7 BD6	IN IN	A3P1-14 A3P1-36	B,G G
15 37	GND ANLG GND ANLG			K K
16 38	+20V +15V	IN IN	P1-7 P2-29	NOT USED K
17 39	−10V −40V	IN IN	P1-13 P1-11	K NOT USED
18 40	L INST 1 L RFON	IN IN	A3P1-8 A2J1-38	A J
19 41	OSC BIAS L RFM	OUT IN	A12A1J1-6 P2-24	J D
20 42	L SSRQ SQ MOD	IN IN	A6P1-23 P2-26	I D
21 43	L 80SW1 PULSE IN	OUT IN	A18(SW1) J5(BNC)	H D
22 44	L 80SW2 +5V REG	OUT IN	A11(SW2) A9P1-7	H K

Mnemonic	Signal Source	Mnemonic Description	Power Supply Interface P1	Plug-in Interface P2	Digital Interface A3P1	Digital Interface A3J1	ALC A4P1	FM A5P1	YO A6P1	Marker A7P1	Sampler A8P1	Rel Resistor A9P1	F.P. Interface A10J1	P/O Plug-in Interface A10J2	Power Supply Interface A10J3	RF Wiring Harness A10J4	RF Ribbon Cable A10J5	Miscellaneous
SCAN CLK	A3P1-38	F.P. Scan Clock			38								27					
SC VTUNE	A6P1-29	Scaled Tune Voltage							29	29								
L SIRQ	A6P1-3	L = Sweep Interrupt Request			18				3									
L SMPLEN	A7P1-25	L = Sampler Latch Enable								25	25							
SQMOD	P2-26	Square Modulation (27.8/1.0 kHz)		26						42				9				
SQMOD2	A7P1-6	Square Modulation Two								6								
L SSRQ	A6P1-23	L = Stop Sweep Request		32					23	20				21				
L UNLVL	A4P1-2	L = Unleveled					2		40				12					
VSW	P2-64	Sweep Voltage		64				25						22				
VTUNE	P1-A1	Tune Voltage	A1-C[1]						44									E5-C[1]
VTUNE RET	P1-A1	Tune Voltage Return	A1-S[2]						43									E5-S[2]
YO DRIVE V	A6P1-42	YO Drive Voltage							42	5			39					
L ZMRQ	A7P1-23	L = Intensity Marker Request		23						23				3				
L 10DBMKR	A7P1-24	L = 10dB Amplitude Marker					25			24								
1V/GHZ	A10J1-5C	1V per GHz Output											50	23				J4[BNC]
-10V REF	A6P1-5	-10V Reference Voltage					43		5									
-20V FREQ REF	A9P1-5	-20V Frequency Reference Sense							21			5						

[1] Coaxial Cable - Center Conductor

[2] Coaxial Cable - Shield

[3] Not used on this assembly

Table 8-13. 83522A Motherboard Wiring List (4 of 5) (CHANGE 11)

▶ CHANGE 12

This change documents the addition of a jumper and a resistor to the A4 ALC assembly. The addition of these parts together with a revised A10 Motherboard assembly eliminate band 0 overshoot. Change 8 to this document is assumed to be incorporated prior to making the changes written in this change (Change 12).

Section VI, Replaceable Parts:

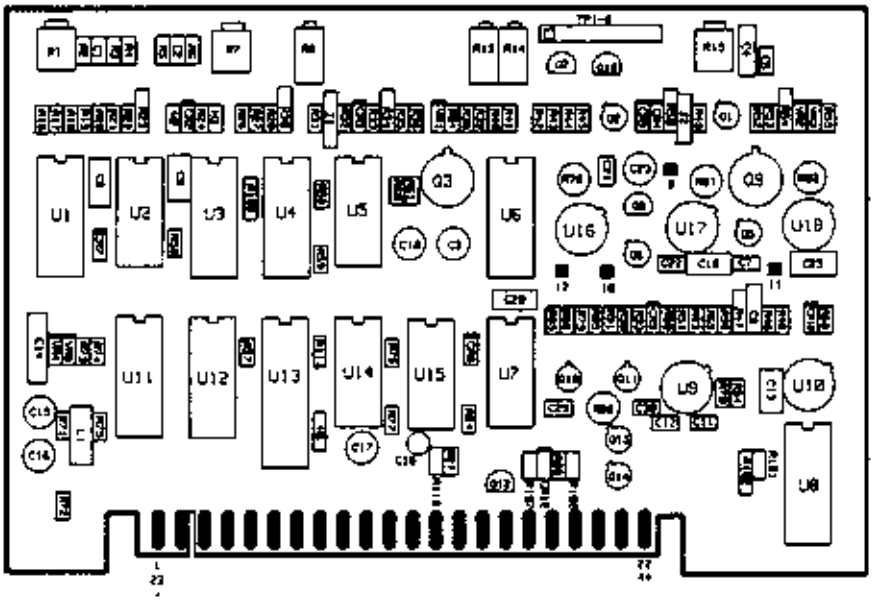
Change A4 ALC assembly to HP and Mfr. Part Number 83522-60098, CD 3.
Add A4W6, HP and Mfr. Part Number 8159-0005, CD 0, RESISTOR-ZERO OHMS 22 AW6 LEAD DIA.
Add A4R111, HP and Mfr. Part Number 0698-7253, CD 8, RESISTOR 5.11K 1% .05W.
Change A10 Motherboard assembly to HP and Mfr. Part Number 83522-60084, CD 7.

Page 8-45, Figure 8-30:

Replace the component locations diagram with *Figure 8-30. A4 ALC, Component Locations (CHANGE 12)* provided in this document.

Page 8-45, Figure 8-35:

Replace the schematic diagram with *Figures 8-35. A4 ALC Schematic Diagram (CHANGE 12).*



HP P/N 83522-60098

Figure 8-30. A4 Component Locations (CHANGE 12)

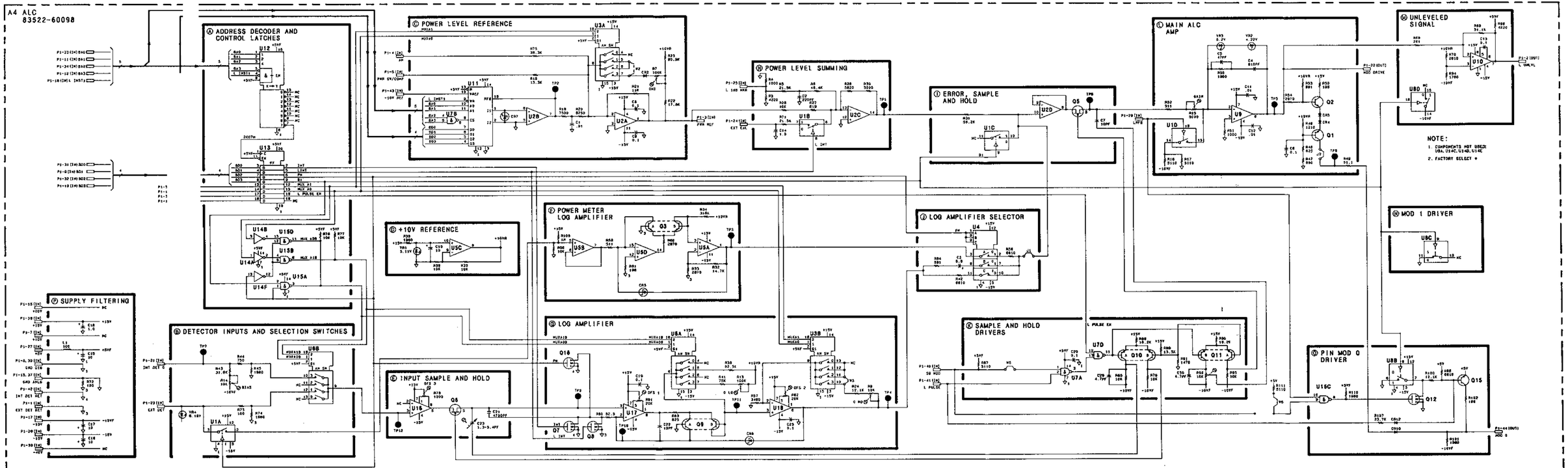


Figure 8-35. A4 ALC Schematic Diagram (CHANGE 12).