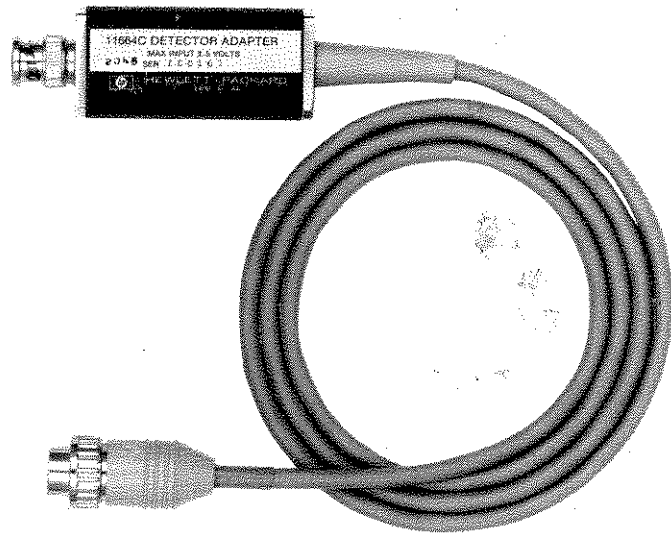


# 11664C DETECTOR ADAPTER



## 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.*

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*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.*

# MANUAL CHANGES

## MANUAL IDENTIFICATION

**Model Number:** 11664C

**Date Printed:** March 1981

**Part Number:** 11664-90033

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 and 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

▶ NEW ITEM

▶ Title Page:

Change the first paragraph to read: This manual applies directly to instruments with serial numbers prefixed 2045A, and to instruments having no serial number prefix.

Page 11, Figure 5:

- ▶ Change Item 5 to 8120-3804, CD2.
- Change Item 6 to 11664-20023, CD0.
- Change Item 10 to 11664-00007, CD9.

## NOTE

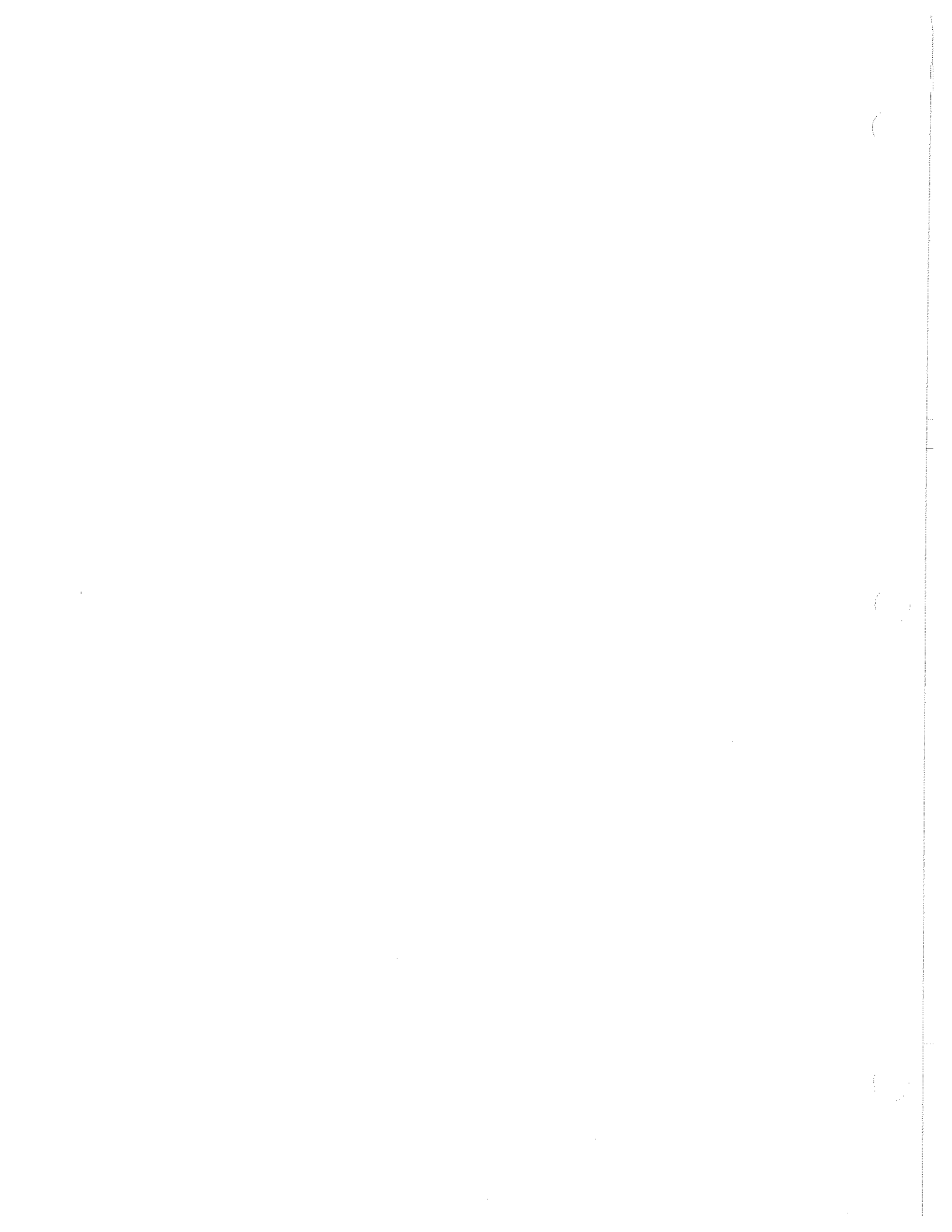
Manual change supplements are revised as often as necessary to keep manuals as current and accurate as possible. Hewlett-Packard recommends that you periodically request the latest edition of this supplement. Free copies are available from all HP offices. When requesting copies, quote the manual identification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

Printed in U.S.A.

6 FEBRUARY 1984

1 page





# 11664C DETECTOR ADAPTER

## SERIAL NUMBERS

This manual applies directly to instruments with serial numbers prefixed 2045A.

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

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### 11664C DETECTOR ADAPTER

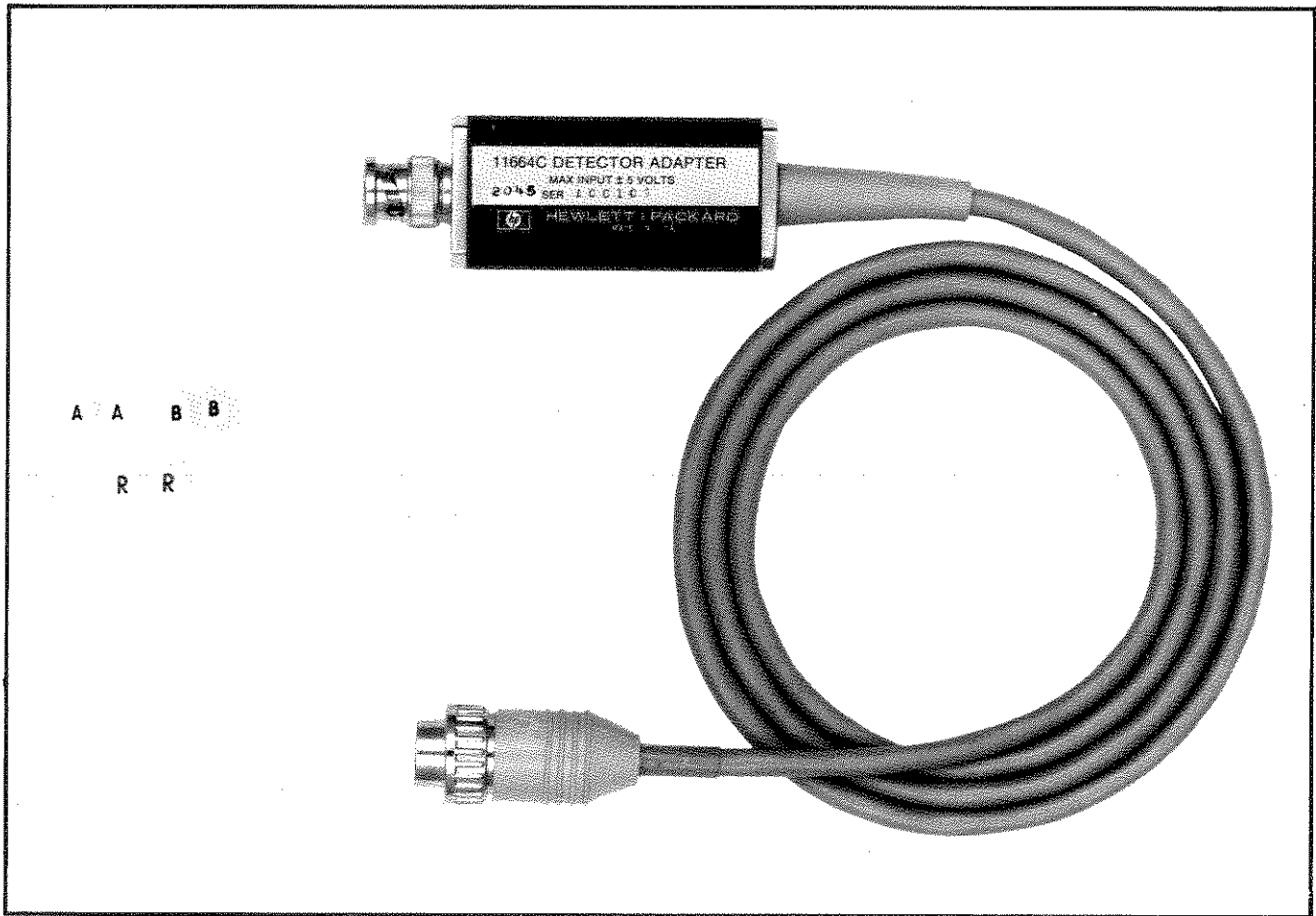


Figure 1. HP Model 11664C Detector Adapter

Table 1. Typical Operating Characteristics

**FREQUENCY RESPONSE:** Function of External Detector

**COMPATIBLE DETECTORS:** Low barrier Schottky or point contact crystal detector (positive or negative). The 11664C provides internal  $\pm 50$  microamp bias capability. Detector Adapter Frequency Response above 10 MHz is limited by detector used.

**GENERAL:**

**Temperature Range:** Operation 0 to +55 degrees C.  
Storage -40 to +75 Degrees C.

**Connector:** BNC Male

**Dimensions:** Cable length is 122 cm (48 in)

**Weight:** Net 0.17 kG. (6 oz.)

**Maximum Input:**  $\pm 5$  volts



## 1. GENERAL INFORMATION

### 2. Introduction

3. This manual contains operating and service information for the Hewlett-Packard Model 11664C Detector Adapter. The instrument along with the supplied cable marker kit (used to identify detector adapter) is shown in Figure 1. Table 1 lists Typical Operating Characteristics. These are not specifications, but typical characteristics included as information for the user.

4. Listed on the title page of this manual is a microfiche part number which can be used to order 10- by 15-centimetre (4- by 6- inch) microfilm transparencies of the manual. Each microfiche contains up to 60 photoduplicates of the manual pages. The microfiche package also includes the latest Manual Changes Supplement as well as all pertinent Service Notes.

### 5. Safety Considerations

6. The voltages present in the 11664C are not in the range to warrant more than normal caution.

### 7. Safety Symbol



The CAUTION sign 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 the equipment. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

### 8. Instruments Covered by Manual

9. 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 as listed under SERIAL NUMBERS on the title page.

10. 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.

11. In addition to change information, the 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 this manual's print date and part number, both of which appear on the title page. Complimentary copies of the supplement are available from your local Hewlett-Packard office listed at the end of this manual.

## 12. DESCRIPTION

13. HP Model 11664C Detector Adapter is used to adapt any standard diode detector output with the HP Model 8755B/C Swept Amplitude Analyzer. The ability to use a standard diode detector extends the possible frequency range of the Swept Amplitude Analyzer to that of the detector used (low frequency limit is 10 MHz). Normally three 11664C Detector Adapters are used with the 8755B/C to make reflection and transmission measurements simultaneously. Any 11664C may be interchanged with any other 11664C without necessity of recalibration providing detectors remain with Detector Adapters.

### 14. OPTIONS

15. Option 910, Extra Manual. The standard instrument is supplied with one Operating and Service Manual. Option 910 instruments are supplied with two manuals.

## 16. EQUIPMENT REQUIRED BUT NOT SUPPLIED

17. To use the instrument the following equipment is required:

- HP Model 8755B/C Swept Amplitude Analyzer
- HP Model 180-series Oscilloscope mainframe
- Crystal Detector, such as HP Model 33330C or R422A

- Directional Coupler, such as HP Model 778D, 11692D, or R752 series
- Sweep Oscillator, such as HP Model 8350-series or 8690-series

**18. Swept Amplitude Analyzer.** The Model 8755B/C Swept Amplitude Analyzer with two or three 11664C Detector Adapters measures amplitude levels of  $-50$  to  $+10$  dBm and amplitude ratios of 60 dB. The Model 8755B/C plugs into the Model 180-series Oscilloscopes.

**19. Oscilloscope.** The Model 8755B/C 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 8755B/C. When modified for use with the HP Model 8750A Storage-Normalizer, the Model 180TR and 182T Oscilloscopes are not compatible with time domain plug-ins. Call your local HP sales office for further information.

**20. Directional Couplers.** To separate the incident, reflected, and reference signals, directional couplers or bridges are usually used with the Model 8755B/C. Either one dual directional coupler or two single directional couplers or bridges connected as a dual directional coupler can be used.

**21. Sweep Oscillator.** A Sweep Oscillator is needed to furnish the RF input signal. Either the HP 8350-series, 8620-series, or the 8690-series Model Sweep Oscillators may be used.

**22. EQUIPMENT AVAILABLE**

23. The following accessories are available:
- Model 11679A: 7.6-metre (25-foot) Extension Cable
  - Model 11679B: 61-metre (200-foot) Extension Cable

*Table 2. Recommended Test Equipment*

Instrument Type	Critical Specifications	Suggested Model	Use*
Swept Amplitude Analyzer	Powers three 11664C Detector Adapters. Processes Adapters. Processes and displays the detected signals.	HP 8755B/C	0
Oscilloscope	Compatible with Swept Amplitude Analyzer	HP 182T	0
Sweep Oscillator	Frequency: $>10$ MHz Power: $>\pm 0$ dBm	HP 8350A and Plug-in of choice	0
Detector	Frequency: Same as Sweep Oscillator	HP 423B	0
Power Meter	Compatible with Thermistor Mount	HP 432A	0
Thermistor Mount	Frequency: 0.01 to 18 GHz 18 to 26.5 GHz 26.5 to 40 GHz	HP 8478B or HP K486A or HP R486A	0
Attenuator	Frequency: 0.01 to 26.5 GHz 26.5 to 40 GHz Attenuation: 0 to 50 dB Accuracy: $\pm 3$ to 7% Impedance: 50 $\Omega$	HP 8495D or HP R382A HP 8495B	0 0
Voltmeter	Accuracy: 0.5% $\pm 1$ digit	HP 3476A	T

\* 0 = Operator's Adjustments and Verification  
T = Troubleshooting

## 24. RECOMMENDED TEST EQUIPMENT

25. Table 1-2 lists recommended test equipment. This equipment is used in the Operation Verification test or troubleshooting the Model 11664C. Other equipment may be substituted, provided its specifications equal or exceed the specifications given under Critical Specifications.

## 26. INITIAL INSPECTION

27. 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. The procedure to use for checking the electrical operation is the Operation Verification Test. If the contents are incomplete, if there is mechanical damage or defect, or if the instrument does not pass the electrical operation verification 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.

## 28. PREPARATION FOR USE

29. **Power Requirements.** Power for the Model 11664C Detector Adapter is obtained from the Model 8755B/C Swept Amplitude Analyzer. Each Detector requires approximately 0.5 watt. The Model 8755B/C normally powers up to three Detectors requiring a maximum of 1.5 watts.

30. **Detector Lead Identification.** Lettered snap-on clips are furnished for lead identification. Place matching clips on both ends of the cable.

### CAUTION

Connecting a detector to the Model 11664C with the bias switched improperly may result in a damaged detector. Before connecting the detector to the adapter read the Operator's Adjustments paragraph.

31. **Connecting the 11664C Detector Adapter.** To connect the 11664C to the 8755B/C, proceed as follows:

- a. Insert the 11664C dc connector into the 8755B/C mating connector. The connector is keyed and the plug should be inserted with the key facing downwards.
- b. Secure the dc connector in the 8755B/C by turning the outer shell clockwise approximately one quarter-turn. This tightens the connector.

32. **Mating Connector.** The input connector to the HP Model 11664C is a BNC male type. This connector should mate directly with most detector output connectors. If it does not mate directly with a particular detector an adapter may be used without degrading performance.

## 33. Operating Environment

34. The HP Model 11664C Detector Adapter operates within the following environmental limits:

- Temperature . . . . . from 0°C to +55°C.
- Humidity. . . . . up to 95%  
However the instrument should be protected from temperature extremes which cause condensation within the 11664C.
- Altitude . . . . up to 7620 metres (25000 feet)

## 35. Storage and Shipment

36. **Environment.** The instrument may be stored or shipped in the environments within the following limits:

Temperature: -40°C to +75°C  
Humidity: Up to 95%  
Altitude: Up to 7620 metres (25000 feet)

The instrument should be protected from temperatures extremes which cause condensation within the instrument.

## 37. Packaging

38. **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 fill out and attach to the instrument one of the enclosed blue service tags. Also, mark the container FRAGILE to assure careful handling. In any

correspondence, refer to the instrument by model number and full serial number.

**39. Other Packaging.** The following general instructions should be used for repackaging with commercially available materials.

- a. Wrap the instrument in heavy paper or plastic. If shipping to a Hewlett-Packard office or service center, fill out and attach one of the blue service tags supplied.
- b. Use a strong shipping container. A double-wall carton made of 160-kilogram (350-pound) test material is adequate.
- c. Use enough shock-absorbing material (7.5 to 10 centimetres) around all sides of the instrument to provide firm cushion and prevent movement inside the container.
- d. Seal the shipping container securely.

#### **40. OPERATION**

**41. Features.** Figure 2 shows and briefly describes the 11664C Detector Adapter connectors and position of operator's adjustments.

#### **42. OPERATOR'S ADJUSTMENTS AND VERIFICATION**

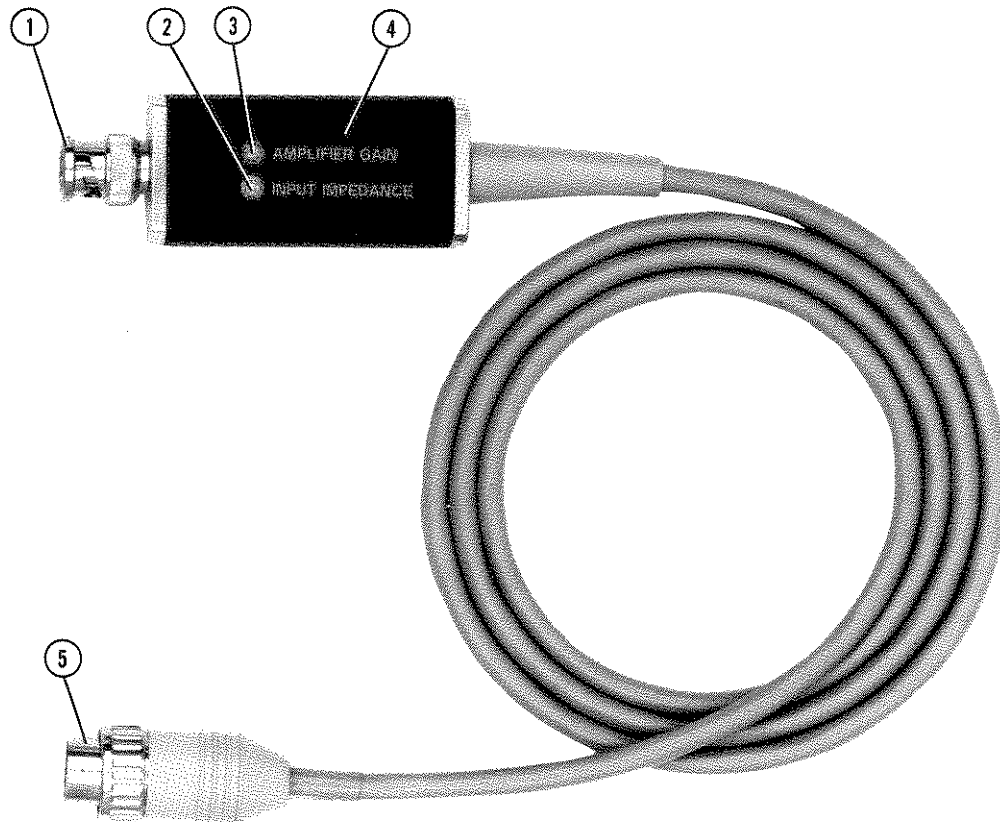
#### **CAUTION**

The 11664C Detector Adapter is shipped from the factory with the internal bias switches in the off position. If the switches are changed and the bias voltage is applied improperly, damage to the detectors may result. To avoid detector damage read the detector information to determine if a bias voltage (check polarity) is required. Then proceed with the operator's adjustment.

43. Operator's adjustments and verification instructions are in Figure 3. The adjustments are required to match the characteristics of the detector used to the 8755B/C input. The verification instructions provide reasonable assurance that the Swept Amplitude Analyzer, Detector used, and 11664C Detector Adapter are functioning properly. This procedure should meet the needs of an incoming inspection (80% verification).

#### **44. OPERATING INSTRUCTIONS**

45. Operating instructions are given in the Operating and Service Manual for the Model 8755B/C Swept Amplitude Analyzer. A typical measurement setup for use from 26.5 to 40 GHz using the 8755B/C and three 11664C Detector Adapters is shown in Figure 4.



1. **Detector Input Connector.** This connector accepts a crystal detector output signal. The detector input connector is a BNC male.
2. **INPUT IMPEDANCE.** An adjustment of the detector load impedance to match the detector characteristics with the shaping in the 8755B/C.
3. **AMPLIFIER GAIN.** An adjustment to match the characteristics of the detector to those of the Swept Amplitude Analyzer.
4. **Bias Switches.** Two switches under the cover provide a positive (S1-1) or negative (S1-2) 50 microamps of bias current at the detector adaptor input connector.
5. **DC Connector.** This connector supplies the necessary dc voltage for operation for the 11664C and conducts the detector output signal to the Model 8755B/C.

Figure 2. Model 11664C Features

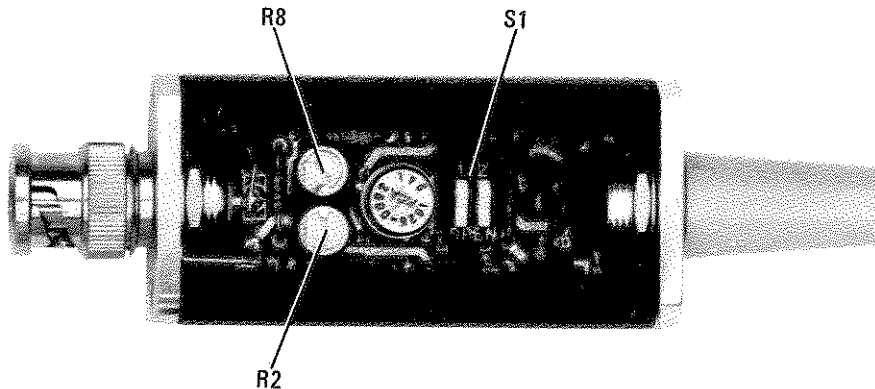
## OPERATOR'S ADJUSTMENTS

### Setting Bias Switches

#### CAUTION

The 11664C is capable of providing a bias current (positive or negative polarity) from its input connector. The incorrect selection of bias (switches 1 or 2) may result in detector damage. To avoid detector damage perform either of the next steps.

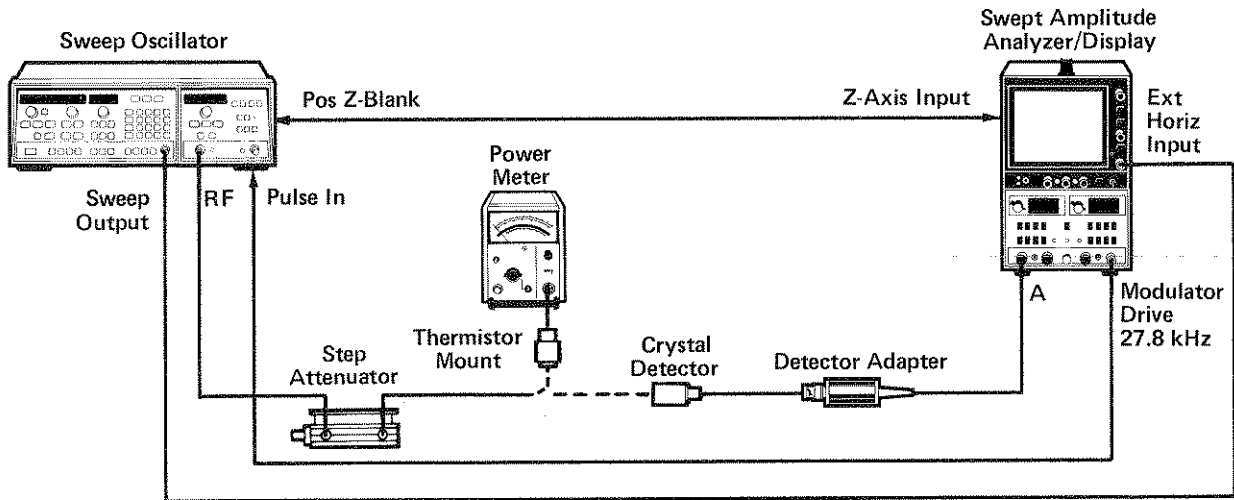
1. Connect the 11664C without a detector to a 8755B/C. Turn INPUT IMPEDANCE control fully clockwise. Turn the 8755B/C power on and measure the voltage on the input connector of the 11664C (center pin to ground). If the voltage is less than  $\pm 0.5$  volt the switches are both off. If the voltage is greater than  $+0.5$  volt, switch 1 is closed for use with negative detectors. If the voltage is more negative than  $-0.5$  volt then switch 2 is closed for use with positive detectors. If the voltage is not set correctly for your detector perform the next step.
2. With the 11664C not connected to the 8755B/C or a detector, remove the two screws one on each side of the cable (W1). Move the connector housing down far enough to slide the adjustment hole cover off. The bias switches (S1 and S2) may set by using the following information:



	-D S1-1	+D S1-2
No bias	Open	Open
Positive detector/negative bias	Open	Closed
Negative detector/positive bias	Closed	Open
Not to be used	Closed	Closed

*Figure 3. Operator's Adjustments and Verification (1 of 3)*

- With the switches set as needed replace the cover and connector bracket.  
Adjusting input impedance and gain.



### Test Setup

#### Equipment:

Swept Amplitude Analyzer.....	HP 8755B/C
Oscilloscope.....	HP 182T
Power Meter.....	432A
Detector.....	To be used with 11664C
Sweep Oscillator.....	*
RF Plug-in.....	*
Step Attenuator.....	*
Thermistor Mount.....	*

\* Use equipment to cover frequency range of detector.

### NOTE

Carefully use a standard adjustment tool instead of a metal screwdriver for the 11664C adjustments to avoid damaging the controls.

- Connect the 11664C as shown in the test setup. Set 11664C AMPLIFIER GAIN AND INPUT IMPEDANCE ADJUSTMENTS to midrange. Turn the instruments on.

Figure 3. Operator's Adjustments and Verification (2 of 3)

**NOTE**

**Detectors with high sensitivity may be difficult to properly adjust at the high power levels. If detector tracking is not accurate at the settings above +0dBm, then adjust the 11664C starting with a maximum power output of 0dBm.**

5. Adjust the source output power to +10 dBm if available or maximum leveled power on the power meter with the source in CW mode and the 27.8 kHz modulation drive removed or switched off.
6. Replace the power meter with the 11664C, switch or connect the 27.8 kHz modulator drive, and set the 8755B/C controls as follows:

```

CHANNEL 1 ..... A
  dB/DIV ..... 1
CHANNEL 2 ..... OFF
VIDEO FILTER ..... IN(enabled)
OFFSET VERNIER ..... OFF
OFFSET dB ..... +10
    
```

7. Set attenuator to 0 dB. Set the 8755B/C OFFSET switches to equal oscillator output power as set on power meter. Adjust 11664C AMPLIFIER GAIN adjustment for a trace on the center line.
8. Set attenuator to 20 dB and set 8755B/C OFFSET dB to 20 dB below oscillator power setting. Adjust 11664C INPUT IMPEDANCE adjustment for a center line trace. Repeat the last two steps until minimal change is noted (about 0.5 dB).

**OPERATOR'S VERIFICATION**

**NOTE**

**The first 8 steps of this procedure adjust the detector adapter to make the detector characteristics match the 8755B/C input. The next 3 steps verify the linearity and noise level of the system.**

9. Set the attenuator to 0 dB and set 8755B/C OFFSET dB to +10 dB. The display trace should be within 2 major divisions ( $\pm 2$  dB) of the center line.
10. Increase the attenuation and decrease the 8755B/C OFFSET by 10 dB steps from +10 to -40 dB. The displayed trace should remain within 2 divisions ( $\pm 2$  dB) at each step.
11. Increase the attenuation to 70 dB. Change 8755 dB/DIV to 10. The display trace should be below center line.

*Figure 3. Operator's Adjustments and Verification (3 of 3)*



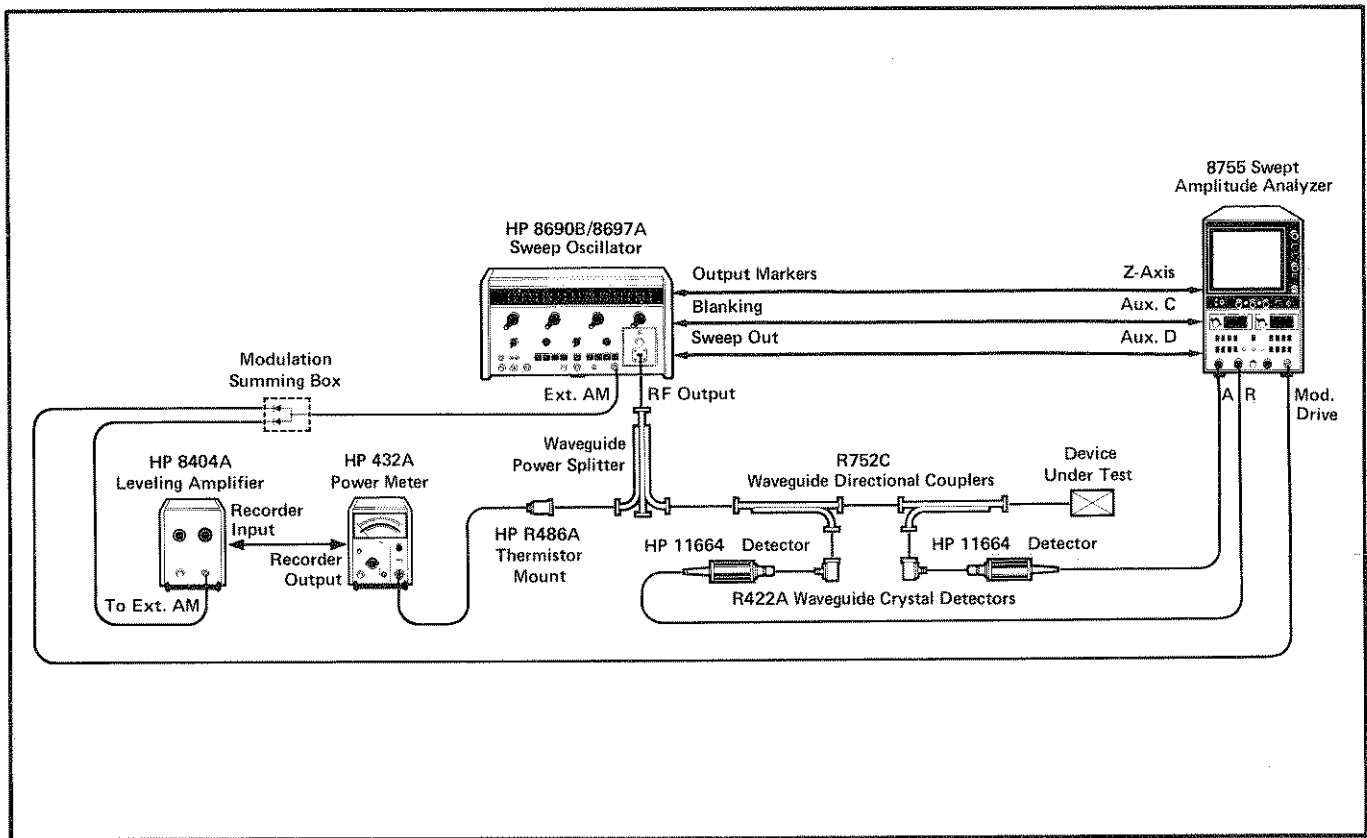


Figure 4. Typical Test Setup using 11664C form 26.5 to 40 GHz

#### 46. REPLACEABLE PARTS

47. Table 3 list abbreviations used in the parts list. Table 4 list all replaceable parts in reference designator order. Figure 6 contains an illustration and parts listing for the mechanical parts in the instrument. Table 5 gives all the manufacturer's code numbers that are used in the parts list.

**48. Replaceable Parts List.** Table 4 is the list of replaceable parts and is organized by listing electrical assemblies and their components in alpha-numerical order by reference designation.

49. The information given for each part consists of the following:

- The Hewlett-Packard part number (HP Part Number).
- The check digit (CD).
- The total quantity (Qty) in the instrument.

- The description of the part.
- The typical manufacturer of the part in a five-digit code (Mfr Code).
- Manufacturer's identification number for the part (Mfr. Part Number).

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

**50. Ordering Instructions.** To order a part listed in the replaceable parts table, quote the Hewlett-Packard part number and check digit, indicate quantity required, and address the order to the nearest Hewlett-Packard office.

51. 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 3. Reference Designators and Abbreviations

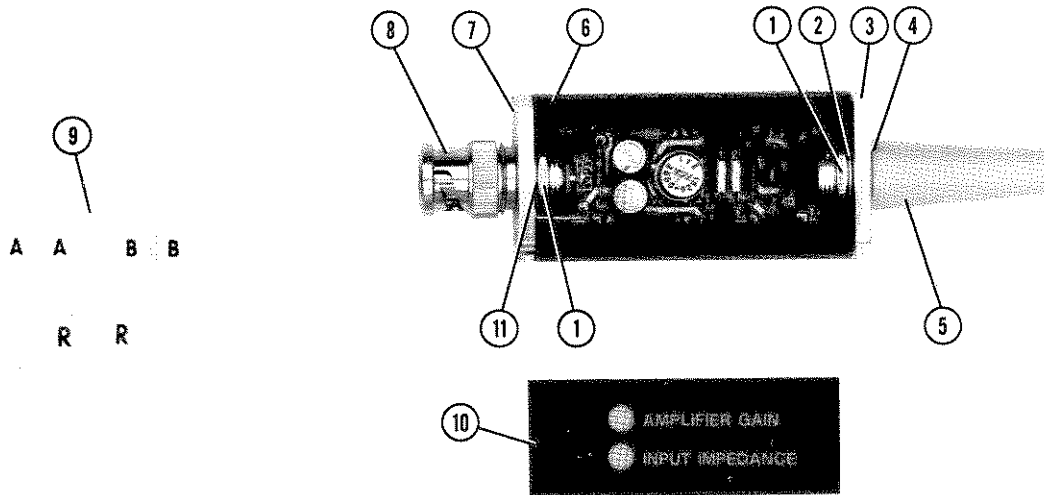
<p><b>REFERENCE DESIGNATORS</b></p> <p>A ..... assembly  C ..... capacitor, carbon  MP ..... mechanical part  U ..... integrated circuit  R ..... resistor  S ..... switch  W ..... cable</p> <p><b>ABBREVIATIONS</b></p> <p>ADJ ..... adjust  ASSY ..... assembly  CER ..... ceramic  CD ..... check digit</p>	<p>CM ..... centimetre  DIP ..... dual-in-line package  F ..... farads, film  FXD ..... fixed  G ..... gram, giga=<math>10^9</math>  GP ..... general purpose  H ..... henries  HEX ..... hexagonal  IC ..... integrated circuit  ID ..... inside dimension  IN ..... inch  K ..... kilo=<math>10^3</math>  m ..... milli=<math>10^{-3}</math>  M ..... meg=<math>10^6</math>  MET ..... metal  MFR ..... manufacturer</p>	<p>MHz ..... mega Hertz  MTG ..... mounting  OP ..... operational amplifier  P ..... pico=<math>10^9</math>  PL ..... plated  QTY ..... quantity  RKR ..... rocker  SCR ..... screw  SI ..... silicon  SLDR ..... solder  TC ..... temperature constant  TRMR ..... trimmer  TRN ..... turn  U ..... micro=<math>10^{-6}</math>  VDCW ..... dc working volts  W ..... watts</p>
---	--	---

Table 4. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A1	11664-60021	2	1	BOARD ASSEMBLY: COMPENSATION AMPLIFIER	28480	11664-60021
A1C1	0180-2794	5	2	CAPACITOR-FXD 3.3UF $\pm 20\%$ 35VDC	02191	MD6-035-335-2019042
A1C2	0180-2794	5		CAPACITOR-FXD 3.3UF $\pm 20\%$ 35VDC	02191	MD6-035-335-2019042
A1MP1	0360-0535	0	3	TERMINAL-TEST POINT .330IN ABOVE	2848	0360-0535
A1MP2	11664-40001	6	1	VARIABLE RESISTOR HOLDER	28480	11664-40001
A1R1	0757-0280	3	2	RESISTOR-FXD 1K 1% .125W F TC= $0 \pm 100$	03292	C4-1/8-TO-1001-F
A1R2	2100-2655	1	1	RESISTOR:TRMR 100K 10% C TOP-ADJ 1-TRN	04568	82PR100K
A1R3	0757-0280	3	3	RESISTOR-FXD 1K 1% .125W F TC= $0 \pm 100$	03292	C4-1/8-TO-1000-F
A1R4	0757-0438	3	1	RESISTOR-FXD 5110 1% .125W F TC= $0 \pm 100$	03292	C4-1/8-TO-5111-F
A1R5	0698-3456	5	1	RESISTOR-FXD 287K 1% .125W F TC= $0 \pm 100$	03292	C4-1/8-TO-2873-F
A1R6	0698-3266	5	1	RESISTOR-FXD 237K 1% .125W F TC= $0 \pm 100$	03292	C4-1/8-TO-2373F
A1R7	0698-0083	8	1	RESISTOR-FXD 1960 1% .12W F TC= $0 \pm 100$	03292	C4-1/8-TO-1961-F
A1R8	2100-2116	9	1	RESISTOR:TRMR 5000 10% C-TOP-ADJ 1-TRN	04568	82PR5K
A1S1	3101-2061	6	1	SWITCH-RKR DIP-RKR-ASSY 2-1A .05A 30VDC	01380	2-435640-9
A1U1	1826-0092	3	1	IC OP AMP GP DUAL TO-99	01921	82301

Table 5. Manufacturers Code List

Mfr. No.	Manufacturers Name	Address	Zip Code
00000	ANY SATISFACTORY SUPPLIER		
01380	AMP INC		
01921	RCA CORP SOLID STATE DIV	HARRISBURG PA	
02191	CORNING/COMPONENTS INC	SOMERVILLE NJ	08876
03292	CORNING GLASS WORKS(BRADFORD)	BIDDEFORD ME	
03316	SPECIALTY CONNECTOR CO INC	BRADFORD PA	16701
04568	BECKMAN INSTRUMENT INC HELIP T DIV	GREENWOOD IN	46227
28480	HEWLETT-PACKARD CO CORP HQ	FULLERTON CA	92634
		PALO ALTO CA	94304



Item	HP Part Number	CD	Qty.	Description	Mfr. Code	Mfr. Part Number
1	2950-0001	8	2	NUT-HEX-DOUBLE CHAMFER	28480	2950-0001
2	2190-0016	3	1	WASHER-LOCK INTERNAL TOOTH 3/8 IN 0.377-IN-ID	28480	2190-0016
3	11664-20004	7	2	END PLATE	28480	11664-20004
4				WASHER P/O W1	28480	
5	8120-1788	7	1	CABLE ASSEMBLY W1 (INCLUDES P1)	28480	8120-1788
6	11664-20005	8	1	DETECTOR HOUSING	28480	11664-20005
7	2200-0167	8	4	SCREW-MACHINE 4-40 0.118-IN-LONG 82 DEGREE	28480	2200-0167
8	11664-20022	9	1	CONNECTOR BNC	28480	11664-20022
9	5061-1044	9	1	CABLE MARKER KIT	28480	5061-1044
10	11664-00006	7	1	BOTTOM COVER	28480	11664-00006
11	0360-1190	5	1	TERMINAL-SLDR LUG PL-MTG	28480	0360-1190

Figure 5. Replaceable Parts Location

## 52. MANUAL BACKDATING CHANGES

53. This manual has been written for and applies directly to instruments with serial numbers prefixed as indicated on the title page. The purpose of this portion of the manual is to document differences between the prefix listed on the title page and earlier prefixes. Later versions of the instrument (serial number prefixes higher than the one indicated on the title page) are documented in a yellow Manual Change Supplement.

54. Since there are no earlier versions of the HP Model 11664C Detector Adapter, 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 is different than the one on the title page, it will be documented in a yellow Manual Change Supplement. Complimentary copies of this supplement can be obtained from your nearest Hewlett-Packard Office. Refer to INSTRUMENTS COVERED BY MANUAL at the beginning of this manual for more information about serial number coverage.

## 55. SERVICE

### 56. Introduction

57. This section contains troubleshooting and repair information. The general organization of this section is:

- a. Text covering repair procedures.
- b. A Service Sheet containing principles of operation, troubleshooting information, parts identification, and a schematic diagram.

### 58. Recommended Test Equipment

59. Equipment recommended to test and maintain the instrument is listed in Table 2.

## 60. REPAIR

61. The following paragraphs give some detailed step-by-step repair procedures for some individual components where special care is necessary.

62. Printed circuit board and cable removal. To remove the printed circuit board assembly or the cable assembly, proceed as follows:

- a. Remove the two posi-drive screws on the cable end of the 11664C.
- b. Slide the assembly out of the housing by carefully pulling on the cable until the adjustment hole cover can be removed.

## 63. SOLDERING

**64. Soldering Cable Leads.** When unsoldering or soldering cable leads to the printed circuit board use extreme care so that plastic insulation on cable wires is not damaged. Always use a heat sink, such as a pair of long-nosed pliers, between the end of the insulation and connection. Always use the minimum amount of heat necessary to make the connection. The connections are:

- a. Shield wire to Ground (near E2).
- b. Violet wire to E4.
- c. Red wire to E2.
- d. White wire to E3.

**65. Soldering to an etched circuit board.** The etched circuit board in the Detector Adapter is of the plated-through type consisting of metallic conductors bonded to both sides of the insulating material. The metallic conductors are extended through the component mounting holes by a plating process. Soldering can be done from either side of the board with equally good results. Following are recom-

mendations and precautions pertinent to etched circuit repair work:

- a. Avoid unnecessary component substitution. It can result in damage to the circuit board and/or adjacent components.
- b. Do not use a high-wattage soldering iron on etched circuit boards. Excessive heat may lift a conductor or damage the board.
- c. Use a suction device or wooden toothpick to remove solder from component mounting holes. **DO NOT USE A SHARP METAL OBJECT SUCH AS AN AWL OR TWIST DRILL FOR THIS PURPOSE. SHARP OBJECTS MAY DAMAGE THE PLATED-THROUGH CONDUCTOR.**
- d. After soldering, remove excess flux from the soldered areas and apply a protective coating, such as Krylon No. 1302, to prevent contamination and corrosion.

**66. Component Replacement.** To replace a defective component, proceed as follows:

- a. Remove defective component from circuit board.
- b. Remove solder from mounting holes using a suction desoldering aid or wooden toothpick.
- c. Bend leads of replacement component to match mounting hole spacing.
- d. Insert component leads into mounting holes, and position component as original was positioned. **DO NOT FORCE LEAD**

**OF REPLACEMENT COMPONENT INTO MOUNTING HOLES.** Sharp lead ends may damage plated-through conductor.

**67. Integrated Circuit Replacement.** In addition to the above precautions, observe the following when replacing an integrated circuit:

- a. Do not apply excessive heat.
- b. Use a heat sink, such as long-nose pliers between integrated circuit body and hot soldering iron.
- c. When installing a replacement integrated circuit, ensure sufficient lead length to dissipate heat of soldering by maintaining about the same length of exposed lead for the original integrated circuit.
- d. Pin one of the integrated circuit is identified by a tab above it on the integrated circuit body. Pin one pad on the circuit board is identified by a square pad.

**68. Installing the printed circuit board.** When installing the printed circuit board assembly into the 11664C, check that all cable wires are connected to the board just before tightening the cable end of the 11664C. These wires are delicate and should be checked each time the 11664C is reassembled.

**69. Hewlett-Packard Servicing.** If Hewlett-Packard service is required, fill out and attach one of the blue service tags before sending the 11664C to your local service office. These enclosed tags when used reduce cost and turn around time.

## THEORY OF OPERATION

**A1 Compensation Amplifier Circuit Description.** The circuit consist of a dual operational amplifier, U1A used in the non-inverting mode and U1B used in the inverting mode. The voltage gain of U1A amplifier is set by fixed resistors R4 and R3. The voltage gain of U1B is set by variable resistor R8 and fixed resistor R7. The input impedance to the amplifier is set by R1 plus the variable resistor R2. The fixed resistor R1 is to insure that the input impedance to the adapter is not 0 ohms which may cause damage in some detector applications. C1 and C2 are power supply bypass capacitors.

### CAUTION

**Selecting the wrong bias for a detector could cause reverse bias on the order of 4 volts. This could result in permanent damage to the diode detector.**

In some cases, diode detectors need bias current to allow them to operate in an optimum square-law mode. Therefore R5 and S1-1 (-D) (when closed) will allow approximately +50 microamps of current to flow in the resistance between the positive supply and the low voltage that appears across the detector. This should be used to bias negative detectors that require biasing. Similarly, S1-2 (+D) and R6 will develop a -50 microamp current if S1-2 (+D) is closed. This would be used for positive detectors that require bias. The amplifier Input Impedance adjustment R2 is used to establish the transition point between square-law and linear detection modes of the diode detector being used. The corner point is set to match the shaping circuitry built in to the 8755B/C logger circuitry. The input impedance will be a function of the type of diode detector used. For a low barrier Schottky diode it will be 5 to 15 K ohms. For a point contact it will be 30 to 50 K ohms. Once the corner transition point is set by the Input Impedance (R2), the overall gain is set by Gain Adjustment (R8). This matches the Detector/Adapter response curve to the logger circuit shaping in the 8755.

### TROUBLESHOOTING

Remove detector from 11664C input connector. Remove adjustment cover and measure the +15V supply point noted on schematic the voltage should be between +14.5 and +15.5 volts. The -12.6 volt point should be between -11.9 and -13.1 volts. If the supplies are within these limits then adjust R2 and R8 fully clockwise and check the voltage at TP1 with S1-1 (-D) and S1-2 (+D) open. The TP1 voltage should be between -1.5 and +1.5 volts. With only S1-1 (-D) switch closed TP1 voltage should be between -9.0 and -12.0 volts. With only S1-2 (+D) closed TP1 voltage should be between +11.0 and +14.0 volts.

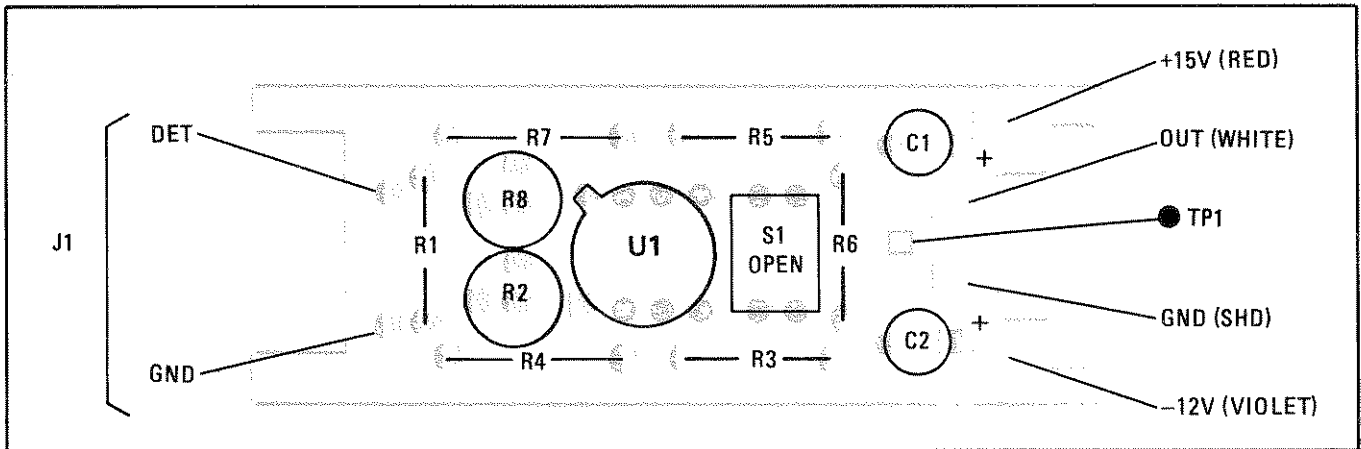


Figure 6. Component Location

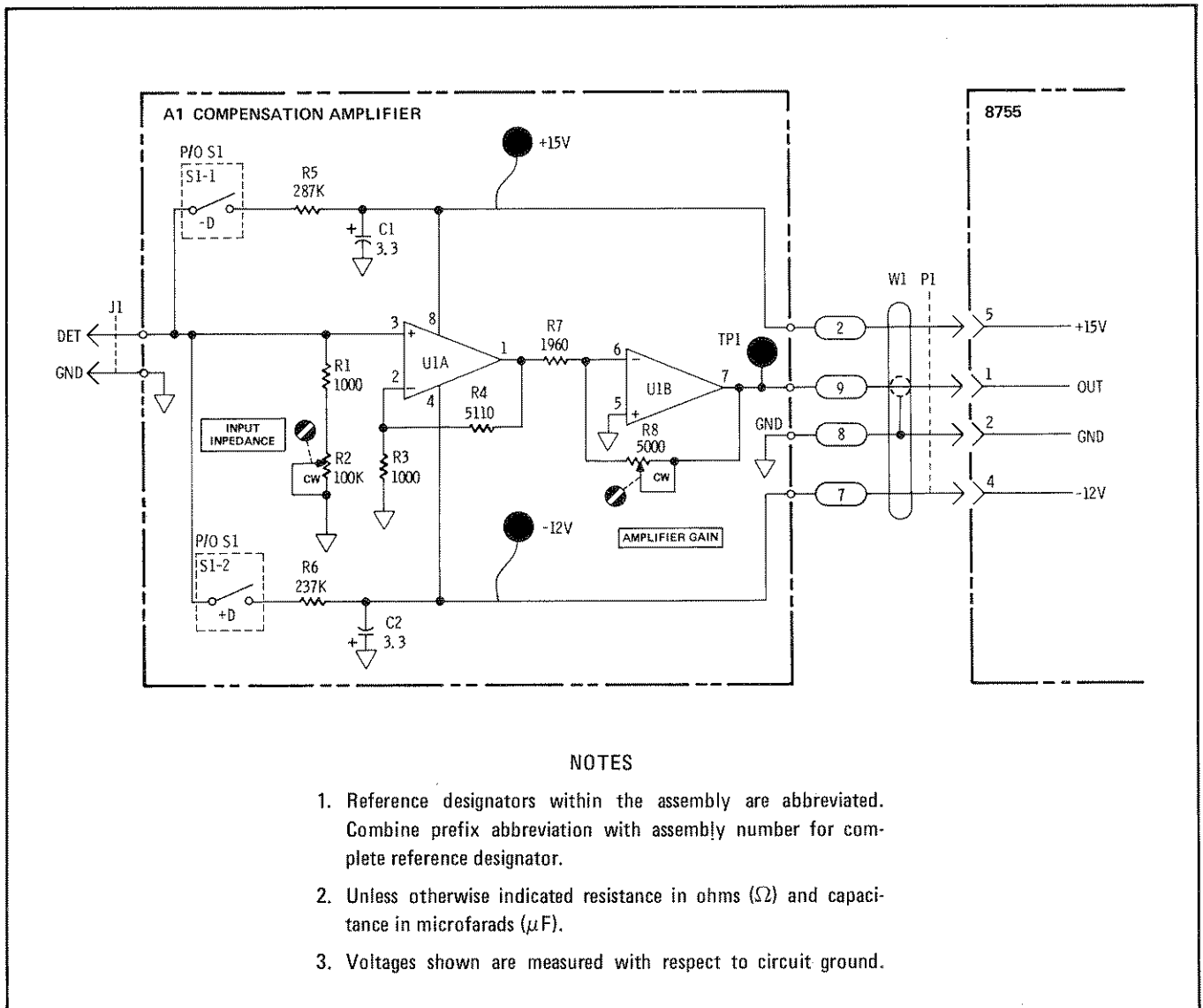


Figure 7. Schematic Diagram

## HEWLETT-PACKARD SALES AND SERVICE OFFICES

To obtain servicing information and order replacement parts, contact the nearest Hewlett-Packard Sales and Service Office in HP Catalog, or contact the nearest regional office listed below.

### THE UNITED STATES:

#### CALIFORNIA

3003 Scott Boulevard  
Santa Clara 95050

#### GEORGIA

P.O. Box 105005  
450 Interstate North Parkway  
Atlanta 30348

#### ILLINOIS

5201 Tollview Dr.  
Rolling Meadows 60008

#### NEW JERSEY

W. 120 Century Road  
Paramus 07652

### CANADA:

#### QUEBEC

Hewlett-Packard (Canada) Ltd.  
275 Hymus Blvd.  
Pointe Claire H9R 1G7

### EUROPE:

#### SWITZERLAND

Hewlett-Packard (Schweiz) AG  
Chateau Bloc 19  
CH-1219 Le Lignon-Geneva

### AFRICA, ASIA, AND AUSTRALIA:

Hewlett-Packard Intercontinental  
3495 Deer Creek Road  
Palo Alto, California 94304

### CENTRAL AND SOUTH AMERICA:

Hewlett-Packard Intercontinental  
3495 Deer Creek Road  
Palo Alto, California 94304





