

DETECTOR

11664A



HEWLETT  PACKARD

PL-14

name

DETECTOR

11664A

SERIAL NUMBERS

This manual applies directly to serial numbers starting at 1244A00238 and continuing throughout the 1244A prefix.

With changes described in Section VII, this manual also applies to instruments with serial number 1244A00237 and below.

For additional important information concerning serial numbers, see INSTRUMENTS COVERED BY MANUAL in Section I.

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1501 PAGE MILL ROAD, PALO ALTO, CALIFORNIA, U.S.A.

Manual Part No. 11664-90005
Microfiche Part No. 11664-90006

Printed: JUNE 1973

HEWLETT  PACKARD

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CAUTION

Take care when connecting or disconnecting the 11664A. Always ground yourself by touching the system ground each time before touching the outer shell of the 11664A OR ANY DEVICE CONNECTED TO THE OUTER SHELL. Another method is to wear non-porous gloves. If this is not done, the diode in the 11664A may burn out.

Design parameters of sensitive microwave diodes make these diodes susceptible to burn-out from static electricity. Tremendous voltages, of the order of tens of thousands of volts, can be built up on the human body under certain conditions. Conditions susceptible to static build-up are dry air, rubber or composition shoe soles, nylon clothing, or floor carpeting.

If static discharges are noticed by the operator, they indicate a voltage of 20,000 volts or more, which is more than enough to burn out the diode. In this case, some thought should be given to reducing the hazard by removing carpeting, wearing clothing other than nylon, or by adding a shunting path to ground on the 11664A. This consists of a piece of wire soldered to a ground lug held under one of the screws in the 11664A case, nearest the RF input connector. Another method, used here at Hewlett-Packard, is to have the operator wear a light, removable, copper bracelet to ground any static electricity on the body. The bracelet is permanently grounded to the system ground. This has been found to be the surest method of protecting the 11664A, since it does not depend on the operator grounding himself.

SECTION I GENERAL INFORMATION

1-1. INTRODUCTION

1-2. This manual contains operating and service information for the Hewlett-Packard Model 11664A Detector. The instrument is shown in Figure 1-1.

1-3. On the first page of this manual, below the manual part number, is a "Microfiche" part number. This number may be used to order 4X6-inch microfilm transparencies of the manual. Each microfiche contains up to 60 photo-duplicates of the manual pages. The microfiche package also includes the latest Manual Changes supplement as well as all pertinent Service Notes.

1-4. Instrument specifications are listed in Table 1-1. These specifications are performance standards or limits against which the instrument may be tested. Table 1-2 lists supplemental characteristics. Supplemental characteristics are not specifications but are typical characteristics included as additional information for the user.

1-5. INSTRUMENTS COVERED BY MANUAL

1-6. This instrument has a two-part serial number. The first four digits and the letter comprise the serial number prefix. The last five digits form the sequential suffix that is unique to each instrument. The contents of this manual apply directly to instruments having the same serial number prefix(es) as listed under SERIAL NUMBERS on the title page.

1-7. An instrument manufactured after the printing of this manual may have a serial prefix that is not listed on the title page. This unlisted serial prefix indicates that the instrument is different from those documented in this manual. The manual for this instrument is supplied with a yellow Manual Changes supplement that contains "change information" that documents the differences.

1-8. In addition to change information, the supplement contains information for correcting errors in the manual. To keep this manual as current and accurate as possible, Hewlett-Packard recommends that you periodically request the latest Manual Changes supplement. The supplement for this manual is keyed to this manual's print date and part number, both of which appear on the title page. Complimentary copies of the supplement are available from Hewlett-Packard.

1-9. For information concerning a serial number listed in the Manual Changes supplement, contact your nearest Hewlett-Packard office.

1-10. EQUIPMENT SUPPLIED

1-11. The equipment supplied is shown in Figure 1-1. A set of color-coded snap-on clips are also included. These clips may be used to identify the ends of each of the 11664A Detectors.



Figure 1-1. HP Model 11664A Detector

Table 1-1. Specifications

SPECIFICATIONS	
FREQUENCY	GENERAL
Frequency Range: 100 MHz to 18 GHz (usable to 10 MHz).	Temperature Range: Operation, 0 to 55 degrees C; storage, -40 degrees C to 75 degrees C.
REFLECTION	Connectors: Standard: Type N plug. Option 001: APC-7. Option 002: SMA jack.
Return Loss:	Dimensions: Cable length is 48 inches.
100 MHz to 4 GHz: ≥ 20 dB (≤ 1.22 SWR).	Weight: Net 6 oz. (0,17 kg).
4 GHz to 8 GHz: ≥ 17 dB (≤ 1.32 SWR).	
8 GHz to 16 GHz: ≥ 10 dB (≤ 1.92 SWR).	
16 GHz to 18 GHz: ≥ 7 dB (≤ 2.61 SWR).	

Table 1-2. Supplemental Characteristics

SUPPLEMENTAL CHARACTERISTICS																	
AMPLITUDE RESPONSE	GENERAL																
Variation due to Temperature	Input Damage Level: + 20 dBm (100 mW) RF power 10 Vdc																
<table border="1" style="display: none;"> <caption>Data points for Amplitude Response Variation due to Temperature</caption> <thead> <tr> <th>Temp. (°C)</th> <th>Response Change (dB)</th> </tr> </thead> <tbody> <tr><td>0</td><td>+0.5</td></tr> <tr><td>10</td><td>+0.4</td></tr> <tr><td>20</td><td>+0.1</td></tr> <tr><td>30</td><td>-0.3</td></tr> <tr><td>40</td><td>-0.5</td></tr> <tr><td>50</td><td>-0.6</td></tr> <tr><td>55</td><td>-0.7</td></tr> </tbody> </table>	Temp. (°C)	Response Change (dB)	0	+0.5	10	+0.4	20	+0.1	30	-0.3	40	-0.5	50	-0.6	55	-0.7	Input Impedance: 50 ohms nominal
Temp. (°C)	Response Change (dB)																
0	+0.5																
10	+0.4																
20	+0.1																
30	-0.3																
40	-0.5																
50	-0.6																
55	-0.7																

1-12. OPTIONS

1-13. The following options are available:

- Option 001: APC-7 connector
- Option 002: SMA-female connector

1-14. DESCRIPTION

1-15. The Model 11664A Detector is used with the HP Model 8755A Swept Amplitude Analyzer. Normally three 11664A Detectors are used with the Model 8755A to make reflection and transmission measurements simultaneously. The 11664A Detectors are used in an ac-coupled system in the 8755A so that any 11664A may be interchanged with any other 11664A without any necessity of recalibration.

1-16. EQUIPMENT REQUIRED BUT NOT SUPPLIED

1-17. To use the instrument with an HP Model 8755A, two or three 11664A Detectors and the following equipment are required:

1. HP Model 8755A Swept Amplitude Analyzer
2. HP Model 180-series Oscilloscope main-frame
3. HP Model 11665A Modulator
4. Directional coupler, such as HP Model 778D or 779D
5. Sweep Oscillator, such as HP Model 8620-series

1-18. Swept Amplitude Analyzer

1-19. The Model 8755A Swept Amplitude Analyzer with two or three 11664A Detectors and the Model 11665A Modulator measures amplitude levels of -50 to +10 dBm and amplitude ratios of 60 dB over a frequency range of 0.1 to 18 GHz. The Model 8755A plugs into the Model 180-series Oscilloscopes.

1-20. Oscilloscope

1-21. The Model 8755A Swept Amplitude Analyzer must be plugged into a Model 180-series Oscilloscope to be useful. The Model 180 acts as a display indicator and power supply for the Model 8755A.

1-22. Modulator

1-23. The Model 11665A Modulator is designed to be used with the Model 8755A Swept Amplitude Analyzer. The Model 8755A supplies a 27.8 kHz modulating signal to the Model 11665A which then squarewave modulates the RF signal.

1-24. Directional Couplers

1-25. To separate the incident and reflected signals, directional couplers are usually used with the Model 8755A. Either one dual directional coupler or two single directional couplers connected as a dual directional coupler can be used. The sweep frequency of the measurement is limited by the frequency range of the directional coupler.

1-26. Sweep Oscillator

1-27. Sweep Oscillators are needed to furnish the RF input signal. Either the HP Model 8620-series or Model 8690-series Sweep Oscillators may be used.

1-28. EQUIPMENT AVAILABLE

1-29. The following accessories are available:

- Model 11679A: 25-foot Extension Cable
- Model 11679B: 200-foot Extension Cable

1-30. RECOMMENDED TEST EQUIPMENT

1-31. Table 1-3 lists recommended test equipment. This equipment is used in performance testing or troubleshooting the Model 11664A. Other equipment may be substituted, provided its specifications equal or exceed the specifications given under Critical Specifications.

Table 1-3. Recommended Test Equipment

Instrument Type	Critical Specifications	Suggested Model	Use*
Sweep Oscillator	Frequency: 100 MHz to 18 GHz	HP Model 8620 mainframe with: HP Model 8621A and: 86330A + 86320A (0.1 to 4.2 GHz) 86341B (3.2 to 6.5 GHz) 86342A (5.9 to 9 GHz) 86350A (8.0 to 12.4 GHz) HP Model 8620 mainframe with 86260A (12.4 to 18 GHz)	P,T
Swept Amplitude Analyzer	Provides 27.8 kHz modulation signal Powers three 11664A Detectors Processes and displays the detected signals	HP 8755A	P,T
Audio Oscillator	Frequency: 27.8 kHz Output: >10 mV adjustable	HP 200CD	T
Modulator	Frequency: 100 MHz to 18 GHz Modulation: 27.8 kHz	HP 11665A	P,T
Dual Directional Coupler	Frequency: 100 MHz to 18 GHz	HP 778D (110 MHz to 2 GHz) HP 779D (1.7 to 12.4 GHz)	P,T
Low-Pass Filter	Frequency: Reduces 2nd harmonic of frequency band of interest ≥ 50 dB	HP 360A (700 MHz cutoff) HP 360B (1.2 GHz cutoff) HP 360C (2.2 GHz cutoff) HP 360D (4.1 GHz cutoff)	P,T
Detectors (2)	Frequency: 100 MHz to 18 GHz	HP 11664A	P,T
Power-Splitting Tee	Frequency: 100 KHz to 18 GHz	Weinschel Model 1506A	P,T
Coaxial Short	Fits mating connector of directional coupler used	HP 11511A (Type N female) HP 11512A (Type N male) HP 11515A (APC-7)	P,T P,T P,T
Attenuators (2)	Frequency: 100 MHz to 18 GHz Attenuation: 10, 20, & 30 dB	HP 11582A	P,T
Open-End Wrench	Thin 1/2 x 9/16-inch wrench	HP Part No. 8710-0877	P,T
Soldering Iron	Wattage: 37.5 watts Tip Temp: 750 to 800° F Tip Size: 1/8" OD	Ungar No. 776 Handle with Ungar No. 1237 Heating Unit	T
Soldering Tip	Shape: chisel Size: 1/8"	Ungar No. PL113	T
De-soldering Aid	Suction device to remove molten solder from connection	Soldavac by the Edsyn Company, Arleta, Calif.	T
Protective Coating	Good electrical insulation, corrosion-prevention properties	Krylon No. 1302	T
Oscilloscope	Vert. Bandwidth: ≥ 250 kHz Vert. Sensitivity: >1 mV/cm	HP 182A/1801A/1820C	T

* P = Performance Testing T = Troubleshooting

SECTION II INSTALLATION

2-1. INTRODUCTION

2-2. This section contains information concerning initial inspection, preparation for use, mating connectors, and storage and shipment.

2-3. INITIAL INSPECTION

2-4. 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. If the contents are incomplete, if there is mechanical damage or defect, or if the instrument does not pass the electrical performance test, notify the carrier as well as the Hewlett-Packard office. Keep the shipping materials for the 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. Power for the Model 11664A Detector is obtained from the Model 8755A Swept Amplitude Analyzer. Each Detector requires 0.35 watts. The Model 8755A normally powers up to three Detectors requiring a maximum of 1.05 watts.

2-8. Selecting RF Input Connector

2-9. The RF Input Connector outer shell and inner conductor assembly may be replaced, thereby changing the type of RF Input connector. This can be done by the operator using a thin open-end wrench. Refer to the Service section of this manual, paragraph 8-12, for details.

2-10. Detector Lead Identification

2-11. Colored clipon clips are furnished for lead identification. Place matching clips on both ends of the cable.

2-12. Connecting the 11664A Detector

2-13. To connect the 11664A to the 8755A, proceed as follows:

- a. Insert the 11664A dc connector into the

8755A mating connector. The connector is keyed and the plug should be inserted with the key facing downwards.

- b. Secure the dc connector in the 8755A turning the outer shell clockwise. This tightens the connector.

- c. To connect the RF Input connector:

1. Read all paragraphs under CAUTION in paragraphs 3-8 and 3-10.
2. If the RF Input connector is an APC-7, refer to Figure 2-1 for instructions.

2-14. Using APC-7 RF Connectors

2-15. Figure 2-1 shows the use of APC-7 connectors. Read the instructions on this figure before attempting to use APC-7 connectors.

2-16. Mating Connectors

2-17. Mating connectors for Type N connectors are the corresponding Type N connectors whose dimensions conform to US specification MIL-C-39012. Mating connectors for the APC-7 connectors are other APC-7 connectors. Mating connectors for other connector types are the corresponding connector of the same series.

2-18. Operating Environment

2-19. **Temperature.** The instrument may be operated in temperatures from -25°C to $+55^{\circ}\text{C}$.

NOTE

See Table 1-2 for response variation due to temperature.

2-20. **Humidity.** The instrument may be operated in environments with humidity up to 95%. However, the instrument should also be protected from temperature extremes which cause condensation within the 11664A.

2-21. **Altitude.** The instrument may be operated at altitudes up to 25,000 feet.

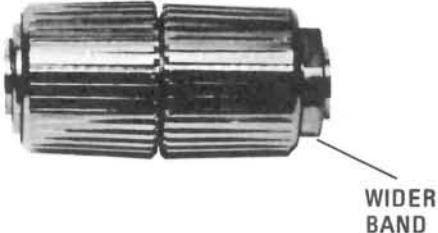
<p>To Connect:</p> <ol style="list-style-type: none"> 1. On one connector, retract the coupling sleeve by turning the coupling nut counter-clockwise until the sleeve and nut disengage. 2. On the other connector, fully extend the coupling sleeve by turning the coupling nut clockwise. To engage coupling sleeve and coupling nut when the sleeve is fully retracted, press back lightly on the nut while turning it clockwise. 3. Push the connectors firmly together, and thread the coupling nut of the connector with retracted sleeve over the extended sleeve. 4. Do NOT tighten the other coupling nut since this will tend to loosen the electrical connection. 	<p>To Disconnect:</p> <ol style="list-style-type: none"> 1. Loosen the coupling nut of the connector showing the wider gold band. <div style="text-align: center;">  </div> <ol style="list-style-type: none"> 2. IMPORTANT: Part the connectors carefully to prevent striking the inner conductor contact.
---	---

Figure 2-1. Use of APC-7 Connectors

2-22. STORAGE AND SHIPMENT

2-23. Environment

2-24. The instrument may be stored or shipped in environments within the following limits:

Temperature: 0°C to +75°C
 Humidity: Up to 95%
 Altitude: Up to 25,000 feet

The instrument should also be protected from temperature extremes which cause condensation within 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. If the instrument is being returned to Hewlett-Packard for servicing, attach a tag indicating the type of service required, return address, model number, and full serial number. Also, mark the container

FRAGILE to assure careful handling. 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 re-packaging with commercially available 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. A double-wall carton made of 350-pound test material is adequate.

c. Use enough shock-absorbing material (3- to 4- inch layer) around all sides of the instrument to provide firm cushion and prevent movement inside the container.

d. Seal the shipping container securely.

SECTION III OPERATION

3-1. INTRODUCTION

3-2. This section contains information concerning operation of the Model 11664A Detector.

3-3. FEATURES

3-4. Features of the Model 11664A are shown in Figure 3-1.

3-5. OPERATOR'S CHECK

3-6. An Operator's Check of the 11664A is included in the Operator's Check for the Model 8755A given in the Operating and Service Manual for the Model 8755A Swept Amplitude Analyzer.

3-7. OPERATING PRECAUTIONS

3-8. Tighten the connectors only with the fingers. Do NOT use a wrench, especially with SMA connectors.

CAUTION

Do NOT apply more than 3 in./lb. (3.5 cm kg) of torque when tightening the connectors. Greater torque may deform the mating surfaces.

3-9. OPERATING INSTRUCTIONS

3-10. Operating instructions are given in the Operating and Service Manual for the Model

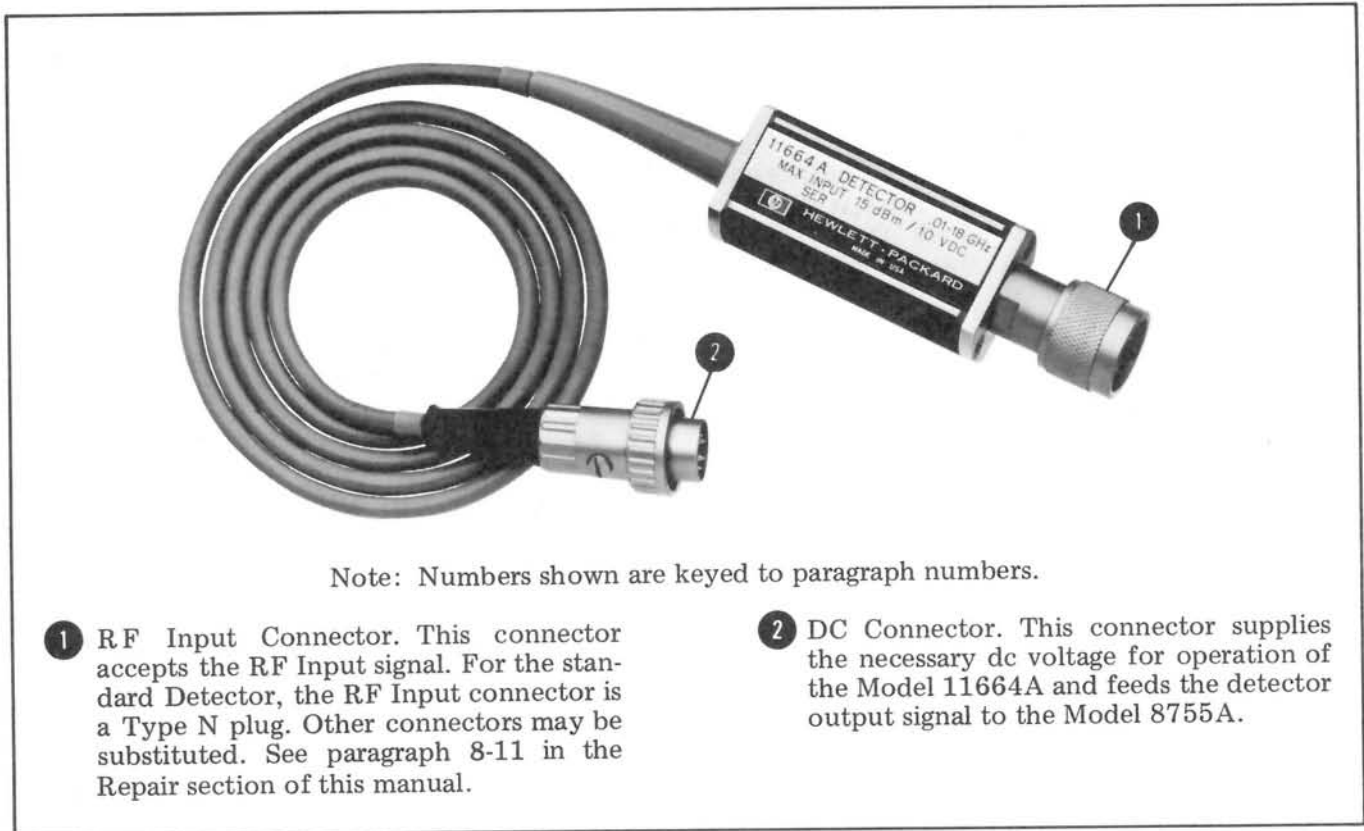


Figure 3-1. Model 11664A Features

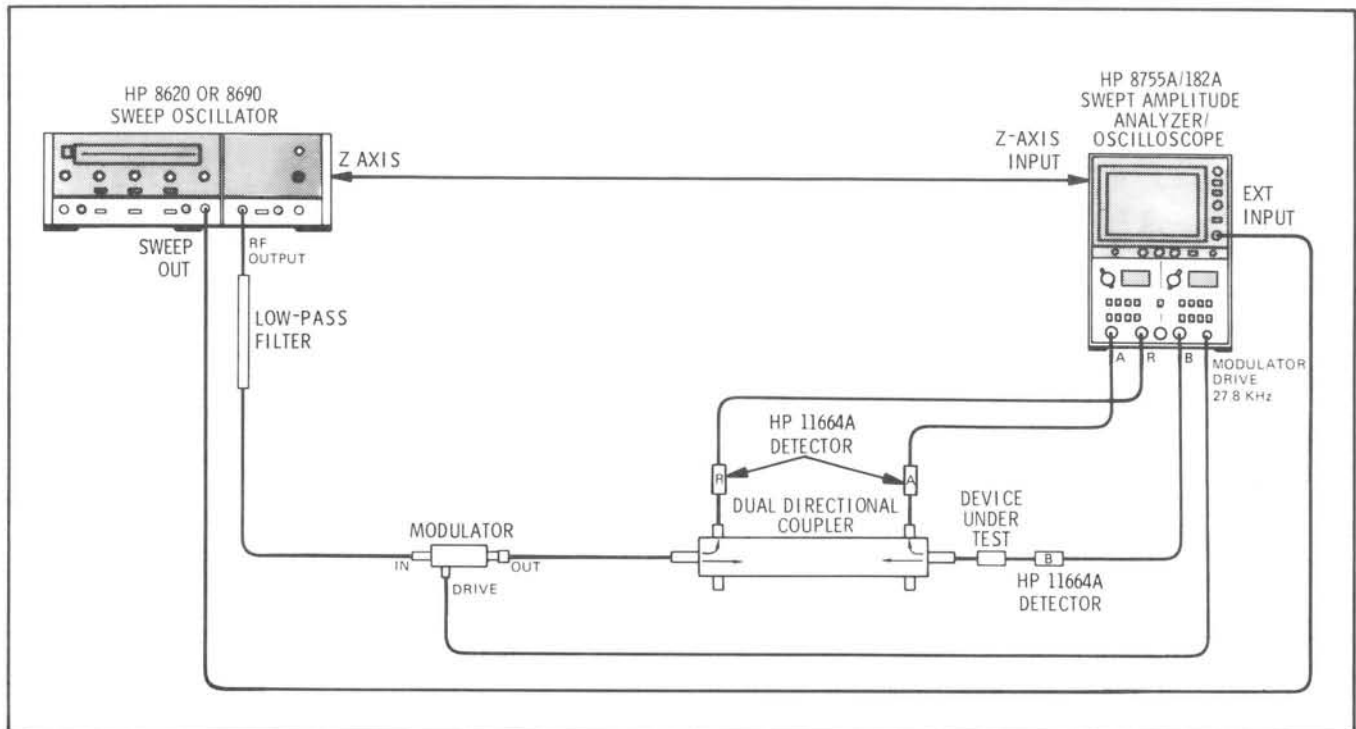


Figure 3-2. Model 8755A Typical Measurement Setup

8755A Swept Amplitude Analyzer. A typical measurement setup using the Model 8755A is shown in Figure 3-2. Be sure to read all the following cautions before operating the 8755A/11664A system.

CAUTION

Do not apply more than +15 dBm RF CW power or more than ± 10 volts dc voltage into the 11664A. If more than this power or voltage is applied, the 11664A may be damaged.

If connecting a cable, always discharge cable center conductor static electricity to instrument ground before connecting RF connector. Static electricity stored in cables can easily burn out the diode.

Do not drop the 11664A or subject it to mechanical shock. The diode can be damaged easily.

Take care when connecting or disconnecting the 11664A. Always ground yourself by touching the system ground each time before touching the outer shell of the 11664A OR ANY DEVICE CONNECTED TO THE OUTER SHELL. Another method is to wear non-porous gloves. If this is not done, the diode in the 11664A may burn out.

If static discharges are noticed by the operator, they indicate a voltage of 20,000 volts or more, which is more than enough to burn out the diode. In this case, some thought should be given to reducing the hazard by removing carpeting, wearing clothing other than nylon, or by adding a shunting path to ground on the 11664A. This consists of a piece of wire soldered to a ground lug held under one of the screws in the 11664A case, nearest the RF input connector. Another method, used here at Hewlett-Packard, is to have the operator wear a light, removable, copper bracelet to ground any static electricity on the body. The bracelet is permanently grounded to the system ground. This has been found to be the surest method of protecting the 11664A, since it does not depend on the operator grounding himself.

SECTION IV

PERFORMANCE TESTS

4-1. INTRODUCTION

4-2. The procedures in this section test the instrument's electrical performance using the specifications of Table 1-1 as the performance standards. All tests can be performed without access to the interior of the instrument.

4-3. EQUIPMENT REQUIRED

4-4. Equipment required for the performance tests is listed in the Recommended Test Equipment table in Section I. Any equipment that satisfies the

critical specifications given in the table may be substituted for the recommended model.

4-5. TEST RECORD

4-6. Results of the performance tests may be tabulated on the Test Record at the end of the procedures. The Test Record lists all of the tested specifications and their acceptable limits. Test results recorded at incoming inspection can be used for comparison in periodic maintenance and troubleshooting and after repairs or adjustments.

4-7. RETURN LOSS

SPECIFICATIONS:

Return Loss:

- 0.1 GHz to 4 GHz: ≥ 20 dB (≤ 1.22 SWR)
- 4 GHz to 8 GHz: ≥ 17 dB (≤ 1.32 SWR)
- 8 GHz to 16 GHz: ≥ 10 dB (≤ 1.92 SWR)
- 16 GHz to 18 GHz: ≥ 7 dB (≤ 2.61 SWR)

DESCRIPTION: Three 11664A Detectors are connected together with an 11665A Modulator, an 8755A Swept Amplitude Analyzer, and a dual directional coupler in a reflectometer test setup. The reflectometer is calibrated using a short. The 11664A Detector is connected and the return loss measured.

PERFORMANCE TESTS

4-7. RETURN LOSS (cont'd)

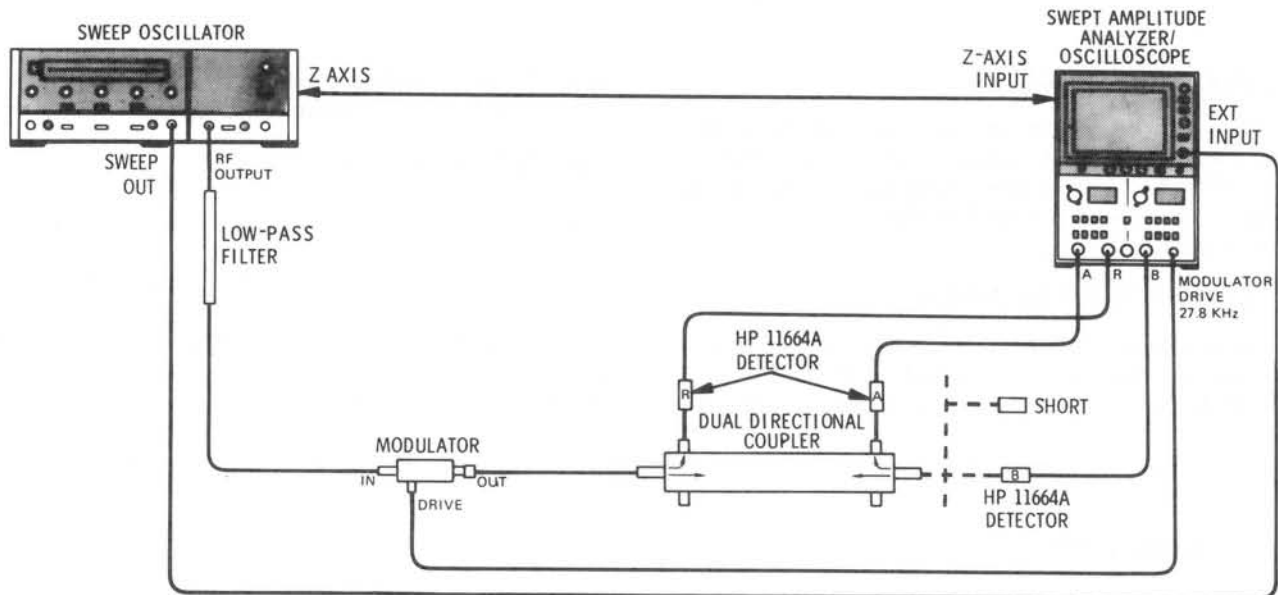


Figure 4-1. Return Loss Test Setup

EQUIPMENT

Sweep Oscillator	HP Model 8620 mainframe with: HP Model 8621A and: 86330A + 86320A (0.1 to 4.2 GHz) 86341B (3.2 to 6.5 GHz) 86342A (5.9 to 9 GHz) 86350A (8.0 to 12.4 GHz) HP Model 8620 mainframe with 86260A (12.4 to 18 GHz)
Dual Directional Coupler*	778D (110 MHz to 2 GHz) 779D (1.7 to 12.4 GHz)
Detectors (2 required)	11664A
Modulator	11665A
Swept Amplitude Analyzer/Oscilloscope	8755A/182A
Coaxial Short	11511A (Type N female) 11512A (Type N male) 11565A (APC-7)
Low-Pass Filter	360A (700 MHz cutoff) 350B (1.2 GHz cutoff) 360C (2.2 GHz cutoff) 360D (4.1 GHz cutoff)

PROCEDURE:

1. Connect the equipment as shown in Figure 4-1 with the short connected.
2. Set the 8755A CHANNEL A OFFSET dB control to 0 dB.

* Two single directional couplers connected as a dual directional coupler can also be used.

PERFORMANCE TESTS

4-7. RETURN LOSS (cont'd)

3. Set CHANNEL A OFFSET CAL switch to OFF.
4. Press CHANNEL A DISPLAY POSITION pushbutton.
5. Adjust CHANNEL A screwdriver adjustment marked POSITION to place trace on the center graticule. Increase resolution and make fine adjustment.
6. Place short on reflectometer.
7. Press CHANNEL A pushbuttons marked DISPLAY R and 10 dB/DIV.
8. Set the Sweep Oscillator to sweep the band of interest.
9. Adjust the Sweep Oscillator output power level to place the trace on the second graticule below the center graticule. (Power input is -20 dBm to the R detector.)
10. Press CHANNEL A pushbutton marked DISPLAY A/R.
11. Turn CHANNEL A OFFSET CAL control to ON and adjust the OFFSET CAL vernier control to place the trace on the center graticule.
12. Increase the dB/DIV resolution by steps to 0.25 dB/DIV. If necessary, adjust the OFFSET CAL control to return the trace to the center graticule.
13. Disconnect the short from the reflectometer test port.
14. Connect the 11664A under test to the reflectometer test port.
15. Use CHANNEL A OFFSET dB thumbwheel to return the trace to the center of the screen, or as close as possible.
16. Read the return loss at the CHANNEL A OFFSET dB window and on the oscilloscope. Return loss is the total indication of both the CHANNEL A OFFSET dB window and the trace on the oscilloscope. Add the trace indication to the window reading if the trace is below the center graticule, subtract if above.
17. Return loss measured should be equal to or greater than the following limits:

Specification	Lower Limit of Reading		
	Coupler Directivity		
	26 dB	30 dB	40 dB
20 dB	26 dB	23.3 dB	20.9 dB
17 dB	20.9 dB	19.2 dB	17.7 dB
10 dB	11.7 dB	11.0 dB	10.3 dB
7 dB	8.2 dB	7.8 dB	7.3 dB

18. If the above limits are not met, test the 11664A Detector using a slotted line at the frequency in question.

Table 4-1. Performance Test Record

Hewlett-Packard Model 11664A Detector		Tested by _____		
Serial No. _____		Date _____		
Paragraph Number	Test	Min.	Actual	Max.
4-7.	Return Loss (0.1 to 4 GHz)	20 dB	_____	
	(4 to 8. GHz)	18 dB	_____	
	(8 to 16 GHz)	10 dB	_____	
	(16 to 18 GHz)	7 dB	_____	

SECTION V ADJUSTMENTS

5-1. The Hewlett-Packard Model 11664A Detector has no adjustments or factory selected components.

SECTION VI REPLACEABLE PARTS

6-1. INTRODUCTION

6-2. This section contains information for ordering parts. Table 6-1 lists abbreviations used in the parts list and throughout the manual. Table 6-2 lists all replaceable parts in reference designator order. Table 6-3 gives all the manufacturer's code numbers that are used in the parts list.

6-3. ABBREVIATIONS

6-4. Table 6-1 gives a list of abbreviations used in the parts list, schematics, and throughout the manual. In some cases, two forms of the abbreviation are given, one all capital letters, and one partial or no capitals. This occurs because the abbreviations in the parts list are always all capitals, since the computer readout does not print lower case letters. However, in the schematics and other parts of the manual, other abbreviation forms are used with both lower case and upper case letters.

6-5. REPLACEABLE PARTS LIST

6-6. Table 6-2 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-numeric order by reference designation.
- c. Miscellaneous parts.

d. Illustrated parts breakdown, if appropriate.

The information given for each part consists of the following:

- a. The Hewlett-Packard part number.
- b. The total quantity (Qty) in the instrument.
- c. The description of the part.
- d. The typical manufacturer of the part in a five-digit code.
- e. Manufacturer code number for the part.

The total quantity for each part is given only once — at the first appearance of the part number in the list.

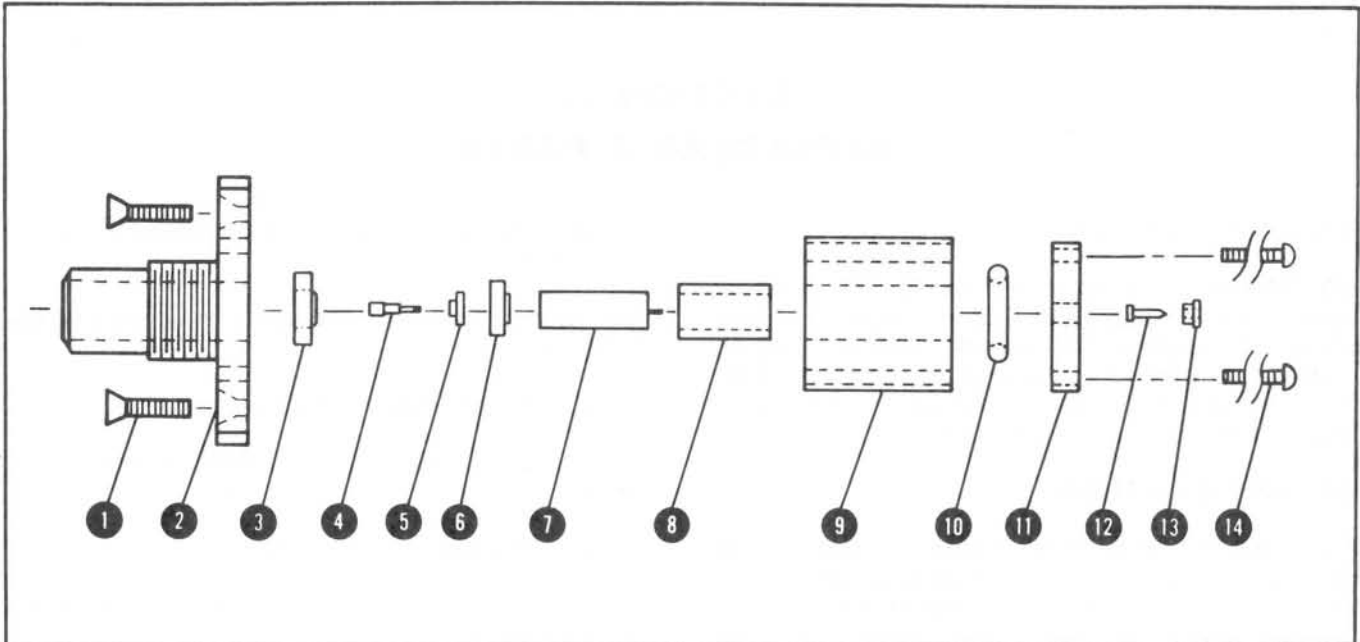
6-7. ORDERING INSTRUCTIONS

6-8. To order a part listed in the replaceable parts table, quote the Hewlett-Packard part number, indicate quantity required, and address the order to the nearest Hewlett-Packard office.

6-9. To order a part that is not listed in the replaceable parts table, include the instrument model number, instrument serial number, the description and function of the part, and the number of parts required. Address the order to the nearest Hewlett-Packard office.

Table 6-1. Reference Designators and Abbreviations Used in Manual

REFERENCE DESIGNATORS							
A	assembly	CR	diode	L	inductor	R	resistor
BT	battery	F	fuse	P	plug	S	switch
C	capacitor	J	jack	Q	transistor	U	integrated circuit
						W	cable
ABBREVIATIONS							
AMPL	amplifier	G	giga (10 ⁹)	MHz	mega Hertz	RMS	root-mean-square
CCW	counterclockwise	H	henries	NPN	negative-positive-	S-B	slow-blow
COMP	composition	K	kilo = 1000		negative	SI	silicon
CONN	connector	M	milli = 10 ⁻³	P	peak	VAR	variable
CW	clockwise	MEG	meg = 10 ⁶	PIV	peak inverse voltage	VDCW	dc working volts
DEPC	deposited carbon	MET FLM	metal film	PNP	positive-negative-	W	watts
ELECT	electrolytic	MET OX	metallic oxide		positive	WIV	working inverse
F	farads	MFR	manufacturer	PP	peak-to-peak		voltage



Description	HP Part No.
① Screw Mach 4-40 x 0.312	2200-0166
② Connector Mounting Body	11664-20003
③ Transition Washer	11664-20006
④ Capacitor-Pin Assy	11664-60005
⑤ Teflon Washer: Large	33102-20007
⑥ Brass Washer: Small	33102-20006
⑦ Diode	5086-7052
⑧ Brass Sleeve	33102-20004
⑨ Mounting Block	11664-20002
⑩ O-Ring	0905-0371
⑪ Mounting Plate	11664-00002
⑫ Contact	1251-1556
⑬ Teflon Washer: Small	5020-7422
⑭ Screw Mach 2-56 x 0.75, gold plated (Do NOT use stainless steel)	11664-20007
Label (not shown)	7124-2323

Figure 6-1. Replaceable Parts

Table 6-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A1	11664-60001	1	BOARD ASSY: PREAMPLIFIER	28480	11664-60002
A1C1	0160-3876	1	C:FXD CER 1000 PF 204 100VDCW	80031	CV2059X7R102M
A1C2	0160-2492	2	C:FXD TANT. 2.7 UF 104 20VDCW	56289	1960275X9020HA1
A1C3	0160-2492	2	C:FXD TANT. 2.7 UF 104 20VDCW	56289	1960275X9020HA1
A1CR2	1901-0023	1	DIODE: SILICON 100MA/1V	07263	FU 2367
A1J1	1251-1556	2	CONNECTOR: SINGLE CONTACT	00779	2-330808-8
A1J1	0363-0070	1	CONTACT: PC	26460	0363-0070
A1Q1	1854-0019	1	TSTR: SI NPN	26480	1854-0019
A1Q2	1853-0007	2	TSTR: SI PNP	80131	2N3251
A1Q3	1854-0071	1	TSTR: SI NPN (SELECTED FROM 2N3704)	28480	1854-0071
A1Q4	1853-0007	2	TSTR: SI PNP	80131	2N3251
A1R1	0698-7249	1	R:FXD FLM 3.48K OHM 2% 1/8W	28480	0698-7249
A1R2	0698-7279	1	R:FXD FLM 61.9K OHM 2% 1/8W	28480	0698-7279
A1R3	0698-8273	1	R:FXD MET FLM 133 OHM 0.5% 1/20W	28480	0698-8273
A1R4	0698-7236	1	R:FXD FLM 1K OHM 2% 1/8W	28480	0698-7236
A1R5	0698-7238	1	R:FXD FLM 1.21K OHM 2% 1/8W	28480	0698-7238
A1R6	0698-8274	1	R:FXD MET FLM 348 OHM 0.5% 1/20W	28480	0698-8274
A1R7	0698-7205	2	R:FXD FLM 51.1 OHM 2% 1/8W	28480	0698-7205
A1R8	0698-7205	2	R:FXD FLM 51.1 OHM 2% 1/8W	28480	0698-7205
A2	11664-60003	1	RF INPUT ASSEMBLY	28480	11664-60003 ✓
J 1	11665-60009		INPUT CONNECTOR: MALE TYPE-N PLUG (STD) CONSISTS OF THE FOLLOWING PARTS:	28480	11665-60009
	1250-0916	1	BODY: RF CONNECTOR SERIES APC-N	02660	131-148
	1250-0917	1	CONTACT: RF CONNECTOR SERIES APC-N	02660	131-147
	1250-0016	1	RING: RF CONNECTOR SERIES N	02660	82-1138-6
	1250-0918	1	NUT: RF CONNECTOR	02660	131-135
	5020-3297	3	CONTACT: SLIDING	28480	5020-3297
	1460-0977	3	SPRING: COMPRESSION 0.255" LG	00000	0RD
	5020-3296	3	CONDUCTOR: CENTER CARTRIDGE ADAPT	28480	5020-3296
	5040-0306	3	INSULATOR	28480	5040-0306
			NOTE		
			APPLY SMALL AMOUNT OF TYPE A "LOCTITE", HP PART NO. 0470-0013 TO THREADS OF CENTER CONTACT.		
			WHEN PROPERLY ASSEMBLED ALL FINGERS OF SLIDING CONTACT SHOULD BE INSIDE THE CENTER CONDUCTOR. ASSEMBLY CAN BE MADE EASIER BY WRAPPING A PIECE OF FINE WIRE AROUND THE CONTACT FINGERS.		
J 1	11665-60010		INPUT CONNECTOR: APL-7 (OPT 001) CONSISTS OF THE FOLLOWING PARTS:	28480	11665-60010
	1250-0909	1	ASSY: RF CONNECTOR APC-7 TYPE	02660	131-1057
	1250-0816	1	CONTACT: RF CONNECTOR FOR APC-7 CONNECT	02660	131-1054
	5020-3297	3	CONTACT: SLIDING	28480	5020-3297
	1460-0977	3	SPRING: COMPRESSION 0.255" LG	00000	0RD
	5020-3296	3	CONDUCTOR: CENTER CARTRIDGE ADAPT	28480	5020-3296
	5040-0306	3	INSULATOR	28480	5040-0306
			NOTE		
			APPLY SMALL AMOUNT OF TYPE A "LOCTITE" HP PART NO. 0470-0013 TO THREADS OF CENTER CONTACT.		
			WHEN PROPERLY ASSEMBLED ALL FINGERS OF SLIDING CONTACT SHOULD BE INSIDE THE CENTER CONDUCTOR. ASSEMBLY CAN BE MADE EASIER BY WRAPPING A PIECE OF FINE WIRE AROUND THE CONTACT FINGERS.		
J 1	11665-60008		INPUT CONNECTOR: FEMALE TYPE-N JACK (SPEC) CONSISTS OF THE FOLLOWING PARTS:	28480	11665-60008
	1250-0914	1	BODY: RF CONNECTOR	02660	131-150
	1250-0915	1	CONTACT: RF CONNECTOR	02660	131-149
	5020-3297	3	CONTACT: SLIDING	28480	5020-3297
	1460-0977	3	SPRING: COMPRESSION 0.255" LG	00000	0RD
	5020-3296	3	CONDUCTOR: CENTER CARTRIDGE ADAPT	28480	5020-3296
	5040-0306	3	INSULATOR	28480	5040-0306

See introduction to this section for ordering information

Table 6-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
J 1	11664-60007	1	NOTE APPLY SMALL AMOUNT OF TYPE A "LOCKTITE" HP PART NO. 0476-0013 TO THREADS OF CENTER CONTACT. WHEN PROPERLY ASSEMBLED ALL FINGERS OF SLIDING CONTACT SHOULD BE INSIDE THE EASIER BY WRAPPING A PIECE OF FINE WIRE AROUND THE CONTACT FINGERS. INPUT CONNECTOR:FEMALE SMA(OPT 002) CONSISTS OF THE FOLLOWING PARTS:	28480	11664-60007
	1250-0507	1	CONNECTOR W/CONDUCTOR & BEAD	28480	1250-0507
	1460-0297 08491-2009	2 2	SPRING:COMPRESSION SLIDING CONTACT	28480 28480	1460-0297 08491-2009
J 1	11664-60006	1	WHEN PROPERLY ASSEMBLED ALL FINGERS OF SLIDING CONTACT SHOULD BE INSIDE THE CENTER CONDUCTOR. ASSEMBLY CAN BE MADE EASIER BY WRAPPING A PIECE OF FINE WIRE AROUND THE CONTACT FINGERS. INPUT CONNECTOR:MALE SMA(OPT 002) CONSISTS OF THE FOLLOWING PARTS:	28480	11664-60006
	1250-0506	1	SPRING:COMPRESSION	28480	1460-0297
	1460-0297 08491-2009		SLIDING CONTACT	28480	08491-2009
P1 W1	11664-60002	1	WHEN PROPERLY ASSEMBLED ALL FINGERS OF SLIDING CONTACT SHOULD BE INSIDE THE CENTER CONDUCTOR. ASSEMBLY CAN BE MADE EASIER BY WRAPPING A PIECE OF FINE WIRE AROUND THE CONTACT FINGERS. PART OF W1(NOT SEPARATELY REPLACEABLE) CABLE	28480	8120-1708
	7120-3103	3	MISCELLANEOUS CABLE IDENTIFICATION CLIPS	28480	7120-3103
	7120-3104	3	WHITE	28480	7120-3104
	7120-3105	3	BLACK	28480	7120-3105
	9220-0176	1	BLUE BAG:CABLE IDENTIFICATION CLIPS	28480	9220-0176

See introduction to this section for ordering information

Table 6-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
1	11664-20006	1	FIGURE 6-1. RF ASSEMBLY A2-11664-60003		
2	11664-60005	1	TRANSITION WASHER	28480	11664-20006
3	33102-20007	1	CAPACITOR-PIN ASSY	28480	11664-60005
4	33102-20006	1	TEFLON WASHER:LARGE	28480	33102-20007
			BRASS WASHER:SMALL	28480	33102-20006
5	0960-2058	1	DIODE	28480	0960-2058
6	33102-20004	1	BRASS SLEEVE	28480	33102-20004
7	11664-20002	1	MOUNTING BLOCK	28480	11664-20002
8	0905-0371	1	SEAL "O" RING:0.250" ID X 0.390" OD	83259	2-10-S613-6
9	11664-00002	1	MOUNTING PLATE	28480	11664-00002
10	1251-1556		CONNECTOR:SINGLE CONTACT	00779	2-330808-8
11	5020-7422	1	TEFLON WASHER:SMALL	28480	5020-7422
12	11664-20007	1	SCREW:PAN HD POZI DR 2-56 X 0.750" LG	28480	11664-20007

Table 6-3. Manufacturers Code List

MFR NO.	MANUFACTURER NAME	ADDRESS	ZIP CODE
00000	U.S.A. COMMON	ANY SUPPLIER OF U.S.A.	
00779	AMP INC. (AIRCRAFT MARINE PROD.)	HARRISBURG, PA.	17101
02660	AMPHENOL CORP.	BROADVIEW, ILL.	60153
07263	FABCHILD CAMERA & INST. CORP. SEMICONDUCTOR DIV.	MOUNTAIN VIEW, CALIF.	94040
28480	HENLETT-PACKARD CO. CORPORATE HQ	YOUR NEAREST HP OFFICE	
56269	SPRAGUE ELECTRIC CO.	N. ADAMS, MASS.	01247
80031	MEPCO DIV. SESSONS CLOCK CO.	MORRISTOWN, N.J.	07960
80131	ELECTRONIC INDUSTRIES ASSOCIATION	WASHINGTON D.C.	20006
83259	PARKER SEAL CO. DIV. PARKER-HANNIFIN CORP.	CULVER CITY, CALIF.	90231

SECTION VII MANUAL CHANGES

7-1. INTRODUCTION

7-2. This section contains information for adapting this manual to instruments for which the content does not apply directly.

7-3. MANUAL CHANGES

7-4. To adapt this manual to your instrument, refer to Table 7-1 and make all of the manual changes listed opposite your instrument serial number. Perform these changes in the sequence listed.

7-5. If your instrument serial number is not listed on the title page of this manual or in Table 7-1 below, it may be documented in a yellow MANUAL CHANGES supplement. For additional important information about serial number coverage refer to INSTRUCTIONS COVERED BY MANUAL in Section I.

Table 7-1. Manual Changes by Serial Number

Serial Prefix or Number	Make Manual Changes
1244A00237 and below	A

7-6. MANUAL CHANGE INSTRUCTIONS

CHANGE A

Page 6-4, Table 6-2:
Delete A1C1.

Page 8-10, Figure 8-8:
Delete A1C1.

7-7. INSTRUMENT IMPROVEMENT MODIFICATIONS

7-8. The above manual changes document the instruments as shipped from the factory. However, if interchannel crosstalk indications are obtained on the Model 8755A with which these Detectors are used and capacitor A1C1 is not installed, install A1C1 as shown in the manual. No retesting is necessary.

7-9. The factory may, from time to time, recommend certain modifications to improve instrument operation. These modifications are not the same as changes to the manual to adapt the manual to your instrument. Consult the yellow manual changes sheet which may be included with your manual for these modifications.

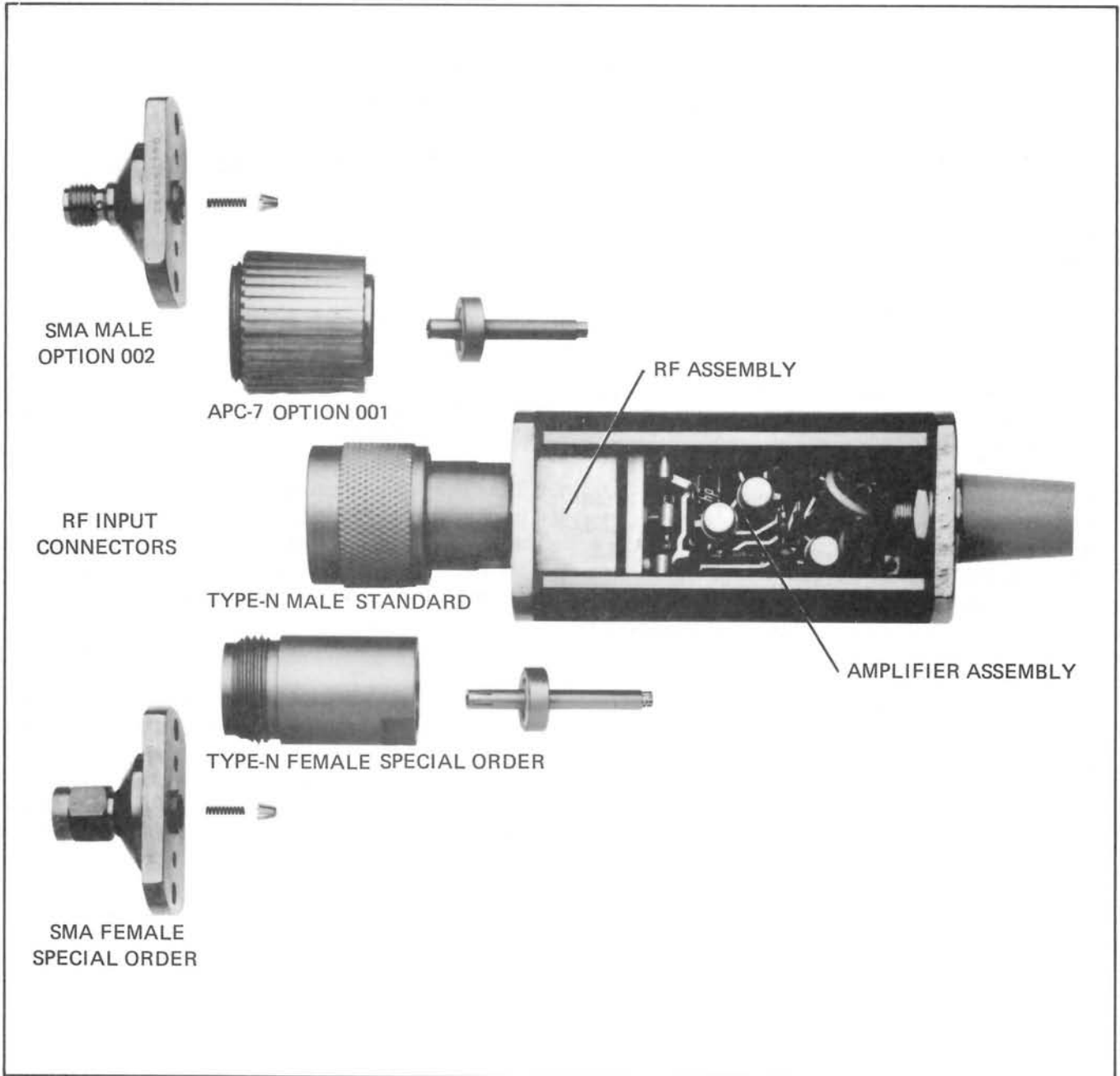


Figure 8-1. Major Assemblies

SECTION VIII

SERVICE

8-1. INTRODUCTION

8-2. This section contains troubleshooting and repair information. The general organization of this section is:

- (a) text covering repair procedures.
- (b) a troubleshooting flowgraph to find troubles.
- (c) a Service Sheet containing parts identification, principles of operation, and a schematic diagram.

8-3. PRINCIPLES OF OPERATION

8-4. A circuit description keyed to the schematic diagram is given opposite the schematic. This is helpful in understanding each major circuit function.

8-5. TROUBLESHOOTING

8-6. Troubleshooting is presented in easy to follow, block-style flowgraph diagrams. The first step in troubleshooting is to refer to TROUBLESHOOTING PROCEDURES. Here the trouble will first be isolated to a particular 11664A in the test setup. Then trouble is further isolated to the RF Assembly or the amplifier section of the 11664A. The trouble is then further isolated to the individual component. If special repair procedures are needed for replacing the individual component, these will be found under REPAIR.

8-7. RECOMMENDED TEST EQUIPMENT

8-8. Equipment recommended to test and maintain the instrument is listed in Table 1-3. Special tools for servicing the instrument are also listed.

8-9. REPAIR

8-10. This section gives detailed step-by-step repair procedures for some individual components where special care is necessary.

8-11. Changing Type N Input Connectors

8-12. Several standard HP RF Input connectors (Figure 8-1) may be used on the instrument. See Table 6-2, Replaceable Parts, for the connectors available.

8-13. To replace the connector outer shell and inner conductor assembly, proceed as follows:

- a. With a thin 1/2-inch (APC-7) or 7/16-inch (Type N) open-end wrench, loosen the connector outer shell on the 11664A. A 1/2- X 9/16-inch thin open-end wrench can be ordered as HP Part No. 8710-0877.
- b. Carefully remove the outer shell and inner conductor assembly.

CAUTION

Do NOT disassemble the center conductor assembly. If the sliding contact is removed, reassembly is difficult.

- c. If the previous connector was an SMA type, install a transition washer (see orientation of washer (3) in Figure 6-1) and a connector mounting body (2). If the previous connector was a type N, these parts should already be installed and this step may be skipped.

d. Insert new center conductor assembly in the RF connector shell. Push down on the center conductor to seat the center conductor assembly.

e. Screw the corresponding outer shell assembly on the connector mounting.

f. Tighten outer shell assembly with the open-end wrench used for disassembly.

8-14. Changing SMA Type Connectors

a. Remove the connector with a small cross-point screwdriver. If the original connector was a type N, remove and save the transition washer (3) in Figure 6-1.

b. Replace the connector with the desired SMA connector. Make sure all parts are present. In particular, make sure the spring contact in the center conductor is making contact.

8-15. APC-7 Connector Center Collet Replacement

8-16. Through wear or damage, the contact in the center conductor may need replacing. This contact is a small four-pronged collet which snaps into a recess in the center conductor. This contact is normally held in by the spring-action of the four

h. Pick up the teflon washer (5) with the right hand. Orient the washer so the shoulder faces to the left. Place the teflon washer over the contact called out in step g.

i. Pick up the small brass washer (6) with the right hand. Orient the washer so the shoulder faces to the right. Place the brass washer over the contact called out in step g.

j. Pick up the diode (7) by the outer shell with the right hand.

CAUTION

Always touch the diode cartridge shell first. If the center conductor is touched first, static discharge may damage the diode.

Insert the diode short center pin into the contact called out in step g. Orient the shoulder of the small brass washer to fit into the diode. Push the contact called out in step g in to hold the brass washer in place. Turn the brass washer to make certain the shoulder of the washer is properly seated.

k. Pick up the brass sleeve (8) and slide it over the shell of the diode.

l. Slide the entire assembly of step k into the aluminum mounting block (9).

m. While holding the entire assembly of step l in the left hand, place the red neoprene O-ring (10) over the long pin of the diode assembly and over the shell of the diode assembly.

n. Place the mounting plate (11) over the long pin of the diode assembly and against the O-ring.

o. Insert the teflon washer/contact (12 and 13) assembly on the end of the long pin of the diode assembly. Push the teflon washer/contact assembly in to hold all pieces assembled so far together.

p. Insert the two mounting screws (14) through the mounting plate.

NOTE

Check to see that the large brass washer is inserted in the RF Input connector mounting plate. If this washer is loose, insert it in the mounting plate with the shoulder away from the connector.

q. Insert the two mounting screws in the tapped holes of the RF connector mounting plate and tighten both screws equally and fully.

r. Insert completed assembly into the end of the 11664A. Insert and tighten the two pozi-drive

screws to secure the RF Input Assembly to the 11664A.

8-31. Transistor Lead Identification

8-32. The emitter lead of each transistor in the 11664A is marked with an E printed on the circuit board. Looking at the bottom of the transistor, the leads are emitter-base-collector reading clockwise from the emitter. Reference designation of the individual transistor is printed on the bottom of the board.

8-33. Diode Lead Identification

8-34. The diode symbol is printed on the board beneath each diode. There are two diodes on the printed circuit board side by side. These two diodes are oriented in different directions.

8-35. TROUBLESHOOTING PROCEDURES

8-36. Troubleshooting the 11664A can be performed in the following order:

a. Isolate the trouble to either the Detector or the Model 8755A using the procedures in Figure 8-3.

b. Isolate the trouble to either the RF Assembly or the Amplifier using the procedures in Figure 8-4.

c. Isolate the trouble to an individual component using the procedures in Figure 8-6.

8-37. TROUBLESHOOTING HINTS

8-38. In order to troubleshoot the Amplifier a Dummy Input Circuit (Figure 8-5) must be connected to the input of the amplifier. This must be done to place the proper bias on the input transistor. In normal operation the Hot Carrier Diode in the RF Assembly loads down the input circuit of the Amplifier.

NOTE

When troubleshooting the Amplifier without the RF Assembly connected, the Dummy Input Circuit must be used.

8-39. If the equipment used in Fig. 8-5 is not available, dc measurements may be used. The same Dummy Input Circuit may be used to preserve the input bias. Any trouble will most likely shift the dc-coupled voltages far from their normal values. Start by measuring the input bias. If this voltage is >50% high or low, the voltages in the entire amplifier may be off. From this point on, standard transistor troubleshooting techniques may be used. For instance, measure the emitter-base voltage of Q1. Substitution of Q1 is an easy operation, as it has plug-in terminals.

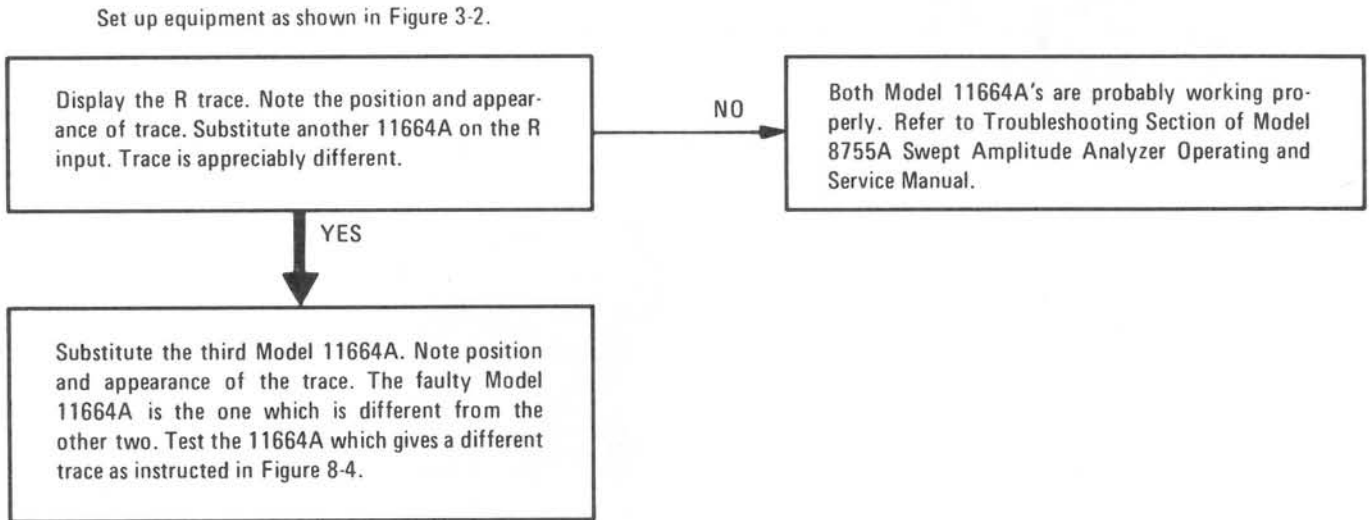


Figure 8-3. Preliminary Troubleshooting

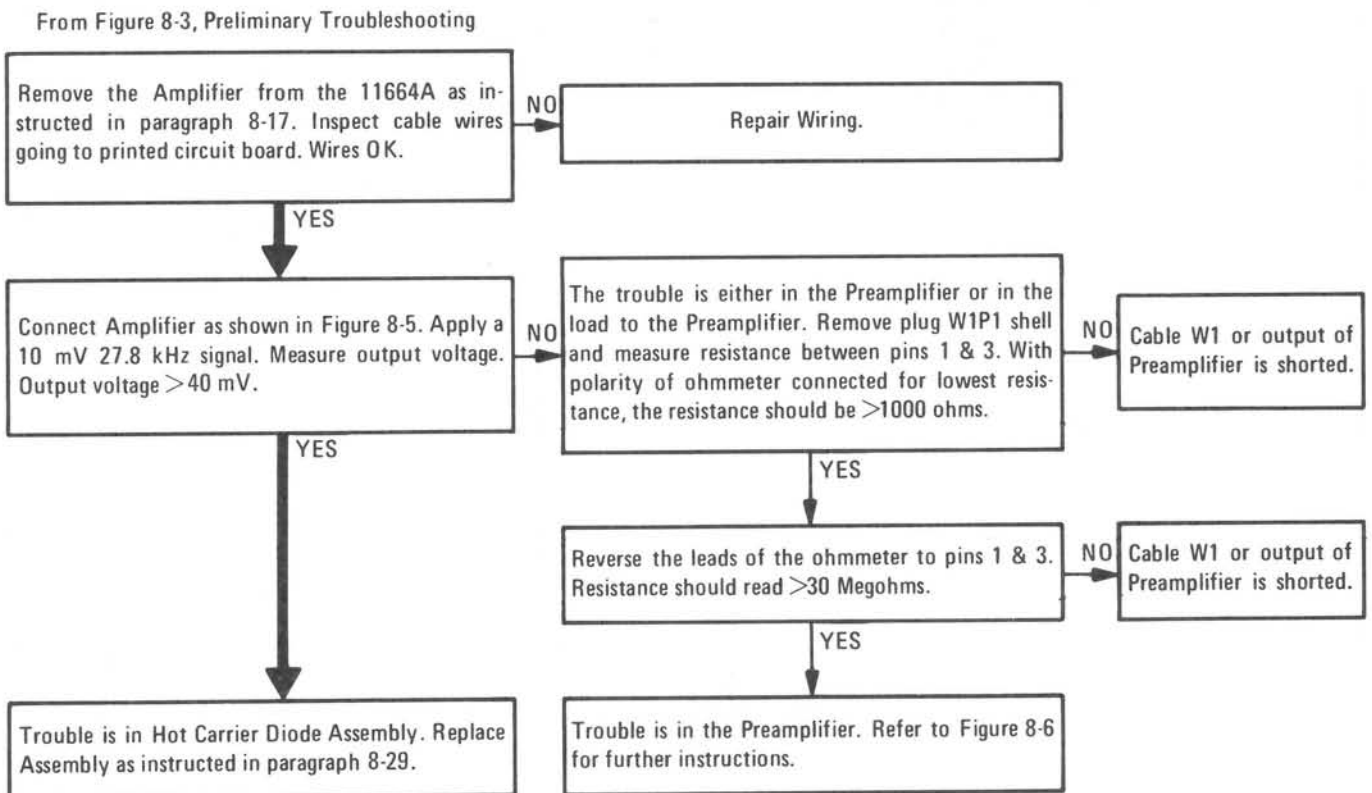


Figure 8-4. Isolating Trouble to A2 RF Assembly or A1 Preamp

PRINCIPLES OF OPERATION

The Model 11664A Detector consists of two basic assemblies, the RF Input Assembly and the Pre-amplifier assembly. The Amplifier in the 11664A is more correctly called a preamplifier since it is used before the amplifiers in the 8755A, but it will be generally referred to as the Amplifier.

RF Input Assembly

The RF Input Assembly consists of the input connector, the Hot Carrier Diode Assembly, and mounting hardware. The Hot Carrier Diode consists of the diode itself and associated components in a hermetically sealed assembly. Capacitor C1 conducts the RF signal applied to the input connector to the Hot Carrier Diode CR1. Resistor R1 matches the impedance of the input to the cable. Diode CR1 detects the 27.8 KHz envelope of the modulated RF signal.

Amplifier

The 27.8 kHz squarewave signal from the RF Input Assembly is fed into the base of A1Q1. Resistor A1R1 reduces the input RC time-constant to less than 2 microseconds so that the input to the Amplifier will follow the modulation envelope at power levels greater than -5 dBm. A resistor, A1R2, adjusts the bias on the base of A1Q1 and across A1CR1.

Transistors A1Q1 and A1Q2 comprise a feedback pair. They are a high-gain direct-coupled amplifier stage composed of an NPN and a PNP transistor cascaded together. A positive-going pulse on the base of A1Q1 will increase the voltage through A1Q1, giving a negative-going pulse to the base of A1Q2. This pulse will, by a similar action, give a positive-going pulse going to the emitter of A1Q1. This positive-going pulse on the emitter of A1Q1 tends to limit the gain of the amplifier.

Transistors A1Q3 and A3Q4 are output emitter followers connected in parallel. They are complementary symmetry fed from the emitter and collector of A1Q1. The necessary difference in bias is furnished by diodes A1CR1 and A1CR2.

Further information concerning the operation of the Model 11664A Detector may be found in the November 1972 issue of the HP Journal, obtainable free from any Hewlett-Packard office.

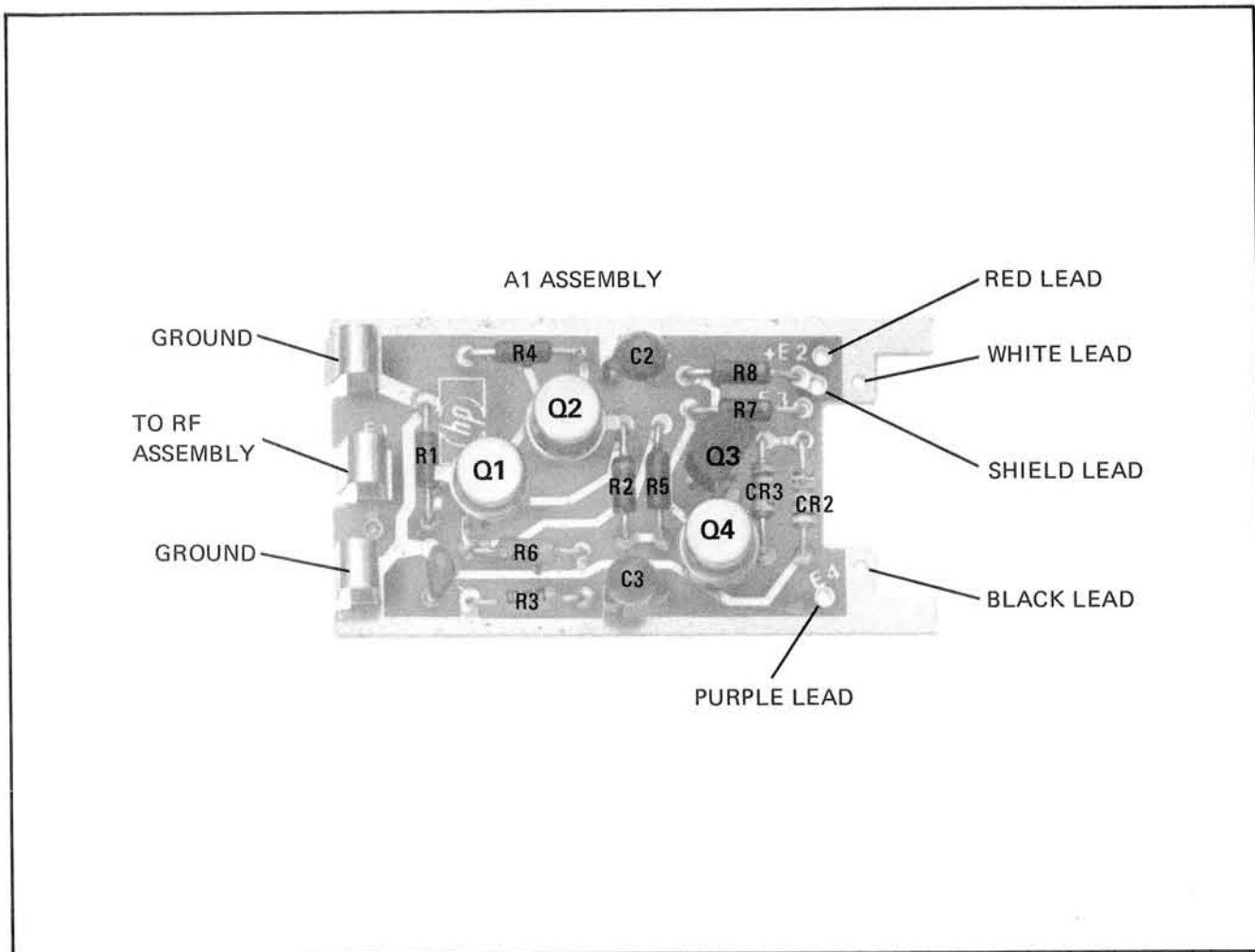


Figure 8-7. A1 Preamp Component Identification Illustration

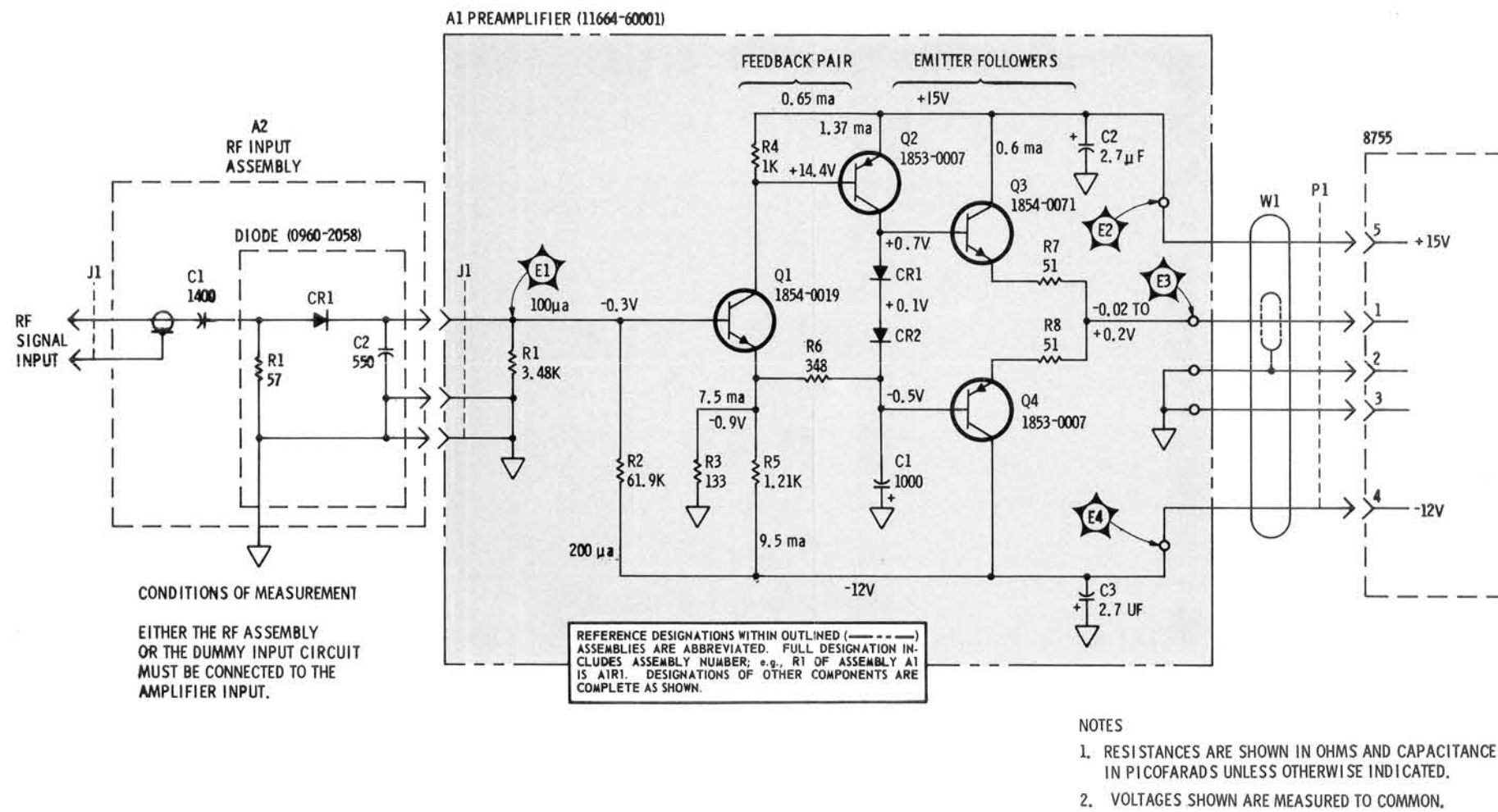


Figure 8-8. Model 11664A Schematic

MANUAL IDENTIFICATION

Model Number: 11664A
 Date Printed: April 1972
 Part Number: 11664-90001

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

To use this supplement:

Make all ERRATA corrections

Make all appropriate serial number related changes indicated in the tables below.

Serial Prefix or Number	Make Manual Changes
1244A 00238 and above	1

Serial Prefix or Number	Make Manual Changes

► NEW ITEM

► ERRATA

Page 1-2, Table 1-1:

Change Accuracy table as follows:

dB Change From Reference	Amplitude Accuracy
10 dB	≤ ± 0.9 dB
20 dB	≤ ± 1.1 dB
30 dB	≤ ± 1.1 dB
40 dB	≤ ± 1.1 dB
50 dB	≤ ± 1.1 dB
60 dB	≤ ± 1.9 dB

CHANGE 1

Page 6-4, Table 6-2:

Change A1C1 to HP Part No. 0160-3878, Qty 1, C:FXD .001 μF ± 20% 100 VDCW, Mfg 72982,
 Mfg Part Number 8121-B135 - X7R - 102M.

Page 6-3, Figure 6-1:

Change Item 12 to Screw Mach 2-56 x 0.75 Gold-Plated (do not use stainless steel) 11664-20007.

Page 8-9/8-10, Figure 8-7:

Add C1 to the right of R7 and R8 on the photograph.

Page 8-9/8-10, Figure 8-8:

Add C1 1000 pf from the base of Q4 to common.

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 CHANGES

SAN DIEGO

CLARKE, RONALD L.

MANUAL IDENTIFICATION

Model Number: 11664A

Date Printed: April 1972

Part Number: 11664-90001

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.

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Make all appropriate serial number related changes indicated in the tables below.

Serial Prefix or Number	Make Manual Changes	Serial Prefix or Number	Make Manual Changes
1244A 00238 and above	1		

► NEW ITEM

CHANGE 1

Page 6-4, Table 6-2:

Change A1C1 to HP Part No. 0160-3878, Qty 1, C:FXD .001 μ F \pm 20% 100 VDCW, Mfg 72982,
Mfg Part Number 8121-B135 - X7R - 102M.

Page 6-3, Figure 6-1:

Change Item 12 to Screw Mach 2-56 x 0.75 Gold-Plated (do not use stainless steel) 11664-20007.

Page 8-9/8-10, Figure 8-7:

Add C1 to the right of R7 and R8 on the photograph.

Page 8-9/8-10, Figure 8-8:

Add C1 1000 pf from the base of Q4 to common.

NOTE

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25 January 1973

HEWLETT  PACKARD

Printed in U.S.A.

MANUAL CHANGES

MANUAL IDENTIFICATION

Model Number: 11664A
 Date Printed: June 1973
 Part Number: 11664-90005

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

To use this supplement:

Make all ERRATA corrections

Make all appropriate serial number related changes indicated in the tables below.

Serial Prefix or Number	Make Manual Changes	Serial Prefix or Number	Make Manual Changes
1244A01166 and above	1		

► NEW ITEM

► ERRATA

Page 6-4, Table 6-2:

Change W1 to HP Part No. 8120-1788.

Page 8-3, Figure 8-2:

Change PURPLE WIRE TO E4 to "VIOLET WIRE TO E4".

Page 8-3, paragraph 8-30:

Add the following to step d;

The diode may be supplied from the factory with long leads which must be cut before installation. First, the polarity of the diode must be determined. Referring to Figure 6-1 on page 6-2, note that the RF side is on the left and the Preamp side is on the right. The center lead which goes to the Preamp is longer. To determine which end of the diode is which, notice that one end has a smaller, circular center conductor; this end is the RF end. The other end has a larger, half-circle center conductor; this end is the Preamp end. Cut the smaller, round conductor (RF end) lead even with the end of the outer shell of the diode. Cut the larger, half-circle conductor (Preamp end) 3/16 inch \pm 1/32 inch beyond the end of the outer shell of the diode.

Page 8-9/8-10, Figure 8-7:

Change PURPLE LEAD to "VIOLET LEAD".

Interchange location lines for the WHITE and SHIELD leads.

NOTE

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MANUAL CHANGES

ERRATA (Cont'd)

Page 8-9/8-10, Figure 8-8:

Add the following wire colors to W1, starting at the top: 2, 9, 8, 0, and 7.

CHANGE 1

Page 8-3, Figure 8-2:

Delete black wire and "BLACK WIRE TO GROUND NEAR E4" reference.

Page 8-6, Figure 8-5:

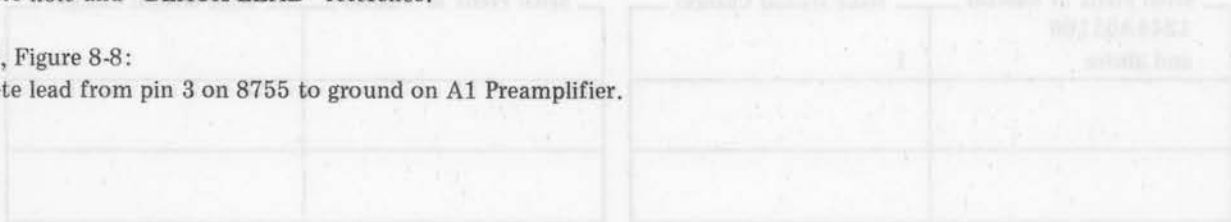
Delete black wire to ground near E4.

Page 8-9, Figure 8-7:

Delete hole and "BLACK LEAD" reference.

Page 8-9, Figure 8-8:

Delete lead from pin 3 on 8755 to ground on A1 Preamplifier.



ERRATA

Page 8-3, Figure 8-2:
Delete black wire and "BLACK WIRE TO GROUND NEAR E4" reference.

Page 8-6, Figure 8-5:
Delete black wire to ground near E4.

Page 8-9, Figure 8-7:
Delete hole and "BLACK LEAD" reference.

Page 8-9, Figure 8-8:
Delete lead from pin 3 on 8755 to ground on A1 Preamplifier.

NOTE

These changes were made to the manual to correct errors in the original manual. The original manual was published in 1971. The changes were made in 1972. The original manual was published in 1971. The changes were made in 1972.

MANUAL CHANGES

MANUAL IDENTIFICATION

Model Number: 11664A

Date Printed: June 1973

Part Number: 11664-90005

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To use this supplement:

Make all ERRATA corrections

Make all appropriate serial number related changes indicated in the tables below.

Serial Prefix or Number	Make Manual Changes	Serial Prefix or Number	Make Manual Changes
▶ 1244A01166 thru 1244A01900	1		
▶ 1413A	1, 2		

▶ NEW ITEM

ERRATA

▶ Page 1-3, Paragraph 1-17:

In item 3, change 11665A to 11665B.

Change item 4 to read "... HP Model 778D, 779D, or 11692D".

▶ Page 1-4, Table 1-3:

Change Dual Directional Coupler critical specification to read "10 MHz to 18 GHz."

Change suggested model from HP 779D (1.7 to 12.4 GHz) to HP 11691D (2 to 18 GHz).

Change Power-Splitting Tee to Power-Splitter.

In specification column, change frequency to read "DC to 18 GHz."

In suggested model column, change Weinschel Model 1506A to read "HP 11667A."

Page 6-4, Table 6-2:

Change W1 to HP Part No. 8120-1788.

Page 8-3, Figure 8-2:

Change PURPLE WIRE TO E4 to "VIOLET WIRE TO E4".

NOTE

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25 October 1974

3 Pages

Printed in U.S.A.

HEWLETT  PACKARD

ERRATA (Cont'd)

Page 8-3, paragraph 8-30:

Add the following to step d;

The diode may be supplied from the factory with long leads which must be cut before installation. First, the polarity of the diode must be determined. Referring to Figure 6-1 on page 6-2, note that the RF side is on the left and the Preamplifier side is on the right. The center lead which goes to the Preamplifier is longer. To determine which end of the diode is which, notice that one end has a smaller, circular center conductor; this end is the RF end. The other end has a larger, half-circle center conductor; this end is the Preamplifier end. Cut the smaller, round conductor (RF end) lead even with the end of the outer shell of the diode. Cut the larger, half-circle conductor (Preamplifier end) 3/16 inch \pm 1/32 inch beyond the end of the outer shell of the diode.

Page 8-9/8-10, Figure 8-7:

Change PURPLE LEAD to "VIOLET LEAD".

Interchange location lines for the WHITE and SHIELD leads.

Page 8-9/8-10, Figure 8-8:

Add the following wire colors to W1, starting at the top: **2** , **9** , **8** , **0** , and **7** .

CHANGE 1

Page 8-3, Figure 8-2:

Delete black wire and "BLACK WIRE TO GROUND NEAR E4" reference.

Page 8-6, Figure 8-5:

Delete black wire to ground near E4.

Page 8-9, Figure 8-7:

Delete hole and "BLACK LEAD" reference.

Page 8-9, Figure 8-8:

Delete lead from pin 3 on 8755 to ground on A1 Preamplifier.

► CHANGE 2

Page 1-2, Table 1-1:

Change frequency range specification to read "10 MHz to 18 GHz".

Change return loss specification 100 MHz to 4 GHz \geq 20 dB (\leq 1.22 SWR) to read as follows:

10 MHz to 40 MHz \geq 10 dB (\leq 1.92 SWR)

40 MHz to 4 GHz \geq 20 dB (\leq 1.22 SWR)

Change Option 002 to read: SMA - Female

Add "Option 003: SMA - Male"

Page 1-3, Paragraph 1-13:

Add "Option 003: SMA - Male Connector"

Page 4-1, Paragraph 4-7:

Change return loss specification 0.1 GHz to 4 GHz: \geq 20 dB (\leq 1.22 SWR) to read as follows:

.01 GHz to .04 GHz: \geq 10 dB (\leq 1.92 SWR)

.04 GHz to 4 GHz: \geq 20 dB (\leq 1.22 SWR)

CHANGE 2 (Cont'd)

Page 4-4, Table 4-1:

Change return loss (0.1 to 4 GHz) to read:
(0.01 to 0.04 GHz) 10 dB minimum
(0.04 to 4 GHz) 20 dB minimum.

Page 6-4, Table 6-2:

Change J1, HP Part No. 11664-60006 from Option 002 to Option 003.

Page 8-0, Figure 8-1:

Substitute the attached major assemblies figure for that shown in the 11664A manual.

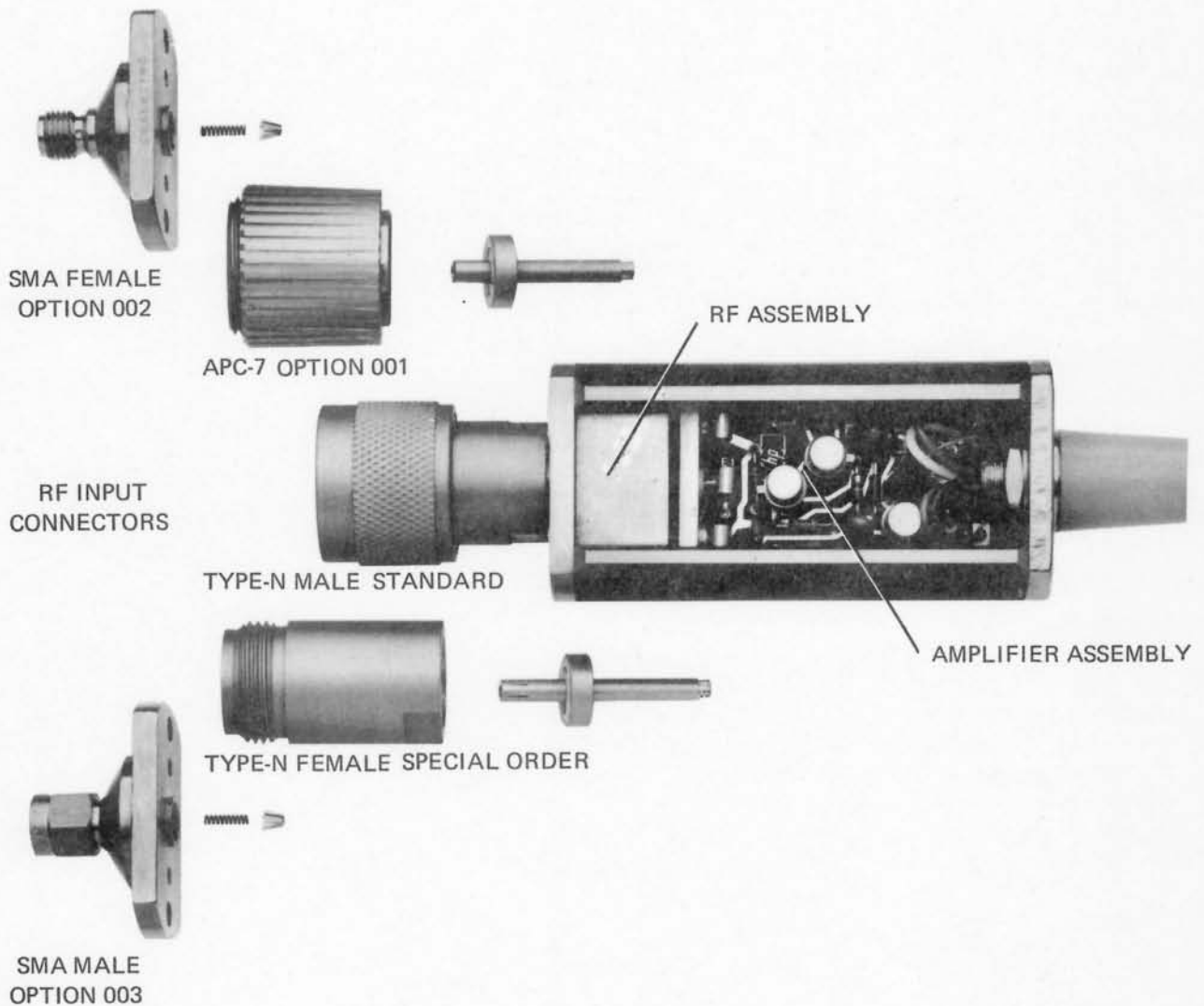


Figure 8-1. Major Assemblies (Change 2)

CLARKE, RONALD L.

MANUAL IDENTIFICATION

Model Number: 11664A
 Date Printed: June 1973
 Part Number: 11664-90005

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Make all ERRATA corrections

Make all appropriate serial number related changes indicated in the tables below.

Serial Prefix or Number	Make Manual Changes	Serial Prefix or Number	Make Manual Changes
1244A01166	1		
▶ 1413	2		

▶ NEW ITEM

ERRATA

▶ Page 1-3, Paragraph 1-17:

In Item 3, change 11665A to 11665B. Change Item 4 to read “. . . . HP Model 778D, 779D, or 11692D”

▶ Page 1-4, Table 1-3:

Change Dual Directional Couple critical specification to read “10 MHz to 18 GHz.” Change suggested model from HP 779D (1.7 to 12.4 GHz) to HP 11692D (2 to 18 GHz).

Change Power-Splitting Tee to Power-Splitter. In specification column, change frequency to read “DC to 18 GHz.” In suggested model column, change Weinschel Model 1506A to read “HP11667A.”

Page 6-4, Table 6-2:

Change W1 to HP Part No. 8120-1788.

Page 8-3, Figure 8-2:

Change PURPLE WIRE TO E4 to “VIOLET WIRE TO E4.”

Page 8-3, Paragraph 8-30:

NOTE

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ERRATA (Cont'd)

Page 8-3, Paragraph 8-30:

Add the following to step d:

The diode may be supplied from the factory with long leads which must be cut before installation. First, the polarity of the diode must be determined. Referring to Figure 6-1 on page 6-2, note that the RF side is on the left and the Preamplifier side is on the right. The center lead which goes to the Preamplifier is longer. To determine which end of the diode is which, notice that one end has a smaller, circular center conductor; this end is the RF end. The other end has a larger, half-circle center conductor; this end is the Preamplifier end. Cut the smaller, round conductor (RF end) lead even with the end of the outer shell of the diode. Cut the larger, half-circle conductor (Preamplifier end) $3/16$ inch $\pm 1/32$ inch beyond the end of the outer shell of the diode.

Page 8-9/8-10, Figure 8-7:

Change PURPLE LEAD to "VIOLET LEAD."

Interchange location lines for the WHITE and SHIELD leads.

Page 8-9/8-10, Figure 8-8:

Add the following wire colors to W1, starting at the top: **2**, **9**, **8**, **0**, and **7**.

CHANGE 1

Page 8-3, Figure 8-2:

Delete black wire and "BLACK WIRE TO GROUND NEAR E4" reference.

Page 8-6, Figure 8-5:

Delete black wire to ground near E4.

Page 8-9, Figure 8-7:

Delete hole and "BLACK LEAD" reference.

Page 8-9, Figure 8-8:

Delete lead from pin 3 on 8755 to ground on A1 Preamplifier.

▶CHANGE 2

Page 1-2, Table 1-1:

Change frequency range specification to read "10 MHz to 18 GHz."

Page 1-3, Paragraph 1-13:

Add Option 003: SMA-Male Connector.

Page 4-1, Paragraph 4-7:

Change return loss specification 0.1 GHz to 4 GHz:

≥ 20 dB (≤ 1.22 SWR) to read as follows:

.01 GHz to 0.04 GHz: ≥ 10 dB (≤ 1.92 SWR)

.04 GHz to 4 GHz ≥ 20 dB (≤ 1.22 SWR)

Page 4-4, Table 4-1:

Change return loss (0.1 to .04 GHz) to read:

(.01 to .04 GHz) 10 dB minimum

(.04 to 4 GHz) 20 dB minimum

Page 6-4, Table 6-2:

Change J1, HP Part No. 11604-60006 from Option 002 to Option 003.

MANUAL CHANGES

MANUAL IDENTIFICATION

Model Number: 11664A

Date Printed: June 1973

Part Number: 11664-90005

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Make all ERRATA corrections

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Serial Prefix or Number	Make Manual Changes	Serial Prefix or Number	Make Manual Changes
▶ 1244A01166 thru 1244A01900	1		
▶ 1413A	1, 2		
▶ 1531A	1,2,3		

▶ NEW ITEM

ERRATA

Page 1-3, Paragraph 1-17:

In item 3, change 11665A to 11665B.

Change item 4 to read "... HP Model 778D, 779D, or 11692D".

Page 1-4, Table 1-3:

Change Dual Directional Coupler critical specification to read "10 MHz to 18 GHz."

Change suggested model from HP 779D (1.7 to 12.4 GHz) to HP 11691D (2 to 18 GHz).

Change Power-Splitting Tee to Power-Splitter.

In specification column, change frequency to read "DC to 18 GHz."

In suggested model column, change Weinschel Model 1506A to read "HP 11667A."

Page 6-4, Table 6-2:

Change W1 to HP Part No. 8120-1788.

Page 8-3, Figure 8-2:

Change PURPLE WIRE TO E4 to "VIOLET WIRE TO E4".

NOTE

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19 SEPTEMBER 1975

4 Pages

Printed in U.S.A.

HEWLETT  PACKARD

ERRATA (Cont'd)

Page 8-3, paragraph 8-30:

Add the following to step d;

The diode may be supplied from the factory with long leads which must be cut before installation. First, the polarity of the diode must be determined. Referring to Figure 6-1 on page 6-2, note that the RF side is on the left and the Preamplifier side is on the right. The center lead which goes to the Preamplifier is longer. To determine which end of the diode is which, notice that one end has a smaller, circular center conductor; this end is the RF end. The other end has a larger, half-circle center conductor; this end is the Preamplifier end. Cut the smaller, round conductor (RF end) lead even with the end of the outer shell of the diode. Cut the larger, half-circle conductor (Preamplifier end) 3/16 inch \pm 1/32 inch beyond the end of the outer shell of the diode.

Page 8-9/8-10, Figure 8-7:

Change PURPLE LEAD to "VIOLET LEAD".

Interchange location lines for the WHITE and SHIELD leads.

Page 8-9/8-10, Figure 8-8:

Add the following wire colors to W1, starting at the top: **2** , **9** , **8** , **0** , and **7** .

CHANGE 1

Page 8-3, Figure 8-2:

Delete black wire and "BLACK WIRE TO GROUND NEAR E4" reference.

Page 8-6, Figure 8-5:

Delete black wire to ground near E4.

Page 8-9, Figure 8-7:

Delete hole and "BLACK LEAD" reference.

Page 8-9, Figure 8-8:

Delete lead from pin 3 on 8755 to ground on A1 Preamplifier.

CHANGE 2

Page 1-2, Table 1-1:

Change frequency range specification to read "10 MHz to 18 GHz".

Change return loss specification 100 MHz to 4 GHz \geq 20 dB (\leq 1.22 SWR) to read as follows:

10 MHz to 40 MHz \geq 10 dB (\leq 1.92 SWR)

40 MHz to 4 GHz \geq 20 dB (\leq 1.22 SWR)

Change Option 002 to read: SMA - Female

Add "Option 003: SMA - Male"

Page 1-3, Paragraph 1-13:

Add "Option 003: SMA - Male Connector"

Page 4-1, Paragraph 4-7:

Change return loss specification 0.1 GHz to 4 GHz: \geq 20 dB (\leq 1.22 SWR) to read as follows:

.01 GHz to .04 GHz: \geq 10 dB (\leq 1.92 SWR)

.04 GHz to 4 GHz: \geq 20 dB (\leq 1.22 SWR)

CHANGE 2 (Cont'd)

Page 4-4, Table 4-1:

Change return loss (0.1 to 4 GHz) to read:
(0.01 to 0.04 GHz) 10 dB minimum
(0.04 to 4 GHz) 20 dB minimum.

Page 6-4, Table 6-2:

Change J1, HP Part No. 11664-60006 from Option 002 to Option 003.

Page 8-0, Figure 8-1:

Substitute the attached major assemblies figure for that shown in the 11664A manual.

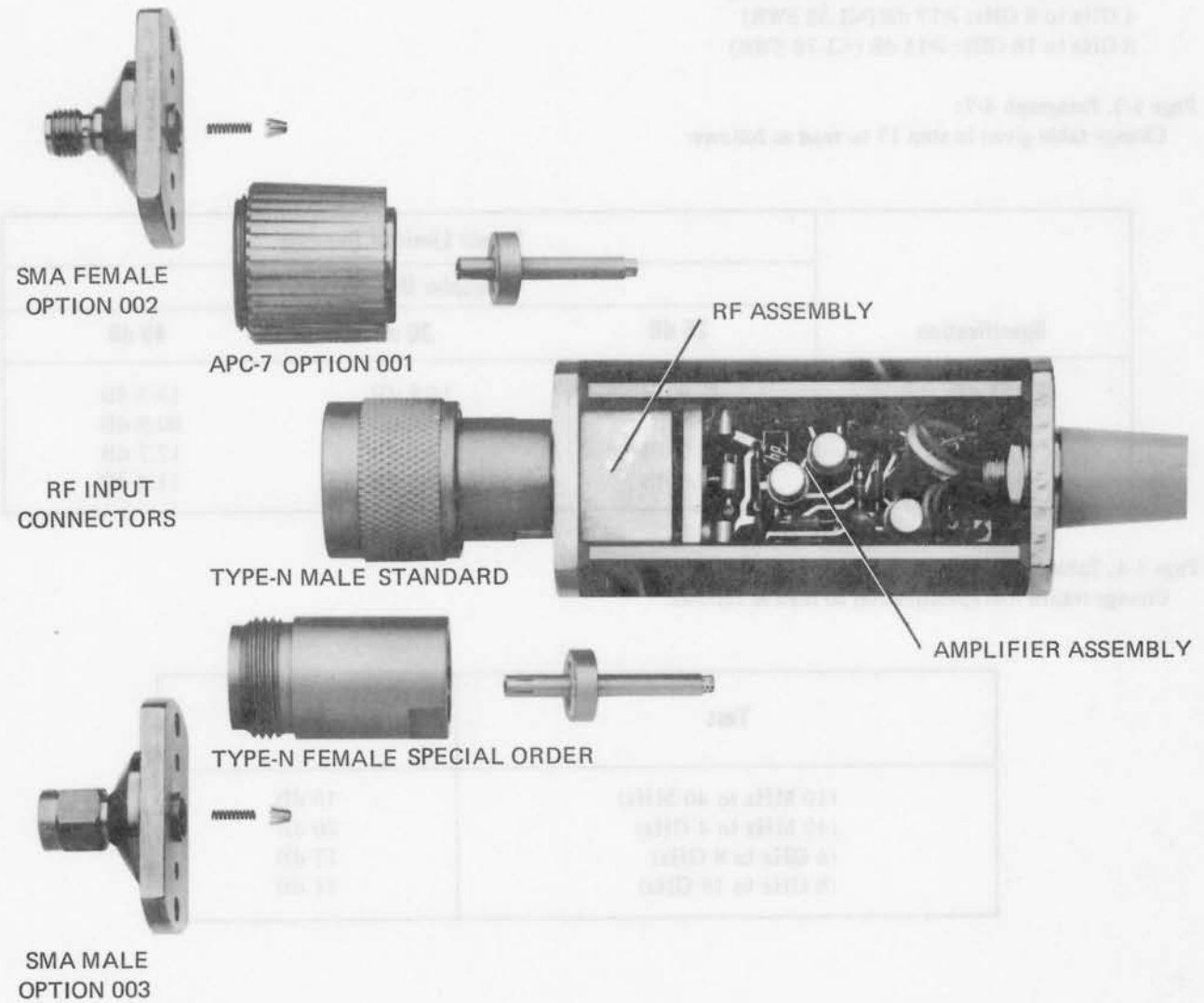


Figure 8-1. Major Assemblies (Change 2)

►CHANGE 3

Page 1-2, Table 1-1:

Change return loss specification to read as follows:

- 10 MHz to 40 MHz: ≥ 15 dB (≤ 1.43 SWR)
- 40 MHz to 4 GHz: ≥ 20 dB (≤ 1.22 SWR)
- 4 GHz to 8 GHz: ≥ 17 dB (≤ 1.32 SWR)
- 8 GHz to 18 GHz: ≥ 11 dB (≤ 1.78 SWR)

Page 4-1, Paragraph 4-7:

Change return loss specification to read as follows:

- 10 MHz to 40 MHz: ≥ 15 dB (≤ 1.43 SWR)
- 40 MHz to 4 GHz: ≥ 20 dB (≤ 1.22 SWR)
- 4 GHz to 8 GHz: ≥ 17 dB (≤ 1.32 SWR)
- 8 GHz to 18 GHz: ≥ 11 dB (≤ 1.78 SWR)

Page 4-3, Paragraph 4-7:

Change table given in step 17 to read as follows:

Specification	Lower Limit of Reading		
	Coupler Directivity		
	26 dB	30 dB	40 dB
15 dB	17.9 dB	16.8 dB	15.5 dB
20 dB	26 dB	23.3 dB	20.9 dB
17 dB	20.9 dB	19.2 dB	17.7 dB
11 dB	12.8 dB	12.1 dB	11.3 dB

Page 4-4, Table 4-1:

Change return loss specification to read as follows:

Test	Min.
(10 MHz to 40 MHz)	15 dB
(40 MHz to 4 GHz)	20 dB
(4 GHz to 8 GHz)	17 dB
(8 GHz to 18 GHz)	11 dB