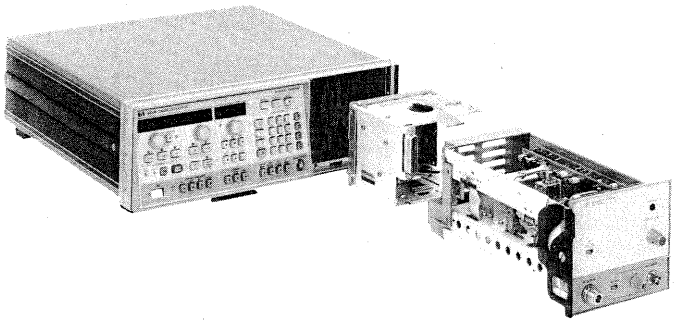
SWEEP OSCILLATORS
HP 8350 Series: RF Plug-ins



Plug-ins Compatible With The HP 11869A Adapter

The HP 11869A adapter attaches to the back of the HP 8620(series plug-in and is equipped with a switch for setting the specific interface code for the plug-in being used.

The following plug-ins will operate in the HP 8350 by using the HP 11869A.

HP 86220A[1,2]
HP 86222A/B
HP 86230B[1,2]
HP 86235A
HP 86240A/B/C
HP 86241A[1]
HP 86242A[1]/C/D[2]
HP 86245A
HP 86250A[1]/B[1]/C/D[2]
HP 86251A[3]
HP 86260A[1]/B[1,3]/C[1,3]
HP 86290A[2]/B/C

HP 11869A Adapter

The HP 11869A adapter provides the electrical and mechanical interface between the HP 8350 and 86200 series plug-ins. All of the HP 8350's standard operating features, including HP-IB remote programming, are available. However, specific plug-in functions (output power level, RF on/off, etc.) cannot be controlled or remotely programmed by the HP 8350 mainframe.

See page 423 for HP 86200 series plug-in specifications.

Ordering Information

HP 11869A adapter — **Price**

Options

Opt 004 Extension cables for plug-ins with rear panel RF output

Opt 006 Type N aux out interface connector for HP 86251A and 86290A[2]/B/C

Opt W30 Extended repair service. See page 723.

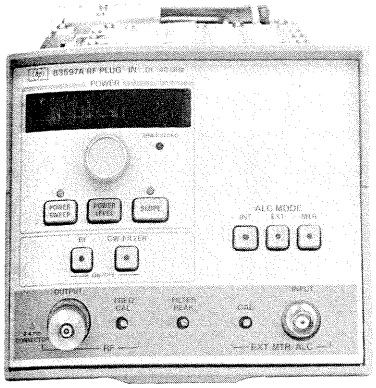
[1] Not compatible with 27.8 kHz square wave modulation.
[2] Models HP 86220A, 86230B, 86290A, 86250A/B/C, and 86242A/C are obsolete. However, existing models can interface to HP 8350B mainframe via the HP 11869A adapter.
[3] Requires a special PROM for the HP 11869A, which is shipped with every HP 86251A, 86260 B/C.

RF Plug-in Summary

	HP Model number	Frequency range (GHz)	Leveled power output	CW Frequency accuracy (MHz)	Complete specifications on page
Broad-band Plug-ins	HP 83597A	0.01–40	1 mW	±20	419
	HP 83596A	2.4–40	1 mW	±20	419
	HP 83595A	0.01–26.5	2.5 mW	±12	417/418
	HP 83595C	0.01-26.5	10 mW/20mW[1]	±12	417/418
	HP 83594A	2–26.5	2.5 mW	±12	417/418
	HP 83592A/B	0.01–20	10 mW/20 mW[1]	±10	417/418
	HP 83592C	0.01–20	2.5 mW/4 mW[2]	±10	417/418
	HP 83590A	2–20	10 mW	±10	417/418
	HP 83525A/B	0.01–8.4	20 mW/10 mW	±15/12	420
	HP 83522A	0.01–2.4	20 mW	±5	420
	HP 86222A/B	0.01–2.4	20 mW	±10	423
	HP 86290B	2–18.6	10 mW	±30	423
	HP 86290C	2–18.6	20 mW	±30	423
Straddle-band Plug-ins	HP 83540A/B	2–8.4	40 mW/20 mW	±12	420
	HP 86240A	2–8.4	40 mW	±25	423
	HP 86240B	2–8.4	20 mW	±25	423
	HP 86240C	3.6–8.6	40 mW	±25	423
	HP 86251A	7.5–18.6	10 mW	±20[3]	423
	HP 83550A	8.0–20.0	100 mW/63 mW[4]	±20	420
Single-band Plug-ins	HP 86235A	1.7–4.3	40 mW	±20	423
	HP 86241A	3.2–6.5	5 mW	±30	423
	HP 86242D	5.9–9	10 mW	±35	423
	HP 83545A	5.9–12.4	50 mW	±20	420
	HP 86245A	5.9–12.4	50 mW	±40	423
	HP 86250D	8.0–12.4	10 mW	±40	423
	HP 86260B	10–15.5	10 mW	±50	423
	HP 86260A	12.4–18	10 mW	±50	423
	HP 86260C	17–22	10 mW	±50	423
	HP 83570A	18–26.5	10 mW	±30	420
	HP 83572C	26.5–40	4 mW (Opt 001)	±100	420

NOTE: The HP 11869A Adapter is required to interface HP 86200 series plug-ins with the HP 8350B mainframe.
[1] 20 mW to 18 GHz (HP 83592B) and 20mW to 20 GHz (HP 83595C).
[2] HP 83592C: 4 mW to 18.6 GHz.
[3] When installed in HP 8350 with HP 11869A Adapter.
[4] HP 83550A: 100 mW to 18.6 GHz.

- 10 MHz to 40 GHz frequency coverage with the 2.4 mm coaxial connector
- −50 dBc harmonics and subharmonics from 1.5 to 20 GHz, −40 dBc from 20 to 40 GHz



HP 83597A

The HP 83597A and 83596A RF plug-ins provide the highest performance and reliability available up to 40 GHz from a swept source. They feature high output power, as well as excellent harmonic performance. They also incorporate the 2.4 mm connector which makes high performance broadband coaxial measurements possible. The superiority of the 2.4 mm connector lies in its ruggedness, repeatable performance and excellent match over the entire frequency range.

A 40 GHz broadband swept scalar measurement system is easy to configure using this sweep oscillator with the HP 8757A/C/E Scalar Network Analyzers, and the appropriate 2.4 mm scalar network analyzer accessories. With −50 dBc of harmonic and subharmonic suppression from 1.5 to 20 GHz, and −40 dBc from 20 to 40 GHz, these plug-ins are the ideal choice for scalar network analysis.

The broadband frequency coverage and high output power of the HP 83597A and 83596A plug-ins make them ideal as local oscillators for down-converting high frequency signals to a lower intermediate frequency. These plug-ins provide the broadest frequency coverage for mixer measurement systems or coaxial noise figure measurements with the HP 8970B Noise Figure Meter.

The outstanding performance of the HP 83597A and 83596A plug-ins make them especially attractive as stand-alone sources for various signal generation and simulation applications. Frequency accuracies of better than ±5 to ±20 MHz are specified depending on the frequency of operation. These plug-ins additionally have very flexible amplitude, frequency and pulse modulation capabilities.

Output Characteristics

Output Power Resolution
Displayed: 0.1 dB
Programmable/Settable: ±0.01 dB

Minimum Settable Power: −15 dBm

Power Variation:
Externally Leveled (excluding coupler/detector variation)
Negative Crystal detector[2] or HP 432A/B/C, 436A or 438A Power Meter[9]: ±0.2 dB, typical

Power Sweep
Calibrated Range: >19 dB (<18.6 GHz), >15 dB (>18.6 GHz)
Accuracy (including linearity): ±1.5 dB, typical
Resolution (displayed): 0.1 dB, typical

Power Slope
Calibrated Range: up to 5 dB/GHz, up to 15 dB for full sweep
Linearity: 0.2 dB, typical
Resolution (displayed): 0.01 dB/GHz, typical

Residual AM in 100 kHz Bandwidth: −50 dBc, typical

Source Output VSWR
(50 Ohm, nominal impedance): <2.0:1, typical

Modulation Characteristics

External AM
Frequency Response: 100 kHz, typical
Maximum Input: 15V
Range of Amplitude Control: 15 dB, typical
Sensitivity: 1 dB/V, typical
Input Impedance: approximately 25 kΩ

Internal Square Wave Modulation
1 kHz or 27.778 kHz square wave modulation selectable by internal jumper in HP 8350B. The 27.778 kHz modulation ensures operation with all Hewlett-Packard scalar network analyzers.
On/Off Ratio: >30 dB

External Pulse Modulation:
Rise/Fall Time (neglecting overshoot): <50 nsec, typical
Minimum RF Pulse Width:
Internally Leveled: <1.5 μsec, typical
Unleveled: <1 μsec, typical
On/Off Ratio: >60 dB, typical

External FM
Maximum Deviations for Modulation Frequencies:
DC to 100 Hz: ±75 MHz (cross-over coupled), ±12 MHz (direct coupled)
100 Hz to 1 MHz: ±7 MHz
1 MHz to 2 MHz: ±5 MHz
2 MHz to 10 MHz: ±1 MHz
Sensitivity (switch selectable):
FM Mode: −20 MHz/V, typical
Phase-lock Mode: −6 MHz/V, typical

General Specifications

Minimum Sweep Time: 30 ms for a single band, 75 ms for <20 GHz sweep width, 150 ms for >20 GHz sweep width.

Auxiliary Output: Rear panel 2.3-7.0 GHz fundamental oscillator output, nominally 0 dBm.

Frequency Reference Output: Switch selectable 0.5 V/GHz (0.01-38 GHz) or 0.25V/GHz (0.01-40 GHz), ±25 mV (<2.4 GHz) or ±100 mV (>2.4 GHz).

RF Output Connector: Type 2.4 mm male.

Weight: Net 6.5 kg (14.4 lb), Shipping 9.5 kg (21 lb).

Ordering Information
HP 83597A 10 MHz to 40 GHz RF Plug-In
HP 83596A 2.4 GHz to 40 GHz RF Plug-In
Opt 002 55 dB Step Attenuator
Opt 004 Rear Panel RF Output
Opt W30 Extended repair service see page 723
Opt W32 Calibration service see pg 723

See HP 8350B Data Sheet

	Band 0	Band 1	Band 2	Band 3	Band 4	Full Band
Frequency Characteristics						
Range						
HP 83597A	0.01-2.4 GHz	2.4-7.0 GHz	7.0-13.5 GHz	13.5-20.0 GHz	20.0-40.0 GHz	0.01-40.0 GHz
HP 83596A		2.4-7.0 GHz	7.0-13.5 GHz	13.5-20.0 GHz	20.0-40.0 GHz	2.4-40.0 GHz
Accuracy[1]						
CW Mode:	±5 MHz	±5 MHz	±10 MHz	±10 MHz	±20 MHz	
All Sweep Modes:[2]	±15 MHz	±20 MHz	±25 MHz	±30 MHz	±50 MHz	±75 MHz
Residual FM (peak)[3]:	<5 kHz	<5 kHz	<7 kHz	<9 kHz	<18 kHz	
Output Characteristics						
Maximum Leveled Power[1,4]	2.5 mW	2.5 mW	2.5 mW	2.5 mW (<18.6 GHz) 1 mW (>18.6 GHz)	1 mW	
Power Level Accuracy[1,5,6]	±1.5 dB	±1.3 dB	±1.3 dB	±1.4 dB	±2.0 dB	±2.0 dB
Power Variation[1,6]	±0.9 dB	±0.7 dB	±0.7 dB	±0.8 dB	±1.2 dB	±1.3 dB
Spurious Signals[7]						
Harmonics and Subharmonics	<−25 dBc (<1.5 GHz) <−50 dBc (>1.5 GHz)	<−50 dBc	<−50 dBc	<−50 dBc	<−40 dBc[8]	
Non-harmonics:	<−25 dBc	<−50 dBc	<−50 dBc	<−50 dBc	<−50 dBc	

[1] 25°C ±5°C.
[2] For sweep times ≥100 ms.
[3] 10 Hz to 10 kHz bandwidth, CW mode with CW filter on.
[4] Typically degrades 0.1 dB/°C above 25°C.
[5] Includes power level variations.
[6] Degrades typically ±0.05 dB/°C outside the 20°C-30°C range.
[7] At specified maximum leveled power.
[8] Typically <−40 dBc above 40 GHz.
[9] For sweep times ≥10 sec and ≥2.5 sec/GHz.