

S E R V I C E N O T E

SUPERSEDES:

P-608A-34 (Rev. 2/69)

HP PART NUMBER 608A-34, 608D-34, 608D-34S, AND 00608-610 REPLACEMENT ATTENUATOR ASSEMBLY

This Service Note contains information necessary for replacing and recalibrating the output attenuator in the 608A/B/C/D/E/F Signal Generators. The procedure is described for each model, using the appropriate replacement attenuator.

EQUIPMENT REQUIRED

A microwave power meter and thermistor mount such as HP Model 432A, 478A combination will be required for calibration.

NOTE

Should it be necessary to replace the drive cable, a new drive cable and drive screw assembly is available under HP Part No. 5060-0205.

DESCRIPTION

The RF power output from the power amplifier is obtained from the resonant plate circuit by means of a pickup loop located in a section of circular

waveguide which opens adjacent to the resonant circuit. The waveguide is smaller than the cut-off size of waveguide designed for use at the frequencies generated by the Model 608 and the energy propagation decreases linearly in dB down the waveguide.

A pulley drive system moves the pickup loop in the waveguide. The energy coupled into the output system varies with the position of the pickup loop.

The attenuator dial is calibrated directly in dB below 1 milliwatt into 50 ohms. A second scale on the attenuator dial is calibrated directly in millivolts and microvolts output across a 50 ohm resistive load.

The pickup loop couples energy from the resonant circuit to the output connector through a special matching network. This network consists of two resistors and a small variable capacitor. The setting of this capacitor primarily determines the standing wave ratio at the instrument output terminals. Do not disturb the factory setting of this capacitor or the position of other components on the end of a replacement attenuator.

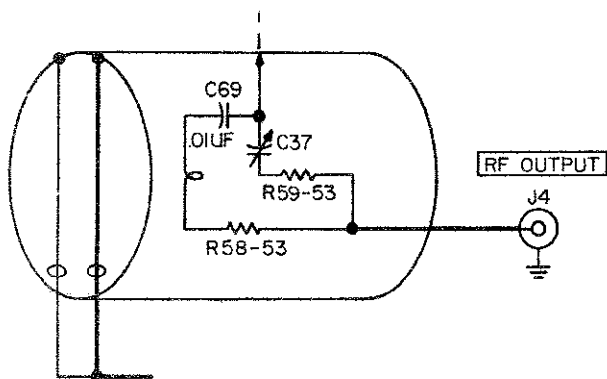
JD/mh/wo

6/69-4

HEWLETT  PACKARD

NOTE

Since 1956 HP attenuator probes have included a capacitor (C69) in the probe to block ground loop currents between the probe ground and the front panel ground. See 608C/D Probe Schematic. This eliminates spurious signals which could appear at the signal generator output. C69 is a .01 μ F 400 volt Mylar capacitor. It was added to the circuit in series between the probe pickup loop and the probe body which is ground. Because of this capacitor, a dc resistance check of the probe between the center conductor of the jack and ground will indicate an open circuit which is normal. A VHF impedance bridge such as the HP 803A may be used to verify impedance of the probe assembly.



Probe Schematic (608C/D)

If excessive power is accidentally applied to the attenuator circuit from an external source, the precision resistors on the output attenuator will be damaged and in most cases burned out. Fuseholder HP Part No. 11509A is available as an accessory to prevent output attenuator damage.

REPLACEMENT PROCEDURE

1. Remove cabinet.
2. Release or Remove Drive Cable from Attenuator:
 - a. If drive screw (1) is slotted, remove nut and pin; slide cable (2) out of slot.
 - b. If drive screw (1) is not slotted, or if cable (2) is frayed, cut cable (2), remove, and discard.

NOTE

Before removing drive cable, note routing of cable and compare with step 5. This will make drive cable replacement easier.

3. Remove Attenuator:

- a. Completely remove attenuator drive screw (1) by unscrewing from attenuator. (First remove lock nut from end inside tube.)

- b. Pull attenuator out of attenuator tube (3). (Waveguide.)

- c. Release attenuator output cable (4) from chassis by removing clamp.

- d. Unscrew knurled sleeve on rear of front panel output connector.

- e. Pull output connector back from panel and then out through hole in rear of chassis. Cut out or remove rubber grommet (608A/B only). A new grommet is supplied on the new attenuator cable.

4. Install Attenuator in Tube (3):

- a. Check attenuator fingers (8). They should project 1/6" to 1/32" past side of attenuator. (If too tight, attenuator will not move freely. If too loose, will cause RF leakage.) Adjust if necessary. If necessary, the fingers can be burnished for smoother operation.

- b. Line up drive screw hole with slot (5) in tube (3).

- c. Compress fingers and insert attenuator into tube.

- d. Install drive screw, using new slotted type. This makes future replacement easier.

- e. Make sure fingers do not catch at forward end of drive screw slot. Bend a finger in toward attenuator as necessary.

- f. Align drive screw, drive screw slot, and rear pulley (9) so cable will run straight.

- g. Pass connector through chassis and replace on panel.

- h. Secure cable clamp, forming cable toward corner near 1/16 Amp. fuse. If this is not done, cable will hit back of case and prevent proper operation.

5. Replace Drive Cable if Necessary:

- a. Turn attenuator dial to extreme counterclockwise position.

- b. Face right rear corner of instrument.

- c. Pass end of drive cable through top hole (11) in drive pulley (12) and secure end under screw (14).

- d. Pass free end up over pulley, around upper idler pulley (15) through slot in drive screw (1), around rear idler pulley (9), around lower idler pulley (16), and out the side under the drive pulley.

NOTE

For the following three steps obtain help, or secure the drive pulley to the stop (with wire or string) in the clockwise position.

e. Keeping the tension on cable, turn attenuator to extreme clockwise position. This winds up one turn on drive pulley.

f. Pass free end under drive pulley and into hole (17).

g. Secure end of drive cable under screw (18), keeping cable taut.

6. Replace Drive Cable in Slot, and Adjust for Optimum Tension:

a. Loosen Allen screw in rear pulley (9) assembly.

b. Pull back on pulley to get desired tension. (If the cable is too tight, the attenuator will not move freely. If too loose, there will be backlash).

c. Tighten Allen screw.

7. Secure Drive Cable to Attenuator:

a. Set attenuator dial at extreme clockwise position.

b. Remove side cover plate and gasket from generator casting.

c. Lift drive cable out of slot and thread one 10-32 hex nut on the attenuator drive screw.

d. Place one fiber washer over the attenuator drive screw and then insert drive cable in the drive screw slot.

e. Plate the remaining fiber washer over drive screw followed by the second 10-32 hex nut. Position the two nuts so that when they are tightened later the cable will be clamped between the two fiber washers in a straight line between pulleys 9 and 15.

f. Slide attenuator forward until the pickup loop (19) is flush with inner end of tube.

g. Tighten nuts on attenuator drive screw.

h. Make sure that these nuts do not hit rear pulley assembly in counterclockwise position of the attenuator control.

i. Check pickup loop position with attenuator control full clockwise. Loop should be flush with inner end of tube.

j. Check amplifier turret and coils. They must not touch the pickup loop when the range switch is operated.

8. 608A/B Attenuator: (Calibration for Models 608C/D refer to appropriate Operating and Service Manual.)

a. Turn attenuator dial to extreme clockwise position.

b. Make sure dial reads exactly +7 dB. If not, loosen attenuator dial knob and reset.

c. Turn dial to indicate exactly -1 dB.

d. Apply power to instrument.

e. Connect bolometer mount and power meter to the Model 608.

f. Set Model 608 to 10 MHz and peak trimmer.

g. Set output level control until external power meter indicates exactly -1 dB.

h. Adjust R20 potentiometer on bracket at rear of generator casting, so that output meter on Model 608 indicates exactly 0.5 volts.

i. Check all bands for correct power output.

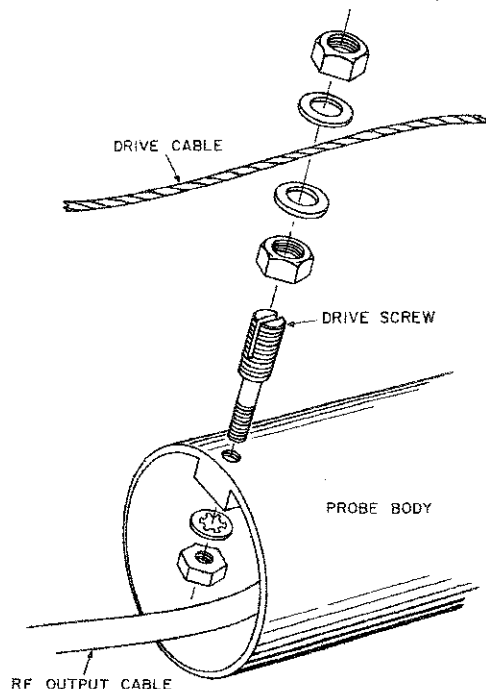
j. Reset attenuator dial to +7 dB and adjust output to Set Level.

k. Check all bands for correct power output. Measured output should be +7 dB plus or minus 1 dB.

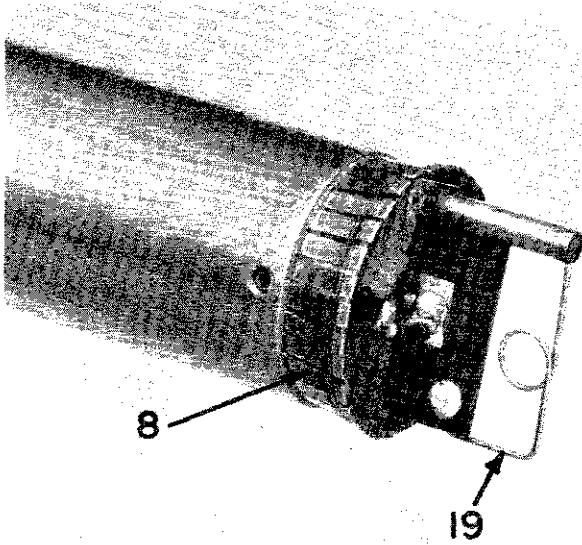
m. Readjust R20 if necessary to compromise for errors noted in these measurements.

NOTE

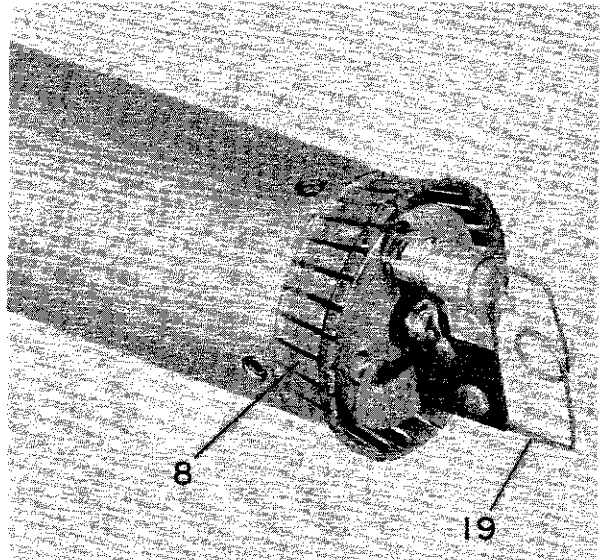
Errors at the -1 dB level should be kept as small as possible since the accuracy of this setting determines the accuracy at lower attenuator settings. The attenuator is very linear below 0 dB but due to endfringe effects of the attenuator tube, there is some non-linearity above 0 dB.



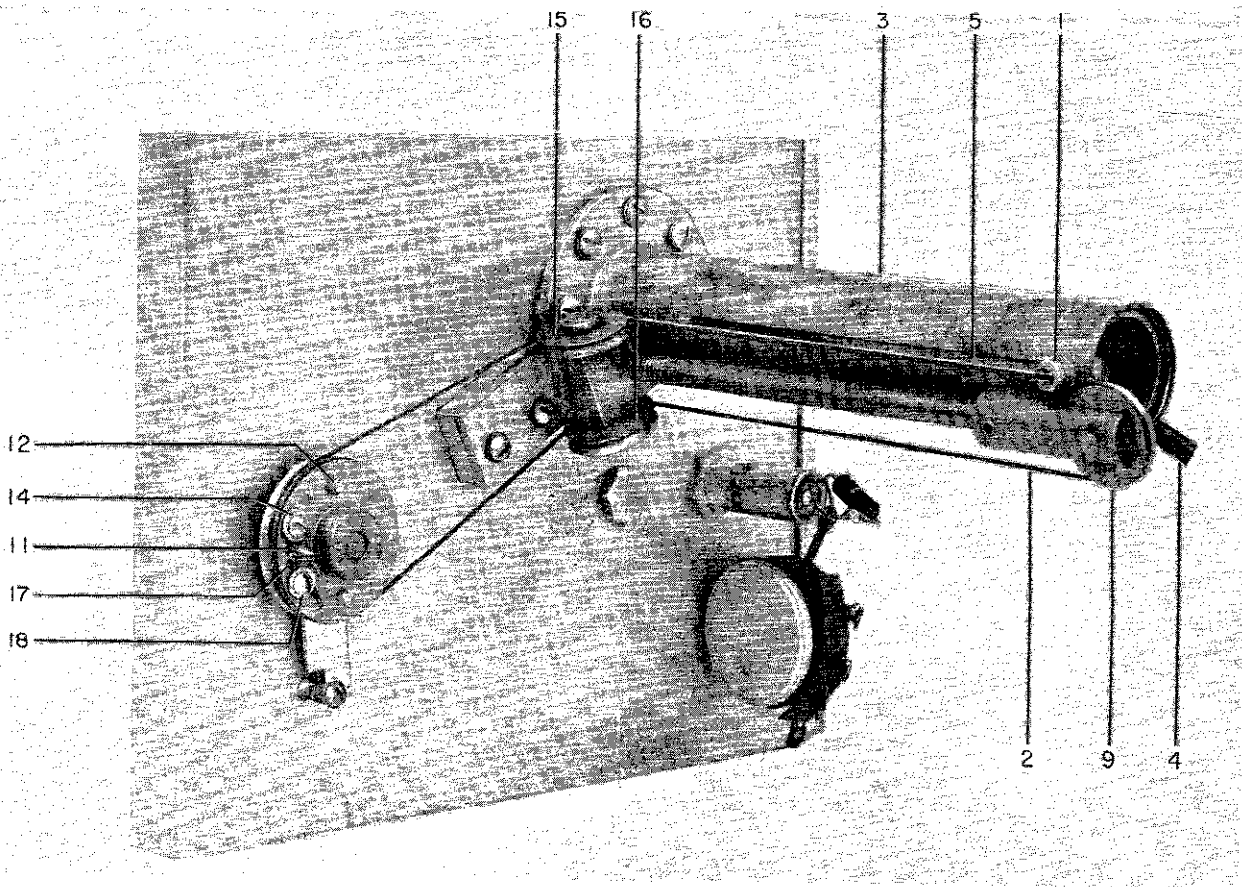
Drive Cable Clamp



End View
Old Style Attenuator



End View
New Style Attenuator



Generator Casting, Attenuator Tube and Drive Mechanism