



OPERATING NOTES

HEWLETT-PACKARD COMPANY • 1501 PAGE MILL ROAD • PALO ALTO, CALIFORNIA, U. S. A.
CABLE "HEWPACK" TELEPHONE DAVENPORT 6-7000

Ⓢ MODEL 444A UNTUNED PROBE

The Model 444A is a sensitive broadband microwave untuned probe used with the Ⓢ Model 809B Universal Probe Carriage. It also may be used with other carriages which have a 3/4-inch mounting hole. The detector covers the frequency range from 3 to 18 kmc. In the range from 8 to 18 kmc, sensitivity exceeds that of many elaborate single- or double-tuned probes.

The 444A consists of a crystal rectifier plus probe in a convenient housing that permits probe penetration to be varied quickly and easily. The output appears at a BNC connector. The detector element is a modified 1N26 or 1N76 silicon crystal, and is suitable for use in standing-wave measurements over a wide range of frequencies.

The convenient no-tuning-required feature of the 444A is made possible by keeping the lead length between crystal and probe to a minimum. With reactances thereby minimized, high efficiency and flat response across a broad band can be achieved without tuning. Polyiron inserts damp out spurious resonances.

1. OPERATION

The probe as it comes from the factory can be used with X- and P-band slotted sections (1 in. x 1/2 in. waveguide or smaller). A set (two each) of four extensions are supplied with the probe to lengthen it for use with the larger-size waveguide sections. To put on an extension, it is not necessary to disassemble the 444A. Simply slip the extension over the tip of the probe. To retain good efficiency and optimum response, use the shortest extension which will give the necessary penetration

The probe is easily adjusted to and locked at any desired penetration. The locking device is a ring on the housing (see Figure 1). Penetration should not exceed the minimum required to obtain a reading. The probe is an admittance shunting the line. Loose coupling (small penetration) is one of the factors which keeps this admittance small. (See Good Practice in Slotted Line Measurements, Hewlett-Packard Journal, Vol. 3, Nos. 1,2.)

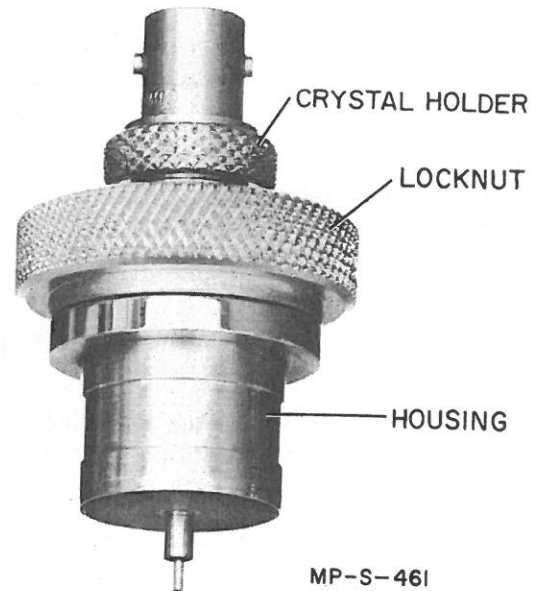


Figure 1. Model 444A Untuned Probe

2. MAINTENANCE

A. EXTENSIONS

If an extension for the probe tip gets loose, it can be tightened by crimping the contact portion over a 0.031-inch mandrel (shank of #68 drill).

B. CRYSTAL REPLACEMENT

The crystal used in the 444A is a modified Sylvania 1N26 or 1N76, Ⓢ Stock No. 444A-25E. It is recommended that replacement crystals be obtained from your sales representative or the Hewlett-Packard Company.

To remove the crystal:

- 1) Loosen the locknut, and lift the crystal holder free of the housing.
- 2) Unscrew the BNC connector from the holder. A male connector may be used to loosen the BNC female.

3) To free the crystal, push on the end of the probe. (The bakelite disk in the probe end of the holder is a disc resistor with which the center conductor of the crystal makes contact.)

Install the new crystal in reverse order.

NOTE: Parts and assemblies are identified in Figure 3.

C. RESISTOR REPLACEMENT

Installing the disc resistor in the crystal holder is a factory operation. Therefore the resistor installed in the holder is made available as a replaceable part (assembly 444A-95C). To install assembly 444A-95C:

- 1) Remove the old assembly 444A-95C: loosen the locknut, and lift the holder out of the housing.
- 2) Unscrew the BNC connector from the holder (a male connector may be used to loosen the BNC female).
- 3) Remove the crystal from the old holder, and install it in the new.
- 4) Install the old BNC connector in the new holder.
- 5) Replace the holder in the housing.

D. REPLACING THE BNC CONNECTOR

- 1) Loosen the locknut, and lift the crystal holder out of the housing.
- 2) Unscrew the BNC connector from the holder (a male BNC may be used to loosen the female).
- 3) Unsolder spring 146-14 from the BNC.
- 4) Solder spring 146-14 to the center conductor of the new BNC connector.
- 5) Screw the new BNC connector into the holder. DO NOT INSTALL THE CRYSTAL UNTIL THE SPRING AND CONNECTOR ARE COLD.

E. REPLACING CONNECTOR AND DISC RESISTOR

For the convenience of those customers who do not wish to remove the BNC connector, a holder assembly, less crystal, is available. This

assembly (444A-95D) includes the holder, disc resistor, BNC connector, and spring. Replacement then becomes simply a matter of installing the old crystal in the new assembly.

F. COMPLETE ASSEMBLY

The entire holder assembly, complete with crystal, is available under part number 444A-95B.

G. CRYSTAL MODIFICATION

If you want to modify the 1N26 or 1N76 diode, follow the instructions given in Figure 2. A metal turning lathe is required for the operation.

Electrical contact to the outer shell of the diode is made inside the cupped end of the outer shell. The film of lacquer within this cup must be removed.

The band of Scotch tape around the shell of the diode functions as a dielectric when the crystal is installed in the mount. It is important to apply this tape as shown in Figure 2.

The contact ring must fit the crystal snugly to assure good electrical contact. Too tight a fit, however, may damage the crystal. The ring may be stretched by forcing it over an awl, or compressed with a pair of pliers to obtain the desired tightness.

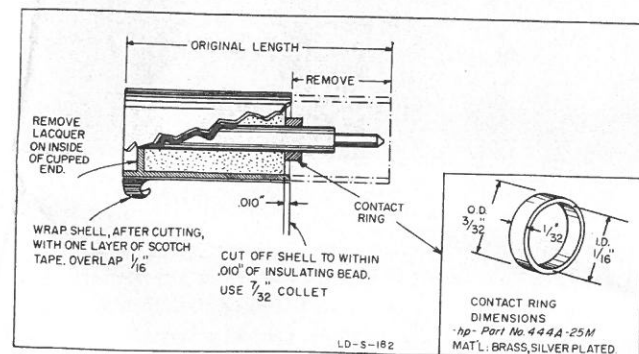


Figure 2. Modification of 1N26 or 1N76 Crystal for use in Model 444A Untuned Probe

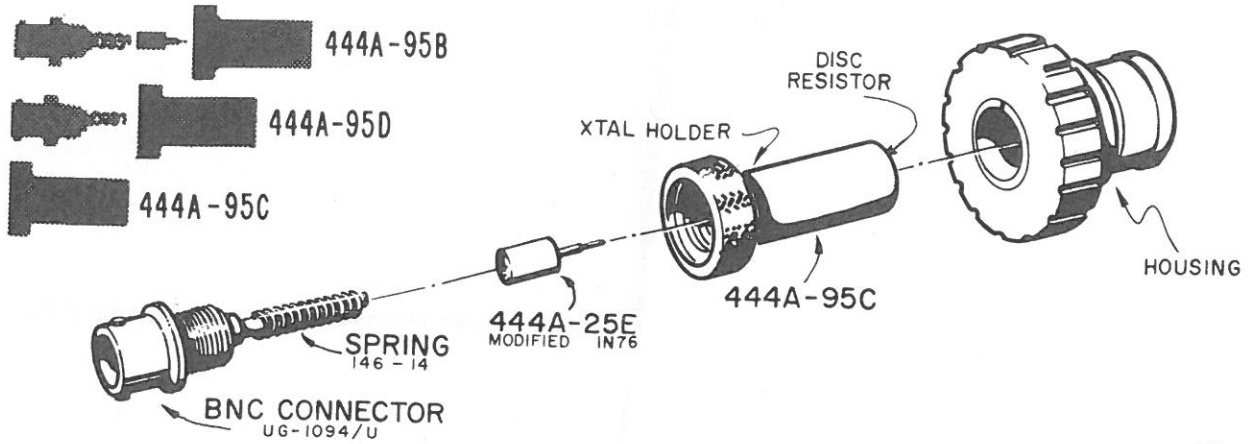


Figure 3. Model 444A Untuned Probe Exploded View

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TABLE OF REPLACEABLE PARTS

Description	⊕ Stock No.	Manufacturer and Designation
Crystal detector modified 1N26 or 1N76 silicon diode	444A-25E	Hewlett-Packard
Assembly crystal detector, crystal holder, disc resistor, BNC connector, spring	444A-95B	Hewlett-Packard
Assembly crystal holder and disc resistor	444A-95C	Hewlett-Packard
Assembly crystal holder, disc resistor, BNC connector, spring	444A-95D	Hewlett-Packard
BNC female connector	125-UG1094/U	Gremar, UG-1094/U
Probe-tip extension assembly	444A-95A	Hewlett-Packard

SPECIFICATIONS

FREQUENCY RANGE: 3.0 to 18.0 mc
 OUTPUT CONNECTOR: BNC female
 ACCESSORIES FURNISHED: Probe-tip extensions, 2 each: 1/4 in., 5/16 in.,
 3/8 in., 7/16 in.