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MICROWAVE TEST ACCESSORIES

Coaxial Fixed Attenuators, Gage Kits, Blocking Capacitor, Air Line Extensions, Harmonic Mixers

HP 8490 Series, 11581/2/3, 11752 Series, 11742A, 11566/7A, 11970 Series



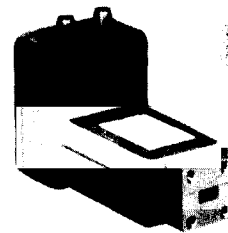
HP 8493C



HP 11742A



HP 11566A



HP 11970 Series

HP 8490D, 8491A/B, 8492A, 8493A/B/C Fixed Attenuators

Hewlett-Packard coaxial fixed attenuators provide precision attenuation, flat frequency response, low SWR over broad frequency ranges (dc-50.0 GHz) at low prices. Attenuators are available in nominal attenuations of 3-dB and 6-dB, also 10-dB increments from 10 dB to 60 dB. These attenuators are swept-frequency tested to ensure meeting specifications at all frequencies. Calibration points are provided on a nameplate chart attached to each unit.

HP 11581A, 11582A, 11583A/C Attenuator Sets

A set of four Hewlett-Packard attenuators—3, 6, 10 and 20 dB—are furnished in a handsome walnut accessory case. The HP 11581A set consists of HP 8491A Attenuators; the HP 11582A set, HP 8491B Attenuators; the HP 11583A set, HP 8492A Attenuators; and the HP 11583C set, HP 8493C Attenuators. The set includes calibration reports certified traceable to the National Institute of Standards and Technology, containing both the attenuation and the reflection coefficients for each attenuator at the frequencies indicated under "Option 890" calibration data on the next page. Thus it is not required to specify Option 890.

These sets are ideal for calibration labs or where precise knowledge of attenuation and SWR is desired.

HP 8498A High Power Attenuator

The HP 8498A Option 030 is designed to meet the needs of high power attenuation applications in the RF and microwave frequency range. It is specified from dc to 18 GHz at 25 watts average, 500 watts peak, from dc to 5.8 GHz and 125 watts peak from 5.8 to 18 GHz. Available only in a 30 dB model (option 030), the unit offers low SWR (<1.30 at 18 GHz) and good accuracy (± 1 dB at 18 GHz). The unit also features 'human engineered' cooling fins that prevent operator burns even under continuous maximum input power conditions.

Option 890 Calibration Data

Extensive calibration data is available on HP attenuators at low cost. When option 890 is specified for the fixed attenuators or microwave step attenuators, standardized calibration data in frequency steps no larger than 500 MHz is provided over the frequency range of the units. This data is generated from measurements made on an HP 8510 Automatic Network Analyzer and features excellent accuracy (traceable to NIST) and low cost. Data is given for attenuation and the SWR (reflection coefficient for the HP 8493C) of each port and is provided in a protective plastic envelope.

Calibration data has important uses in applications such as RF substitution measurements and test system verification. Using the actual calibration data rather than data sheet specifications allows the attenuation uncertainty to be reduced 60% or more. Also, the calculated mismatch uncertainty for a test system is lower if the actual SWR data for the attenuators is used.

HP 11742A Blocking Capacitor

The HP 11742A is a high performance outside blocking capacitor. It features broadband performance, low SWR (1.2 from .01 to 26.5 GHz) and low insertion loss (.6dB from .01 to 26.5 GHz). The HP 11742A comes with 3.5 mm connectors. It is ideal for use with high frequency oscilloscopes and in bias circuits for the attenuation of low frequencies and blocking D.C. voltages up to 50V.

HP 11752C/D/E Coaxial Connector Gage Kits

With SMA connectors or with the newer 2.4, 2.92, or 3.5mm connectors, pin depth and dielectric control are critical to ensure repeatable measurements and to prevent connector damage. The HP 11752C SMA Connector Gage Kit is designed to measure pin depth or setback and dielectric protrusion. Each gage kit is supplied to make both measurements, on either male (option 001) or female (option 002) connectors. All gages feature rugged mechanical indicators graduated in 0.0001-inch increments for accurate adjustment of center conductor pin depth and dielectric protrusion.

The HP 11752D is used for measuring center conductor pin depth on 3.5mm connectors and the HP 11752E measures 2.92 and 2.4mm connectors. Each of these kits contain a male and female gage plus their respective gage set masters. Each kit is supplied with a handsome walnut case and a comprehensive user's manual.

HP 11566A, 11567A Air Line Extension

Impedance: 50 ohms.

Frequency: dc-18 GHz.

Reflection coefficient: 0.018 + (0.001 x frequency in GHz).

Connector: APC-7.

Length: 11566A, 10.21 cm (4 in.); 11567A, 20.21 cm (8 in.)

Shipping weight: 0.45 kg (1 lb).

Ordering Information

HP 11752C SMA Connector Gage Kit

Opt 001 Male Pin Depth & Dielectric

Opt 002 Female Pin Depth & Dielectric

HP 11752D 3.5mm Connector Gage Kit

HP 11752E 2.92 & 2.4 mm Connector Gage Kit

HP 11742A Blocking Capacitor

HP 11566A Air Line Extension

HP 11567A Air Line Extension

Price

\$1,200

\$1,200

\$1,300

\$1,400

\$170

\$365

\$400

HP 11970 Series Harmonic Mixers

Although designed for operation with HP spectrum analyzers, these broadband mixers also serve a wide variety of general-purpose uses for the frequency bands from 18 to 110 GHz. Such uses include down-conversion for noise figure and network analysis measurements.

As down-conversion mixers for test receivers, the HP 11970s offer flat response, low SWR, and low conversion loss without requiring bias. These mixers can also serve as harmonic generators with input signals from 2 to 6.1 GHz. Outputs are at the band specified, and each mixer is individually calibrated for conversion loss over its complete band.

HP 11970 Series Specifications

HP Models	Frequency Range (GHz)	Frequency Response (dB)	Waveguide and Equivalent Flange	Price
11970K	18 - 26.5	± 1.9 ± 2.1	WR-42 UG-595/U	\$1750
11970A	26.5 - 40	± 1.9 ± 2.1	WR-28 UG-599/U	\$1800
11970Q	33 - 50	± 1.9 $\pm 2/3$	WR-22 UG-383/U	\$1950
11970U	40 - 60	± 1.9 ± 2.3	WR-19 UG-383/U (mod)	\$2200
11970V	50 - 75	± 2.1 ± 2.5	WR-15 UG-385/U	\$2650
11970W	75 - 110	± 3.0	WR-10 UG-385/U (mod)	\$3000

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HP 8491A/B series



HP 8492 series



HP 8493A/B/C series

HP 8490D



Ordering Example

Include appropriate frequency range/connector and attenuation designations from the ordering example below with every attenuator order.

Calibration Data
Include "Option 890" in addition to attenuation option when ordering calibration data.

8491B Option 010 Option 890

Connectors and Frequency Range

- 0D: 2.4mm (m,f), dc-50.0 GHz
- 1A: Type N (m,f), dc-12.4 GHz
- 1B: Type N (m,f), dc-18 GHz
- 2A: APC-7, dc-18 GHz
- 3A: SMA (m,f), dc-12.4 GHz
- 3B: SMA (m,f), dc-18 GHz
- 3C: 3.5mm (m,f), dc-26.5 GHz
- 8A: Type N (m,f), dc-18 GHz

8498 is available in a 30 dB model only

* Not available for HP 8493A/B

** Not available for HP 8493A/B/C and HP 8490D

Attenuation

- 003: 3 dB
- 006: 6 dB
- 010: 10 dB
- 020: 20 dB
- 030: 30 dB
- 040: 40 dB*
- 050: 50 dB**
- 060: 60 dB**

Option 890 Example

hp CALIBRATION REPORT												
MODEL	8490D	SIC	890	NBS	TEST	NO	835214	DATE	9-APR-1990	TAG	COI	
SER	NO	8724400001	TECH	NO	222473							
FREQUENCY	ATTENUATION	FWD	LEFT	RIGHT								
MHZ	dB	ANG	VSUR	ANG	VSUR	ANG						
33200	0	10 50	123	4	1 034	83	5	1 045	94	7		
33600	0	10 50	122	9	1 032	80	9	1 041	90	2		
34000	0	10 51	110	7	1 028	82	7	1 037	87	9		
34400	0	10 54	99	2	1 024	86	7	1 031	86	9		
34800	0	10 54	87	6	1 023	76	8	1 026	80	5		
35200	0	10 55	76	0	1 020	66	4	1 023	72	2		
35600	0	10 54	64	5	1 021	56	1	1 024	64	8		
36000	0	10 55	52	9	1 022	46	9	1 024	54	9		
36400	0	10 55	41	3	1 029	37	9	1 030	43	9		
36800	0	10 55	30	4	1 049	28	8	1 030	34	4		
37200	0	10 55	19	3	1 057	19	3	1 034	24	4		
37600	0	10 55	8	4	1 068	10	6	1 040	14	0		
38000	0	10 54	-4	4	1 074	2	2	1 049	8	9		
38400	0	10 54	-15	2	1 087	12	2	1 059	2	0		
38800	0	10 51	-26	1	1 090	18	1	1 063	13	0		
39200	0	10 50	-37	9	1 097	18	4	1 068	4	0		
39600	0	10 51	-47	9	1 103	18	4	1 073	4	0		
40000	0	10 50	-57	2	1 103	18	4	1 073	4	0		
40400	0	10 51	-67	1	1 103	18	4	1 073	4	0		
40800	0	10 51	-74	1	1 103	18	4	1 073	4	0		
41200	0	10 51	-81	1	1 103	18	4	1 073	4	0		

Ordering Information

- HP 11581A 3, 6, 10, 20 dB HP 8491A set
- HP 11582A 3, 6, 10, 20 dB HP 8491B set
- HP 11583A 3, 6, 10, 20 dB HP 8492A set
- HP 11583C 3, 6, 10, 20 dB HP 8493C set

Price

- \$450
- \$550
- \$1,050
- \$950

HP 8490D, 8491A/B, 8492A, 8493A/B/C, 8498A, Option 890 Specifications

HP Model (OEM Model)	Frequency Range GHz	SWR Maximum (GHz)	Maximum Input Power	Attenuation Accuracy						Connector	Price (Specify option)	
				3 dB (Option 003)	6 dB (Option 006)	10 dB (Option 010)	20 dB (Option 020)	30 dB (Option 030)	40 dB (Option 040)			50 dB (Option 050)
8490D (33340D)	dc-50.0	1.15, dc-26.5 1.25, 26.5-40 1.45, 40-50	2W Avg. 100 W Peak	+0.9 dc-26.5 GHz -0.5	+0.9 dc-26.5 GHz -0.6	+0.9 dc-26.5 GHz -0.6	+0.9 dc-26.5 GHz -0.8	+1.3 dc-26.5 GHz -0.8	+1.5 dc-26.5 GHz -0.8	-	2.4 mm (m,f.)	\$375
8491A 3-30 dB	dc-12.4	dc-8 GHz: 1.2 8-12.4 GHz: 1.3	2 W Avg. 100 W Peak	±0.3 dB	±0.4 dB	±0.6 dB	±0.6 dB	±1 dB	-	-	N(m,f)	\$125
40-60 dB				-	-	-	-	-	±1.5 dB	±1.5 dB	±2 dB	\$175
8491B 3-30 dB	dc-18	dc-8 GHz: 1.2 8-12.4 GHz: 1.3 12.4-18 GHz: 1.5	2 W Avg. 100 W Peak	±0.3 dB dc-12.4 GHz ±0.4 dB 12.4-18 GHz	±0.4 dB dc-12.4 GHz ±0.5 dB 12.4-18 GHz	±0.6 dB	±0.6 dB dc-12.4 GHz ±1.0 dB 12.4-18 GHz	±1 dB	-	-	N(m,f)	\$150
40-60 dB				-	-	-	-	-	±1.5 dB	±1.5 dB	±2 dB	\$210
8492A 3-30 dB	dc-18	dc-8 GHz: 1.15 8-12.4 GHz: 1.25 12.4-18 GHz: 1.35	2 W Avg. 100 W Peak	±0.3 dB dc-12.4 GHz ±0.4 dB 12.4-18 GHz	±0.4 dB dc-12.4 GHz ±0.5 dB 12.4-18 GHz	±0.6 dB	±0.6 dB dc-12.4 GHz ±1.0 dB 12.4-18 GHz	±1 dB	-	-	APC-7	\$275
40-60 dB				-	-	-	-	-	±1.5 dB	±1.5 dB	±2 dB	\$340
8493A 3-20 dB (33340A)	dc-12.4	dc-8 GHz: 1.2 8-12.4 GHz: 1.3	2 W Avg. 100 W Peak	±0.3 dB	±0.4 dB	±0.6 dB	±0.6 dB	-	-	-	SMA (m,f)	\$120
30 dB				-	-	-	-	±1 dB	-	-	-	-
8493B 3-20 dB (33340B)	dc-18	dc-8 GHz: 1.2 8-12.4 GHz: 1.3 12.4-18 GHz: 1.5	2 W Avg. 100 W Peak	±0.3 dB dc-12.4 GHz ±0.4 dB 12.4-18 GHz	±0.4 dB dc-12.4 GHz ±0.5 dB 12.4-18 GHz	±0.6 dB	±0.6 dB dc-12.4 GHz ±1.0 dB 12.4-18 GHz	-	-	-	SMA(m,f)	\$145
30 dB				-	-	-	-	±1 dB	-	-	-	-
8493C (33340C)	dc-26.5	dc-8 GHz: 1.1 8-12.4 GHz: 1.15 12.4-26.5 GHz: 1.25(1.27 Opt. 006)	2 W Avg. 100 W Peak	±0.5 dB dc-18 GHz ±1.0 dB 18-26.5 GHz	±0.6 dB ±0.6 dB	±0.3 dB	±0.5 dB	±0.7 dB	±1.0 dB	-	3.5 mm (m,f)	\$250
30 dB				-	-	-	-	±1.0 dB	±1.3 dB	-	-	-
8498A Option 030	dc-18	dc-8 GHz: 1.15 8-12.4 GHz: 1.25 12.4-18 GHz: 1.30	25 W Avg. 500 W Peak (dc-5.8 GHz) 125 W Peak (5.8-18 GHz) 500 watt-µs max. per pulse	-	-	-	-	±1 dB	-	-	N(m,f)	\$975
Option 890 Calibration Data	HP Models		Calibration Frequencies (MHz)						Option 890 Price			
	8490D 8491A, 8493A 8491B, 8492A, 8493B, 8498A 8493C		0.4 GHz to 50 GHz in 400 MHz steps .2 GHz to 12.4 GHz in 200 MHz steps .2 GHz to 18.0 GHz in 200 MHz steps 1.5 GHz to 26.5 GHz in 250 MHz steps						\$+50 \$+20 \$+25 \$+40			

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