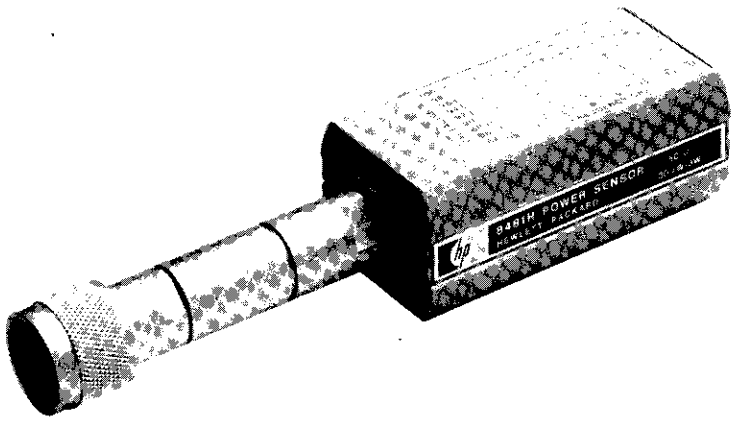
OPERATING AND SERVICE MANUAL

8481H
8482H
POWER SENSOR



HEWLETT hp PACKARD

HP 8481H
HP 8482H

CERTIFICATION

The Hewlett-Packard Company certifies that this instrument was thoroughly tested and inspected and found to meet its published specifications when it was shipped from the factory. The Hewlett-Packard Company further certifies that its calibration measurements are traceable to the U.S. National Bureau of Standards to the extent allowed by the Bureau's calibration facilities, or to the calibration facilities of other International Standards Organization members.

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This Hewlett-Packard product is warranted against defects in materials and workmanship. This warranty applies for one year from the date of delivery. Hewlett-Packard will repair or replace products which prove to be defective during the warranty period provided they are returned to Hewlett-Packard. No other warranty is expressed or implied. We are not liable for consequential damages.

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HEWLETT hp PACKARD

OPERATING AND SERVICE MANUAL

8481H
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POWER SENSOR

SERIAL NUMBERS

This manual applies directly to instruments with serial numbers prefixed 1545A.

For additional important information about serial numbers, see INSTRUMENTS COVERED BY MANUAL on page 2.

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

MANUAL PART NUMBER 08481-90016
Microfiche Part Number 08481-90017

Printed: NOVEMBER 1975

1. GENERAL INFORMATION

2. This Operating and Service Manual contains informaton about initial inspection, performance tests, adjustments, operation, troubleshooting and repair of the Model 8481H and 8482H Power Sensors.

3. On the title page of this manual is a "Microfiche" part number. This number can be used to order a 4 x 6-inch microfilm transparency of the manual.

4. Instruments Covered by Manual

5. 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 a sequential suffix which is unique to each instrument. The contents of this manual apply directly to instruments having the serial number prefix listed under SERIAL NUMBERS on the title page.

6. 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 manual for this instrument is supplied with a yellow Manual Changes supplement containing "change information" that documents the differences.

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

8. For information concerning a serial number prefix not listed on the title page or in the Manual Changes supplement, contact your nearest Hewlett-Packard office.

9. Description

10. The Power Sensors are used for measuring the average power supplied by an RF source to a 50-ohm load. In use, the Power Sesnor is connected to the RF source and to a compatible power meter. (Suitable meters are the HP 435A or 436A Power Meter.) The Power Sensor places a 50-ohm load on the RF source, and the power meter indicates the power dissipated in this load. The power is determined from the RF voltage developed across the Power Sensor load, and is expressed in μW (or W) and dBm. The HP 436A Power Meter can also provide readings, in dB, relative to a previous RF input to the Power Sensor.

11. The Power Sensors measure power levels from −15 dBm to +35 dBm (30 μW to 3W), at frequencies from 10 MHz to 18 GHz (8481H) or 100 kHz to 4.2 GHz (8482H).

12. The physical configuration of both sensors is the same. However, because of the different frequency ranges covered, there are some changes in part numbers and component values.

13. Calibration data is provided by a graph on the Power Sensor. The graph, individually prepared for each Power Sensor, shows the calibration factor (CAL FACTOR) at 17 frequencies. This calibration factor is used to adjust the power meter to suit the particular Power Sensor and RF frequency. For greater accuracy, a table showing the calibration factor to two significant digits is supplied with each Power Sensor.

14. Specifications for the Power Sensor are provided in Table 1.

15. Option 002

16. Option 002 is a range knob for the HP 435A Power Meter, permitting more convenient use of power meters which have serial prefix number 1527A and under. HP 435A Power Meters with a higher serial prefix number do not require Option 002. No HP 436A Power Meter requires Option 002.

17. Recommended Test Equipment

18. Table 2 lists the test equipment recommended to check, adjust, and troubleshoot the Power Sensor. If substitute equipment is used, it must meet or exceed the critical specifications.

19. INSTALLATION

20. Initial Inspection

21. Inspect the shipping container. If the container or packing material is damaged it should be kept until the contents of the shipment have been

Table 1. Specifications

Frequency Range: 10 MHz to 18 GHz (8481H) , 100 kHz to 4.2 GHz (8482H)

Power Measurement Range: 30 microwatts (μW) to 3 watts (W).

Maximum Permissible RF Power, Average: 3.5 W.

Maximum Permissible RF Power, Peak: 100W.
Maximum Energy/Pulse: 100 W/μs.

Maximum SWR (Reflection Coefficient) of Power Sensor:

8481H		8482H
1.20 (0.091)	10 MHz to 8 GHz	1.20 (0.091) 100 kHz to 4.2 GHz
1.25 (0.112)	8 GHz to 12.4 GHz	
1.30 (0.130)	12.4 GHz to 18 GHz	

RF Impedance: 50 ohms nominal.

RF Connector: Type N Male (meets military specifications).

Calibration: Individual calibration graph and table, traceable to NBS, provided with each Power Sensor.

Dimensions, including RF connector: 30 mm wide, 38 mm high, 149 mm long (1-3/16 x 1-1/2 x 5-7/8).

Weight: Net, 0.2 kg (8 oz.).

Table 2. Recommended Test Equipment

Instrument Type	Critical Specifications	Suggested Model	Use*
Digital Voltmeter	Range: 100 mVdc to 100 Vdc Input impedance: 10 megohms Resolution: 4-digit Accuracy: ±0.05% ± 1 digit	HP 3439A/3443A	T
Oscilloscope	Bandwidth: dc to 50 MHz Sensitivity: Vertical, 0.2V/div Horizontal, 1 ms/div	HP 180C/1801A/1821A	A, T
10:1 Divider Probe	10 Megohms 10 pF	HP 10004D	A
Ohmmeter	Range: 1 ohm to 100,000 ohms Accuracy: ±5%	HP 412A	T
DC Power Supply	Range: 0—20 Vdc Load Regulation: 0.01% + 4 mV	HP 6204B	T

*A = Adjustment, T = Troubleshooting.

checked mechanically and electrically. If there is mechanical damage or if the instrument does not pass the performance tests, notfiy the nearest Hewlett-Packard office. Keep the damaged shipping materials (if any) for inspection by the carrier and a Hewlett-Packard representative.

22. Storage and Shipment

23. Environment. The instrument should be stored in a clean, dry environment. The following limitations apply to both storage and shipment:

a. Temperature —40 to +75°C

b. Relative humidity, less than 95%

c. Altitude, less than 7,600 metres (25,000 feet).

24. 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 ser-

vice required, return address, model number, and serial number. Also, mark the container FRAGILE to assure careful handling. In any correspondence, refer to the instrument by model number and serial number.

25. INTERCONNECTIONS

26. Refer to the power meter operating and service manual for interconnecting instructions.

27. OPERATION

28. Environment

29. The operating environment for the Power Sensor should be as follows:

a. Temperature, 0° to 55°C

b. Relative humidity, less than 95%

c. Altitude, less than 4,572 metres (15,000 feet).

30. Operating Precautions

31. Before the Power Sensor is connected, the following precautions must be observed.

CAUTIONS

BEFORE CONNECTING THE POWER SENSOR TO ANOTHER INSTRUMENT, ensure that the instrument and power meter are connected to the protective (earth) ground.

Exceeding the energy and power levels shown in paragraph 32 may result in damage to the power meter system.

Do not apply torque to the Power Sensor's body while connecting or disconnecting the Type N RF connector.

32. The absolute maximum RF signal level that may be coupled to the Power Sensor is:

a. Maximum Average Power 3.5W

b. Maximum Peak Power 100W

c. Maximum Energy Per Pulse 100W/μs.

33. Calibration is performed as follows:

a. For the HP 435A Power Meter, set the RANGE switch to 1 mW, and adjust the CAL ADJ control to bring the needle on the meter to the CAL position.

b. For the HP 436A Power Meter, adjust the CAL ADJ control to obtain a reading of 1 mW on the digital display.

34. Operating Procedures

35. Instructions for use of the Power Sensor are provided in the power meter manual. Note, however, the different calibration procedure described in paragraph 33 above. During operation, the precautions in paragraph 31 must be observed.

36. SWR (REFLECTION COEFFICIENT) PERFORMANCE TEST

37. The maximum SWR and reflection coefficient for the Power Sensor are listed in Table 3. For making these measurements, use equipment which has measurement uncertainties not exceeding those shown in the table.

38. FET BALANCE ADJUSTMENT

39. The sampling gate balance is affected by the relative positions of the wires in the Power Sensor which connect to pins G and H of connector J1. One wire is black and white, and the other is brown and white. Once positioned, care must be used not to displace these wires.

40. To correctly position these wires, after replacement of A2U1, connect an oscilloscope as follows to display switching transients:

a. Test point A4TP4 in the HP 435A Power Meter, or

b. Test point A2TPAC (3) in the HP 436A Power Meter.

41. Adjust the black-and-white and brown-and-white wires until the switching transient amplitude is less than 0.8 Vp-p.

42. REPLACEABLE PARTS

43. Table 4 is a list of replaceable parts. Figure 1 illustrates the major parts. To order a part, quote the Hewlett-Packard part number, specify the quantity required, and address the order to the nearest Hewlett-Packard office. To order a part not

Table 3. SWR and Reflection Coefficient

Frequency	Measuring System Reflection Coefficient Uncertainty	Actual Measurement	Maximum SWR (Reflection) Coefficient)
	8481H		
10 MHz to 8 GHz	±0.025	_____	1.20 (0.91)
8 GHz to 12.4 GHz	±0.030	_____	1.25 (0.112)
12.4 GHz to 18 GHz	±0.035	_____	1.30 (0.130)
	8482H		
100 kHz to 4.2 GHz	±0.025	_____	1.20 (0.91)

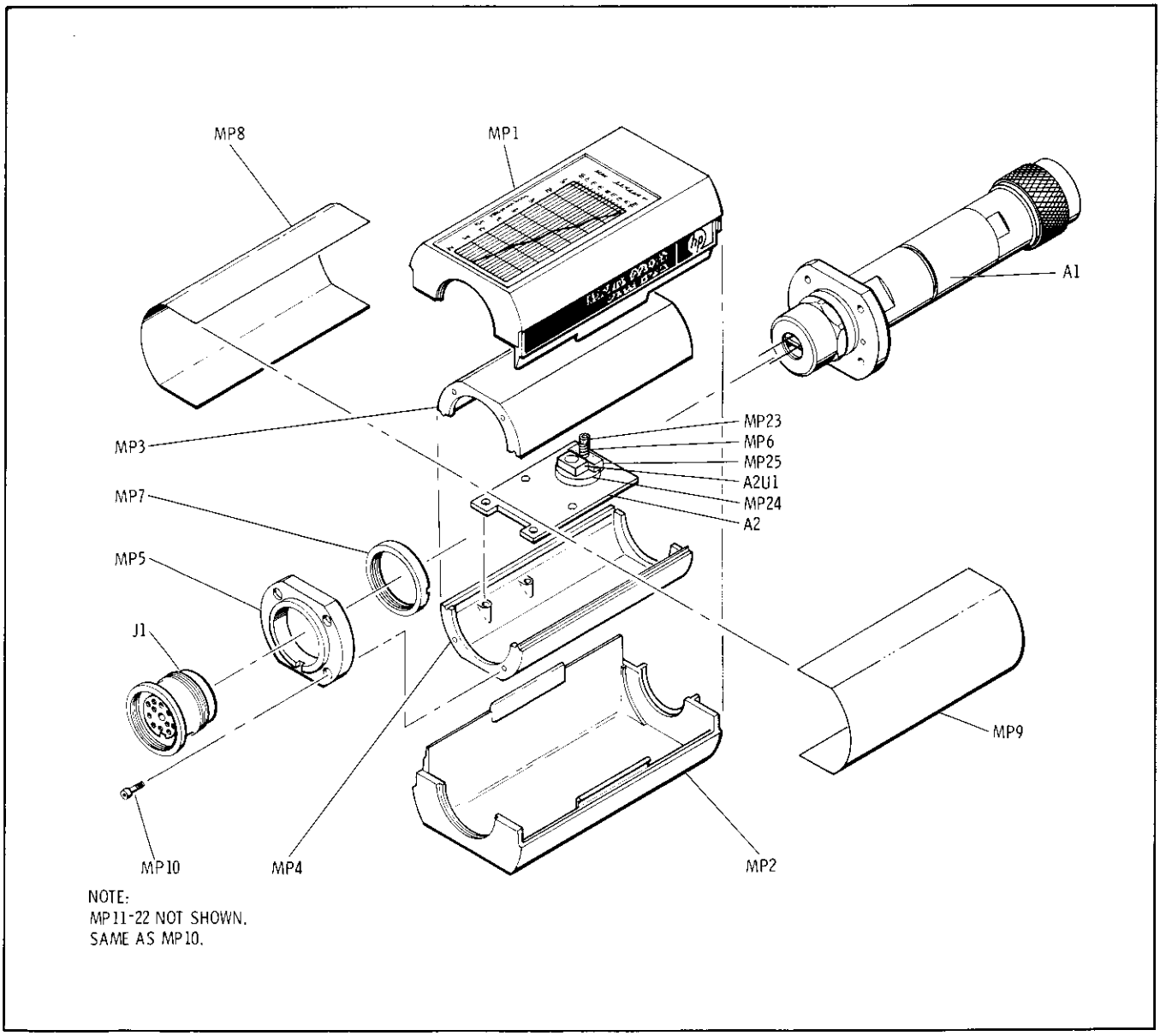

Figure 1. Illustrated Parts Breakdown

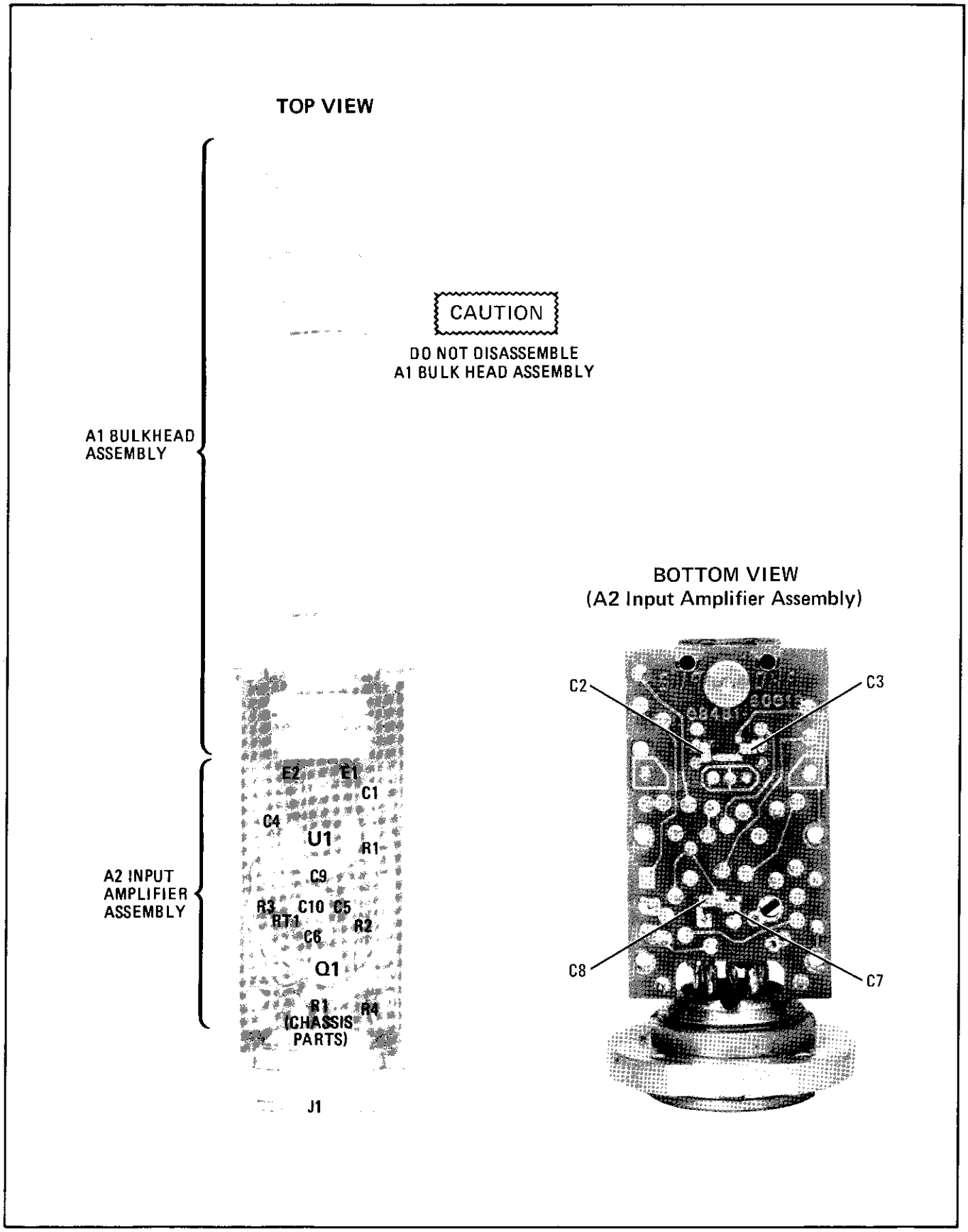

Figure 2. Component and Assembly Locations

Table 4. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A1	08481-60014	1	20 DB BULKHEAD TYPE N (FOR 8481H ONLY)	28480	08481-60014
A1	08482-60009	1	20 DB BULKHEAD TYPE N (FOR 8482H ONLY)	28480	08482-60009
A2	08481-60017	1	BOARD ASSEMBLY, POWER SENSOR (FOR 8481H ONLY)	28480	08481-60017
A2	08482-60005	1	BOARD ASSEMBLY, POWER SENSOR (FOR 8482H ONLY)	28480	08482-60005
A2C1	0180-2515	2	CAPACITOR-FXD 47UF+-20% 6VDC TA (FOR 8481H)	56289	196D476X0006KA1
A2C1	0180-0555	1	CAPACITOR-FXD 39UF+-20% 10VDC TA (FOR 8482H)	12954	D39GS1B10M
A2C2	0160-4306	4	CAPACITOR-FXD 100PF +-10% 100WVDC CER	28480	0160-4306
A2C3	0160-4306		CAPACITOR-FXD 100PF +-10% 100WVDC CER	28480	0160-4306
A2C4	0180-0594	1	CAPACITOR-FXD 3.3UF+-20% 15VDC TA	14433	TAG-10-3.3/16-20
A2C5	0160-3094	1	CAPACITOR-FXD .1UF +-10% 100WVDC CER	28480	0160-3094
A2C6	0160-3879	1	CAPACITOR-FXD .01UF +-20% 100WVDC CER	28480	0160-3879
A2C7	0160-4306		CAPACITOR-FXD 100PF +-10% 100WVDC CER	28480	0160-4306
A2C8	0160-4306		CAPACITOR-FXD 100PF +-10% 100WVDC CER	28480	0160-4306
A2C9	0180-2515		CAPACITOR-FXD 47UF+-20% 6VDC TA	56289	196D476X0006KA1
A2C10	0180-2545	1	CAPACITOR-FXD 100UF+-20% 4VDC TA	56289	196D107X0004KE3
A2Q1	1854-0610	1	TRANSISTOR:SI NPN	28480	1854-0610
A2R1	0698-3260	1	RESISTOR 464K 1% .125W F TC=0+-100 (FOR 8481H ONLY)	03888	PME55S
A2R1	0757-0483	1	RESISTOR 562K 1% .125W F TC=0+-100 (FOR 8482H ONLY)	19701	MF5C1/8-T0-5623-F
A2R2	0698-7248	1	RESISTOR 3.16K 2% .05W F TC=0+-100	24546	C3-1/8-T0-3161-G
A2R3	0698-7224	1	RESISTOR 316 2% .05W F TC=0+-100	24546	C3-1/8-T0-316R-G
A2R4	0698-7236	1	RESISTOR 1K 2% .05W F TC=0+-100	24546	C3-1/8-T0-1001-G
A2RT1	0811-3210	1	RESISTOR 31.6 5% .05W PWW TC=+5040+-252	14140	1409-1/20-31R6-J
A2U1	1813-0060	1	IC, NS8108	28480	1813-0060
			A2 MISCELLANEOUS		
	0590-1040	1	PRESS-IN NUT 0-80 .06-LG	28480	0590-1040
	5040-6938	1	SPACER	28480	5040-6938
			CHASSIS PARTS		
J1	1251-3228	1	CONNECTOR, 12-PIN FEMALE MULTICONTACT	9D949	91T-3638
MP1	08481-40002	2	SHELL, PLASTIC	28480	08481-40002
MP2	08481-40002		SHELL, PLASTIC	28480	08481-40002
MP3	08481-20011	2	CHASSIS	28480	08481-20011
MP4	08481-20011		CHASSIS	28480	08481-20011
MP5	08481-20008	1	END BELL	28480	08481-20008
MP6	1460-1330	1	SPRING-CPRSN .1-OD .15-LG MUW	28480	1460-1330
MP7	1251-3363	1	NUT:CONNECTOR MOUNTING	28480	1251-3363
MP8	08481-00002	2	SHIELD	28480	08481-00002
MP9	08481-00002		SHIELD	28480	08481-00002
MP10	3030-0422	13	SCREW-SKT HD CAP 0-80 .188-IN-LG HEX-REC	28480	3030-0422
MP11	3030-0422		SCREW-SKT HD CAP 0-80 .188-IN-LG HEX-REC	28480	3030-0422
MP12	3030-0422		SCREW-SKT HD CAP 0-80 .188-IN-LG HEX-REC	28480	3030-0422
MP13	3030-0422		SCREW-SKT HD CAP 0-80 .188-IN-LG HEX-REC	28480	3030-0422
MP14	3030-0422		SCREW-SKT HD CAP 0-80 .188-IN-LG HEX-REC	28480	3030-0422
MP15	3030-0422		SCREW-SKT HD CAP 0-80 .188-IN-LG HEX-REC	28480	3030-0422
MP16	3030-0422		SCREW-SKT HD CAP 0-80 .188-IN-LG HEX-REC	28480	3030-0422
MP17	3030-0422		SCREW-SKT HD CAP 0-80 .188-IN-LG HEX-REC	28480	3030-0422
MP18	3030-0422		SCREW-SKT HD CAP 0-80 .188-IN-LG HEX-REC	28480	3030-0422
MP19	3030-0422		SCREW-SKT HD CAP 0-80 .188-IN-LG HEX-REC	28480	3030-0422
MP20	3030-0422		SCREW-SKT HD CAP 0-80 .188-IN-LG HEX-REC	28480	3030-0422
MP21	3030-0422		SCREW-SKT HD CAP 0-80 .188-IN-LG HEX-REC	28480	3030-0422
MP22	3030-0422		SCREW-SKT HD CAP 0-80 .188-IN-LG HEX-REC	28480	3030-0422
MP23	3030-0436	1	SCREW-SKT HD CAP 0-80 .5-IN-LG SST-300	28480	3030-0436
MP24	5040-6939	1	CLAMP	28480	5040-6939
MP25	5040-6940	1	BLOCK	28480	5040-6940
MP26	7120-5101	1	LABEL-ID (FOR 8481H ONLY)	28480	7120-5101
MP26	7120-5102	1	LABEL-ID (FOR 8482H ONLY)	28480	7120-5102
R1	0698-7249	1	RESISTOR 3.48K 2% .05W F TC=0+-100	24546	C3-1/8-T0-3481-G

Table 5. Code List of Manufacturers

Mfr. No.	Manufacturer Name	Address	Zip Code
03888	PYROFILM CORP	WHIPPANY NJ	07981
12954	DICKSON ELECTRONICS CORP	SCOTTSDALE AZ	85252
14140	EDISON ELEK DIV MCGRAW-EDISON	MANCHESTER NH	03130
14433	ITT SEMICONDUCTORS DIV OF ITT CORP	PALM BEACH FL	33401
19701	MEPCO/ELECTRA CORP	MINERAL WELLS TX	76067
24546	CORNING GLASS WORKS (BRADFORD)	BRADFORD PA	16701
28480	HEWLETT-PACKARD CORPORATE HQ	PALO ALTO CA	94304
56289	SPRAGUE ELECTRIC CO	NORTH ADAMS MA	01247
9D949	AMPHENOL SALES DIV OF BUNKER—RAMO	HAZELWOOD MO	63042

listed in Table 4, give the instrument model number, instrument serial number, the description and function of the part, and the quantity of parts required.

44. SERVICE

45. Test equipment which meets or exceeds the critical specifications in Table 2 may be used in place of the recommended instruments for troubleshooting the Power Sensor.

46. Figure 2 shows the locations of the assemblies and components. Figure 3 is the schematic diagram.

47. Principles of Operation

48. Bulkhead assembly A1 presents a 50-ohm load to the RF signal applied to the power sensor. The RF signal absorbed by the thermocouples generates a dc voltage that is proportional to the RF input power.

49. Components A2E1 and A2E2 are ferrite beads situated in the black plastic block through which the wires from A1 pass to A2. Each ferrite bead increases the self-inductance of the wire passing through the bead, causing this portion of wire to act as an RF choke. The result is to minimize rf feedthrough to the A2 input amplifier assembly.

50. The dc output from the bulkhead assembly is applied to the two field-effect transistors (FET's) in A2U1. These transistors function as a sampling gate (or chopper). The sampling rate is controlled by a 220 Hz square wave supplied by the power meter. The sampling gate output (at pin 3 of A2U1) is a 220 Hz square wave having a voltage proportional to the RF power input.

51. The output of A2U1 is amplified about 700 times by an operational amplifier made up of A2Q1 and the first amplifier stage in the power meter. Figure 4 is a simplified diagram of the complete operational amplifier.

52. The Auto Zero Feedback circuit is coupled to the Power Sensor from the Power Meter. The dc voltage used to set the zero level is applied to the input of FET A2U1Q1 by using A2R1 and the series resistance of the thermocouple A1TC1 as a voltage divider.

53. When the Power Sensor is used with the HP 436A Power Meter, the resistance of R1 indicates the type of power sensor in use. As a result, the power meter automatically selects the proper measurement range. The 3.48K ohm resistance of R1 causes selection of the −15 to +35 dBm range. With the HP 435A Power Meter, R1 serves no function.

54. Troubleshooting

55. The troubleshooting information which follows is intended to isolate a problem to a stage. The defective component can then be identified by voltage and resistance checks. The field-effect transistors (FET's) in A2U1 are slightly light sensitive. As a result, dc levels are shifted slightly when the FET's are exposed.

CAUTION

Be extremely careful when measuring across the gold wires. They are delicate and can be damaged easily.

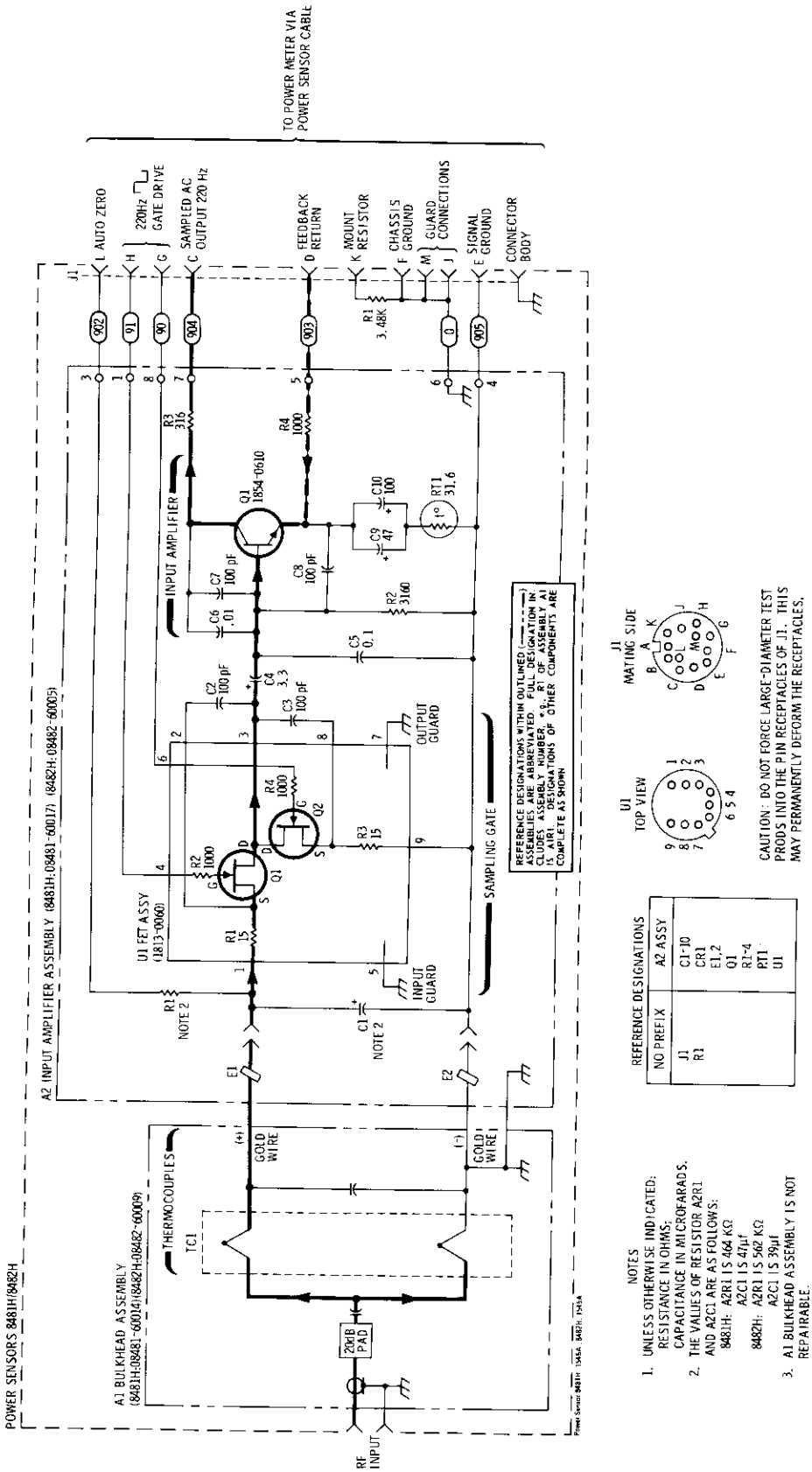

Figure 3. Schematic Diagram

56. The A1 bulkhead assembly normally supplies +3.79 ± 1 mV when the RF input is 3W. Measure this voltage at A2U1 pin 1. This dc voltage will vary somewhat if the A2 input amplifier is inoperative, or if the bulkhead assembly is disconnected from the input amplifier. Resistance measured across the two gold wires leading to the A2 assembly should be 200 ± 10 ohms (8481H) or 245 ± 12.5 ohms (8482H). Note that excessive power will damge either the 20 dB pad or the thermocouples. If the 20 dB pad is damaged it will present an open circuit to the input signal. If the thermocouples are damaged their resistance will increase. If the A1 Bulkhead Assembly is defective, the entire Bulkhead Assembly must be replaced.

57. The FET's in A2U1 may be checked by the following procedure:

a. Disconnect the cables from the Power Sensor.

b. Remove the upper chassis from the Power Sensor. (Refer to disassembly procedures, paragraph 66).

c. Measure the resistance between pins 1 and 2 of the A2U1. The resistance should be 15 ± 0.75 ohms. The same resistance should be found between pins 8 and 9 of A2U1.

d. Short pins 4, 6, and 9 of A2U1. While the pins are shorted, measure the resistance between pins 2 and 3, and between pins 3 and 8, of A2U1. The resistance should be less than 40 ohms.

e. Set a power supply to 10 Vdc.

f. Connect the positive side of the power source to the Power Sensor signal ground. Connect the negative power supply lead to pins 4 and 6 of A2U1.

g. Measure the resistance between pins 2 and 3 of A2U1. Also measure the resistance between pins 3 and 8 of A2U1. In both cases, the resistance should be several hundred times the resistance found in step d.

58. The 220 Hz drive from the power meter should have the following levels:

a. −0.05 ± 0.05 Vdc (top of square wave).

b. > −9 Vdc (bottom of square wave).

59. In most cases it may be assumed that the operational amplifier (made up of A2Q1 and the first amplifier in the power meter) is operating correctly if the dc voltage on the metal cover of A2Q1 (collector) is −70 ± 30 mVdc.

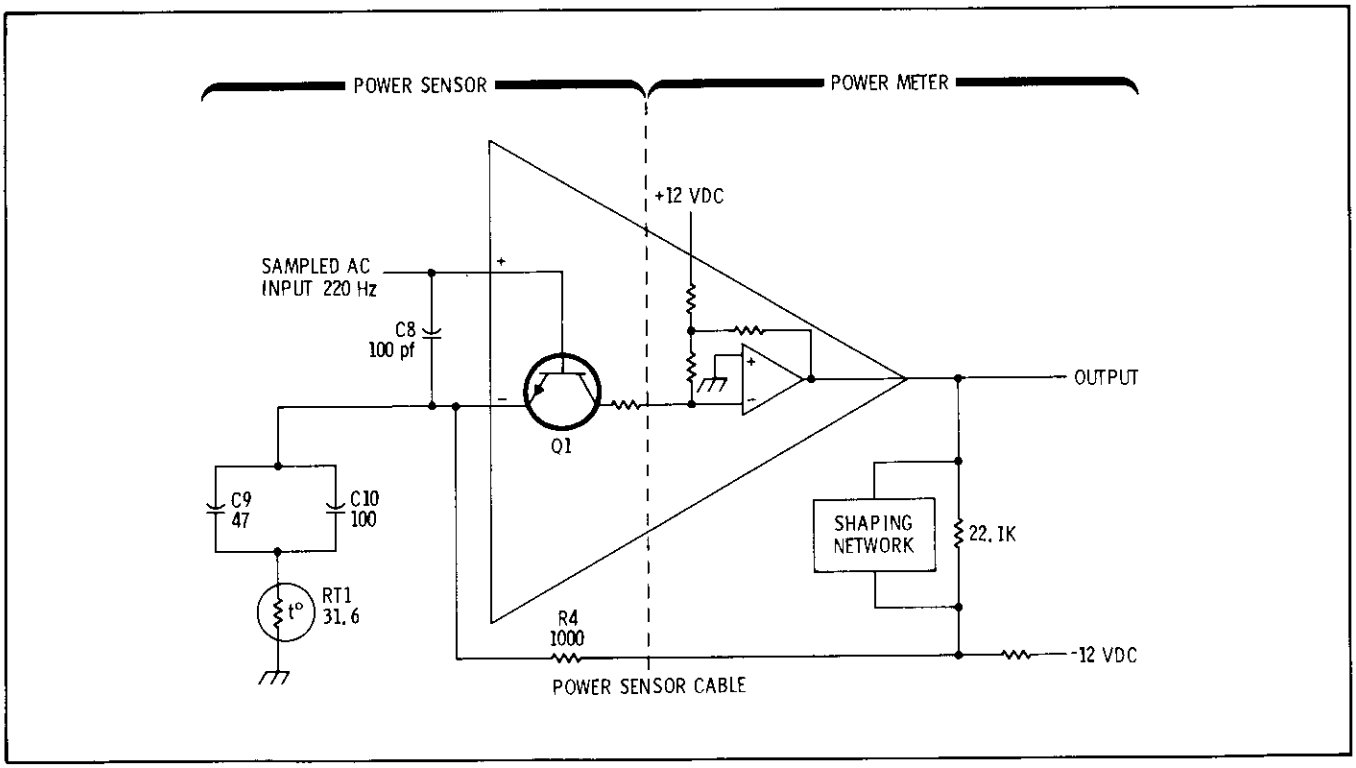

Figure 4. Operational Amplifier

60. REPAIR

61. Cleanliness

62. Do not handle the A2 input amplifier circuit board more than necessary. Dirt or moisture from the hands may make the circuits inoperative. Do not use solder-flux remover on the circuit board. It is particularly important to keep the area around A2U1 clean.

63. Soldering Techniques

64. The Power Sensor is a high-sensitivity device, and is affected by very small differences in temperature between its components. Therefore, after the performance of any soldering in the unit, *several hours* must be allowed for the unit to reach thermal equilibrium before it is used or tested.

65. Capacitors A2C2, A2C3, A2C7, and A2C8 (Figure 2) require low-temperature soldering techniques. The connections to these capacitors are a gold film deposited on a ceramic base. Molten solder results in the gold forming an amalgam with the solder, and the consequent removal of the gold from its ceramic base. Soldering must be done quickly, and a low-temperature soldering iron and solder must be used. The capacitors must be discarded if unsoldered. If integrated circuit A2U1 or transistor A2Q1 is replaced, two of these capacitors must be removed, and therefore must be replaced with new ones. The required low-temperature soldering iron and solder are as follows:

a. Hexacon Thermo-O-Trac soldering iron with J206X tip, temperature 600° F (311°C).

b. Low-temperature solder SN 62, HP part no. 5090-0410.

66. Disassembly Procedures

CAUTIONS

Disassembly must be performed in the sequence described below, otherwise damage may be caused to the two gold wires between the A1 bulkhead assembly and the A2 input amplifier assembly. If these wires are damaged, the A1 bulkhead assembly must be returned to the factory for repair.

Each Power Sensor has an individually prepared graph on the housing. If more than one Power Sensor is disassembled, be sure to use the proper housing for each when they are reassembled.

67. Disassemble the Power Sensor by performing the following steps:

CAUTION

The gold wires connecting the A1 Bulkhead Assembly and the A2 Input Amplifier Assembly are extremely delicate and may be easily broken. Be careful when working around them.

a. Insert the blade of a small screwdriver between the two-piece plastic shell at the rear of the Power Sensor. Gently pry the sections apart. (See Figure 5.)

b. Proceed to the other side of the connector and again pry the cover sections apart. Remove the shells and magnetic shields.

c. Position the Power Sensor as shown in Figure 6 (top). The small hole ❺ should be on the left side of the RF input connector. Remove the allen cap screws ❶, ❷, ❿, and ⓭. Loosen ⓫ and ⓬. Remove the upper chassis from the Power Sensor.

d. Remove the spring clamp cap screw ❼ to free the gold leads which come from the Bulkhead Assembly.

e. Remove cap screws ❸, ❹, and ❻.

f. Slide the Bulkhead Assembly straight out from the chassis.

g. Remove cap screws ❽, ❾, ⓫, ⓬, ⓮, and ⓯.

e. Lift the A2 Input Amplifier and J1 connector out of the chassis.

68. Reassembly Procedures

CAUTION

The gold wires connecting the A1 Bulkhead Assembly and the A2 Input Amplifier Assembly are extremely delicate and may be easily broken. Be careful when working around them.

a. Place the printed circuit board and connector into place.

b. Cap screws ❽, ❾, ⓫, ⓬, ⓮, and ⓯ must be inserted but not tightened. Refer to Figure 6.

c. Center the circuit board so there is equal air gap between each side and the chassis. Tighten ❽, ❾, ⓮, and ⓯.

d. With small hole ❺ to the left, carefully insert the gold leads on A1 bulkhead assembly through the holes in the black plastic guide on A2 input amplifier.

e. Insert screws ❸, ❹, and ❻. Tighten only screw ❻.

f. Position the ends of the gold wires over the pads on A2U1. The wires should not pass over the hole in the pad. Lightly clamp the leads in place with screw ❼. DO NOT fully compress the spring.

g. Place the upper chassis in position and insert cap screws ❶, ❷, ❿, and ⓭.

h. Tighten ❶, ❷, ❸, and ❹.

i. Tighten ❿, ⓫, ⓬, and ⓭.

j. Place the plastic shells, magnetic shields, and the chassis together as shown in Figure 1. Snap the plastic shells together.

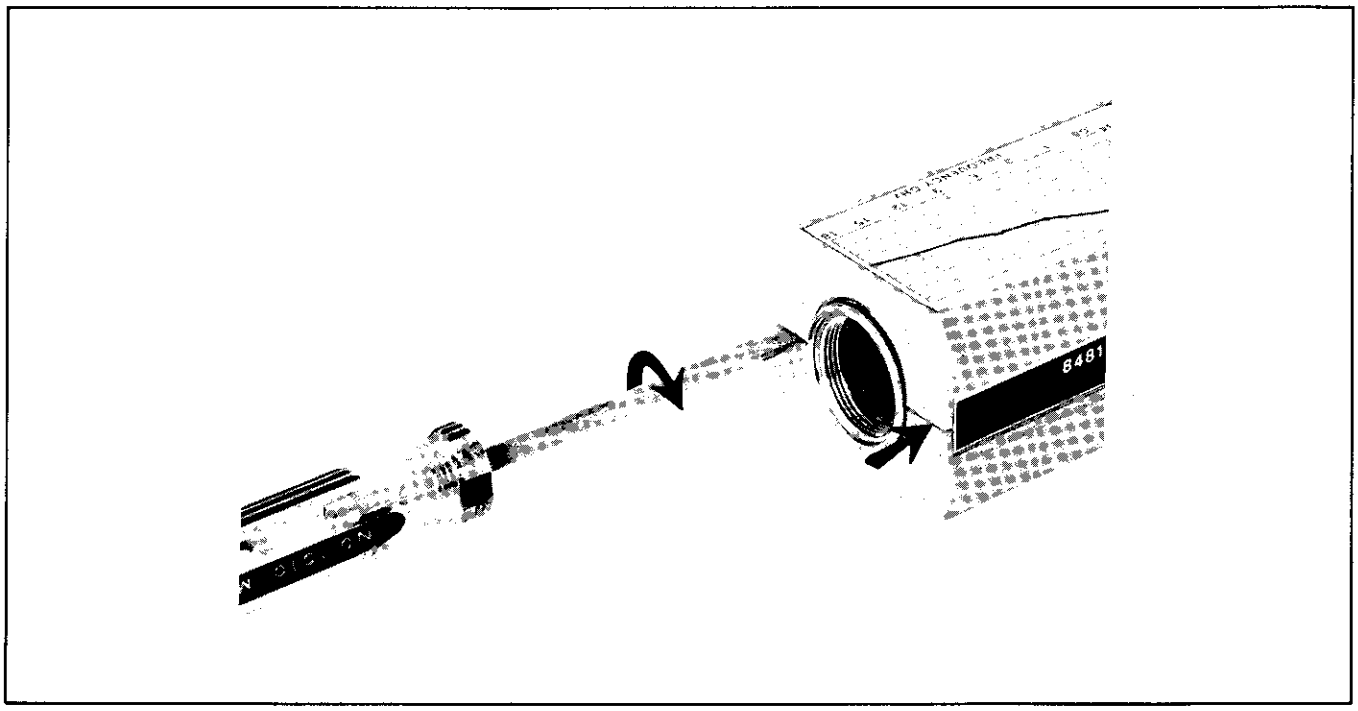

Figure 5. Removing the Power Sensor's Cover

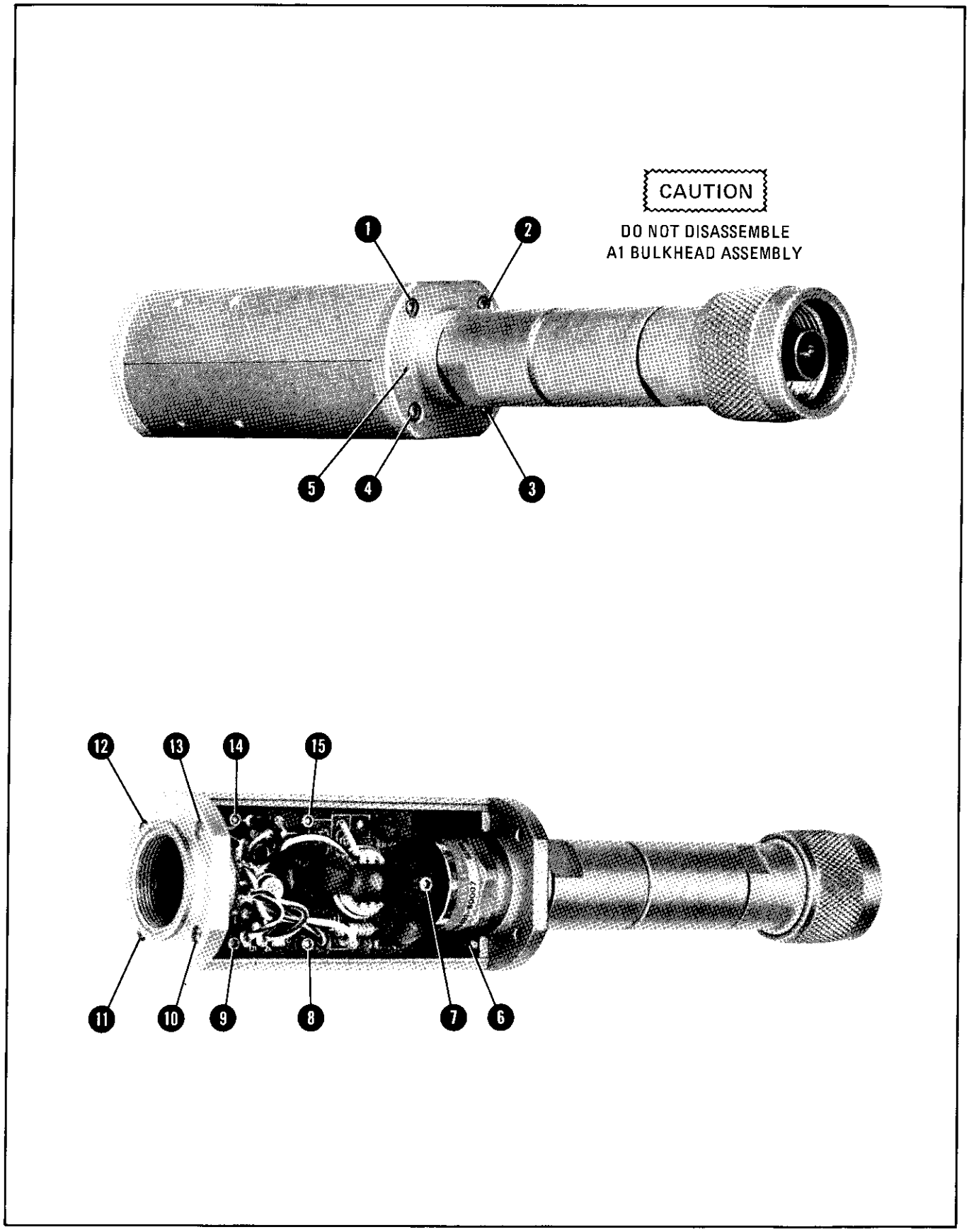

Figure 6. Power Sensor Hardware Locations

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