

# MICROWAVE TEST ACCESSORIES

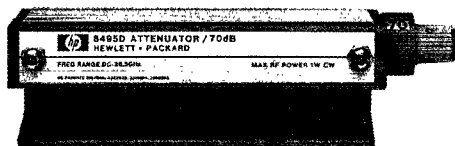
## Coaxial Step Attenuators

HP 355 Series, 8494/5/6/7 Series, 11716 Series, 33320 Series

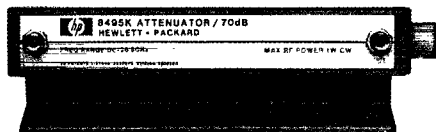
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- Excellent repeatability
- Manual and programmable

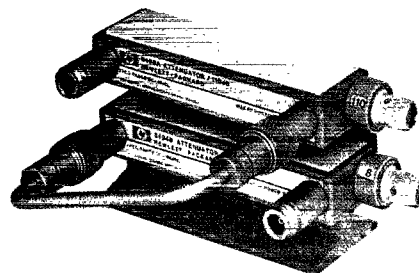
- Calibration data available
- Five million cycles per section reliability



HP 8495D



HP 8495K



HP 11716A



### DC to 1000 MHz Programmable and Manual Step Attenuators. HP 355C/D/E/F

- Precision attenuation from DC to 1000 MHz
- 355C/E provide 0 to 12 dB in 1 dB steps
- 355D/F provide 0 to 120 dB in 10 dB steps
- All standard models use standard BNC RF connector
- Programmable models (E/F) use 7-pin connector

### DC to 4, 18, and 26.5 GHz Programmable and Manual Step Attenuators

HP 8494A/B/G/H (0 to 11 dB, 1 dB steps)

HP 8495A/B/D/G/H/K (0 to 70 dB, 10 dB steps)

HP 8496A/B/G/H (0 to 110 dB, 10 dB steps)

HP 8497K (0 to 90 dB, 10 dB steps)

Hewlett-Packard attenuators offer exceptional repeatability and reliability in a wide range of attenuation, frequency, and connector options.

- SMA (f), Type N (f), APC-7 mm (f), and 3.5 mm RF connectors.
- DC to 4 GHz, dc to 18 GHz, and dc to 26.5 GHz models.
- Permanent magnet latching design and automatic DC current interrupts simplify programmable model drive circuit design.

Each attenuator contains three or four cascaded attenuator sections; edge-line contacts insert and remove attenuator sections as needed. Precision gold-plated leaf springs ensure long life (over 5 million cycles) and very high attenuator repeatability (typically 0.01 dB). Programmable models (G, H, and K suffixes) feature fast-switching solenoids; attenuation programming is done through a 12-pin connector.

To improve measurement accuracy in manual and automated test systems, NIST traceable calibration data (SWR and attenuation) is available as Option 890. Generated on an HP 8510 network analyzer, this option offers swept data for each attenuator step in 250 MHz steps from 1500 MHz to 26.5 GHz (upper frequency varies by model).

To simplify connecting programmable attenuators to the drive circuit, each unit is supplied with a 5-ft cable assembly. With an HP 11713A Attenuator Driver, or an HP 70611 Driver for MMS-based systems, the attenuators are easily integrated into a Hewlett-Packard Interface Bus (HP-IB) automated system.

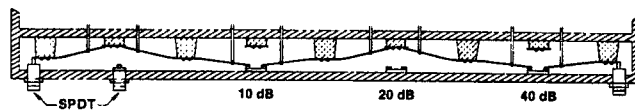


Figure 1. 70 dB plus SPDT.

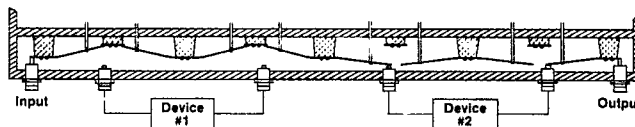


Figure 2. Dual transfer switch showing device #2 inserted in signal path.

### Custom Attenuator and Switch Combinations

Custom step attenuator/switch combinations are possible with the HP 8494/5/6/7 attenuator family. Examples can be as simple as adding a SPDT switch section to a standard 70 dB attenuator (figure 1) or creating a dual transfer switch (figure 2). See the HP Microwave Test Accessories Catalog for more information.

### HP 11716A/B Attenuator Interconnect Kits

Quickly and conveniently connect 1 dB step and 10 dB step attenuators together to achieve greater dynamic range with 1 dB steps. The 11716A/B interconnect kits contain a rigid RF cable, mounting bracket, and necessary hardware to connect any pair of HP 8494/5/6/7 attenuators in series (see photo above). Attenuators must be ordered separately.

### Ordering Information

HP 11716A Interconnect Kit (Type N)

HP 11716B Interconnect Kit (7mm)

### Price

\$220

\$300

### HP 33320 Series OEM Step Attenuators

The HP 33320 series step attenuators are compact versions of the HP 8495/6/7 benchtop attenuators. They offer the same specifications, but are configured to fit easily into microwave systems and instruments. Both manual and programmable versions are available; the manual version occupies less than 1.5 square inches of panel space. OEM quantity discounts are available for the HP 33320 series; the HP 33320 series has a five-million-cycles-per-step reliability guarantee.

Programmable models are supplied with a 5-ft cable, fitted with a round 12-pin Viking connector that mates with the HP 11713 Attenuator/Switch Driver. A flat ribbon cable with a DIP-type connector, compatible with a standard 14-pin DIP IC socket, is also available.