

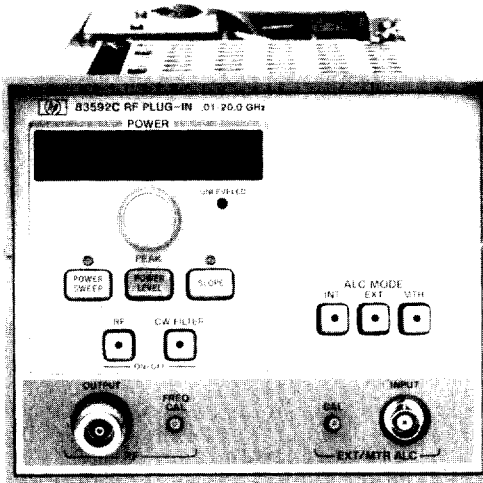


SWEEP OSCILLATORS

Model 8350 Series: Broadband RF Plug-Ins

Models 83595A, 83592A/B/C, 83594A, 83590A

- Calibrated output power with 0.1 dB resolution
- +13 dBm from 0.01 to 18.6 GHz
- 12 MHz frequency accuracy at 26.5 GHz



HP 83592C



The six HP 83590 series plug-ins feature ultra-wideband frequency coverage as exemplified by the HP 83595A which covers 0.01–26.5 GHz in a single sweep. While the HP 83590 series feature broadband sweeps, they still maintain narrowband precision. The frequency output exhibits excellent stability and accuracy. At 26.5 GHz the HP 83595A maintains an accuracy of ± 12 MHz. The HP 83592B does not sacrifice power for broadband high frequency coverage; the output power is internally leveled for a minimum +13 dBm (to 18.6 GHz) output with ± 0.9 dB flatness. The HP 83592C provides a clean test signal with -55 dBc harmonic and subharmonic levels to maximize dynamic range. Power output capabilities have been expanded to provide power sweep and slope control. In addition, the HP 83590 series plug-ins are completely HP-IB programmable.

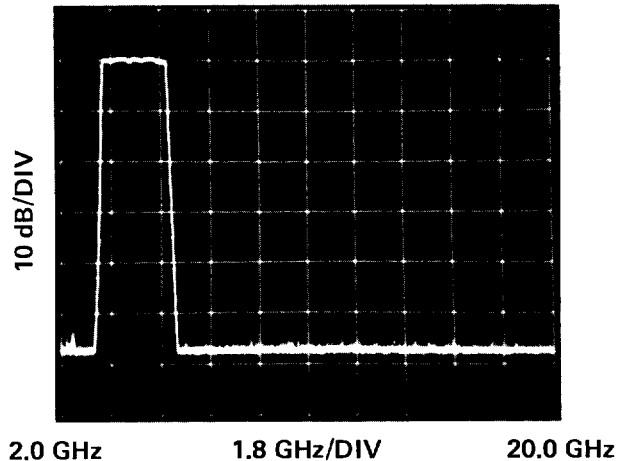
The most outstanding feature of the HP 83590 series plug-ins is their broad frequency range. Innovative technology is used to create this precision frequency range. The principle behind this technology is the Switched YIG Tuned Multiplier circuit (SYTM). The YTM circuit uses the output of a fundamental oscillator to drive a high-efficiency multiplier that has been integrated with a tracking YIG filter in order to create and select high order harmonics to be used as output frequencies.

A figure of merit for the HP 83590 series is their flat output power over the entire frequency range. The output power is internally leveled within 0.9 dB for a minimum output power of 10 dBm, with a displayed resolution of 0.1 dB. The power level may be controlled to a minimum settable power level of -5 dBm. This level may be extended to -75 dBm on the HP 83592A/B and HP 83590A with Option 002 (70 dB Step Attenuator) or to -60 dBm on the HP 83592C, the HP 83595A and HP 83594A with Option 002 (55 dB Step Attenuator).

Since power parameters are critical to high frequency measurements, the HP 83590 Series (along with all HP 83500 series plug-ins) offer many modes of power output. In addition to a single power output, the HP 83590 Series offer a Power Sweep function. The Power Sweep function sweeps a power range for characterizing level sensitive devices like amplifiers and transistors. The Slope mode is also supplied to provide compensation for cable or test set losses. In all these modes the power output is internally monitored and leveled. If preferred, the power may be externally leveled. The HP 83590 Series plug-ins are capable of power meter leveling with the HP 432A/B/C, 436A, and 438A power meters.

HP-IB programmability is an essential feature when one of the HP 83590 series is used in automatic test systems. For example, the automated tests of amplifiers for gain compression are possible. These plug-ins are completely programmable, which means the power mode may be selected and the power level may be set with .02 dB resolution.

- -55 dBc harmonics and subharmonics from 3.5 to 20 GHz
- Internal leveling and slope standard
- HP-IB



2.0 GHz

1.8 GHz/DIV

20.0 GHz

General Specifications

Sweep time (minimum): 10 ms for a single band (Bands 0, 1, 2, 3, 4). 25 ms for full band (HP 83590A, 83592A/B).

Switch points: HP 83595A, 83592A/B/C: Internal bands are 0.01–2.4 GHz, 2.3–7.0 GHz, 6.9–13.5 GHz, 13.4–20.0 GHz and 19.9–26.5 GHz (HP 83595A only). Broadband switch points are at approximately 2.4 GHz, 7.0 GHz, 13.5 GHz and 20.0 GHz (HP 83595A only). HP 83594A, 83590A: Internal bands are 2.0–7.0 GHz, 6.9–13.5 GHz, 13.4–20.0 GHz and 19.9–26.5 GHz (HP 83594A only). Broadband switch points are at approximately 7.0 GHz, 13.5 GHz and 20.0 GHz (HP 83594A only).

Auxiliary output: HP 83595A, 83592A/B/C: Rear panel 2.3–7.0 GHz fundamental oscillator output, nominally 0 dBm. HP 83594A, 83590A: Rear panel 2.0–7.0 GHz fundamental oscillator output, nominally 0 dBm.

Frequency reference output: HP 83595A, 83592A/B/C: nominal 1V/GHz (0.01–19 GHz) ± 20 mV rear panel BNC output. HP 83594A, 83590A: nominal 1V/GHz (2–19 GHz) ± 20 mV rear panel BNC output.

RF output connector: HP 83595A, 83594A: Type APC 3.5 male. HP 83592A/B/C, 83590A: Type N female.

Weight: net, 6.0 kg (13.2 lb); shipping, 9.2 kg (20 lb).

Improved Network Measurement Capabilities

These plug-ins are compatible with the:

- HP 8510 Network Analyzer
- HP 8410 Network Analyzer
- HP 8757A Scalar Network Analyzer
- HP 8756A Scalar Network Analyzer
- HP 8970A Noise Figure Meter
- HP 8709A Phase-Lock Synchronizer
- HP 5344S Source Synchronizer

Output Characteristics

Impedance: 50 Ω nominal.

VSWR: <1.9:1

Power Sweep (with option 002 Power Sweep cannot cross an attenuator step)

Calibrated range: HP 83590A, 83592A/B/C: >10 dB (15 dB typical); HP 83594A, 83595A: 9 dB.

Accuracy (including linearity): $< \pm 1.5$ dB typical.

Resolution: 0.1 dB.

Slope Compensation (with option 002 Slope cannot cross an attenuator step).

Calibrated range: up to 0.5 dB/GHz (10 dB over full range).

Linearity: <0.3 dB typical.

Resolution: 0.1 dB/GHz.

Attenuator Accuracy (\pm dB referenced from the 0 dB setting, HP 83590A, 83592A/B only).

Frequency Range (GHz)	Attenuator Setting (dB)						
	10	20	30	40	50	60	70
0.01-12.4	0.6	0.7	0.9	1.8	2.0	2.2	2.3
12.4-18.0	0.7	0.9	1.2	2.0	2.3	2.5	2.8
18.0-20.0	0.9	1.5	2.5	3.0	3.2	3.3	3.5

Modulation Characteristics

External AM

Frequency response: typically 100 kHz.

Input impedance: approximately 10 k Ω .

Range of amplitude control: typically 15 dB.

Sensitivity: 1 dB/V typical.

Maximum input: 15 V.

Pulse In (HP 83595A and 83592A/B/C only)

TTL Compatible: Logic high = RF on, logic low = RF off.

0.01 to 20.0 GHz: Squarewave modulation up to 30 kHz.

0.01 to 2.5 GHz

Rise/Fall Time: typically 50 ns.

Minimum Pulse Width

Leveled: 1 μ sec.

Unleveled: typically 200 ns.

2.5 to 20 GHz

Rise/Fall Time: typically 10 ns.

Minimum Pulse Width

Leveled: typically 1 μ s.

Unleveled: typically 100 ns.

External FM

Maximum Deviations for Modulation Frequencies

DC to 100 Hz: \pm 75 MHz.

100 Hz to 1 MHz: \pm 7 MHz.

1 MHz to 2 MHz: \pm 5 MHz.

2 MHz to 10 MHz: \pm 1 MHz.

Sensitivity

FM Mode: -20 MHz/V typical.

Phase-lock mode: -6 MHz/V typical.

Input impedance: 2 k Ω nominal.

Frequency response (DC to 2 MHz): \pm 3 dB.

Ordering Information

Price

HP 83590A 2.0 to 20 GHz RF Plug-in	\$17,700
Option 002: 70 dB Step Attenuator	add \$1,305
Option 004: Rear Panel RF Output	add \$200
HP 83592A 0.01 to 20 GHz RF Plug-in	\$20,500
Option 002: 70 dB Step Attenuator	add \$1,305
Option 004: Rear Panel RF Output	add \$200
HP 83592B 0.01 to 20 GHz (13 dBm) RF Plug-in	\$26,580
Option 002: 70 dB Step Attenuator	add \$1,305
Option 004: Rear Panel RF Output	add \$200
HP 83592C 0.01 to 20 GHz (-55 dBc harmonics) RF Plug-in	\$26,580
Option 002: 55 dB Step Attenuator	\$1,305
Option 004: Rear Panel RF Output	\$200
HP 83594A 2.0 to 26.5 GHz RF Plug-in	\$22,820
Option 002: 55 dB Step Attenuator	add \$1,305
Option 004: Rear Panel RF Output	add \$200
HP 83595A 0.01 to 26.5 GHz RF Plug-in	\$29,085
Option 002: 55 dB Step Attenuator	add \$1,305
Option 004: Rear Panel RF Output	add \$200

	HP 83592A/B/C HP 83590A (excluding Band 0)					HP 83595A HP 83594A (excluding Band 0)					
	Band ^A 0	Band ^A 1	Band ^A 2	Band ^A 3	Full ^A Band	Band 0	Band ^A 1	Band ^A 2	Band ^A 3	Band ^A 4	Full ^A Band
	.01-2.4	2.4-7.0	7.0-13.5	13.5-20	.01-20	.01-2.4	2.4-7.0	7.0-13.5	13.5-20	20-26.5	.01-26.5
Frequency Characteristics Accuracy: (25°C \pm 5°C) CW Mode: (MHz) Typically: (MHz) All Sweep Modes (100ms Sweep Time): (MHz) Linearity: Typ. (MHz)	\pm 5 \pm 2 \pm 15 \pm 2	\pm 5 \pm 2 \pm 20 \pm 2	\pm 10 \pm 3 \pm 25 \pm 4	\pm 10 \pm 4 \pm 30 \pm 6	\pm 10 \pm 5 \pm 50 \pm 10	\pm 5 \pm 2 \pm 15 \pm 2	\pm 5 \pm 2 \pm 20 \pm 2	\pm 10 \pm 3 \pm 25 \pm 4	\pm 10 \pm 4 \pm 30 \pm 6	\pm 12 \pm 5 \pm 35 \pm 10	\pm 15 \pm 5 \pm 50 \pm 15
Stability With Temperature: Typically (MHz/ $^{\circ}$ C) With 10% Line Voltage Change: (kHz) With 10 Power Level Change: (kHz) With 3:1 Load VSWR: (kHz) With Time (after 1 hour warmup at the same frequency) Typically (kHz) Residual FM (10 Hz-10kHz bandwidth, peak) (kHz)	\pm 0.2 \pm 50 \pm 200 \pm 100 \pm 100 \pm 100	\pm 0.2 \pm 50 \pm 200 \pm 100 \pm 100 \pm 100	\pm 0.4 \pm 100 \pm 400 \pm 200 \pm 200 \pm 200	\pm 0.6 \pm 150 \pm 600 \pm 300 \pm 300 \pm 300	\pm 0.6 \pm 150 \pm 600 \pm 300 \pm 300 \pm 300	\pm 0.2 \pm 50 \pm 200 \pm 100 \pm 100 \pm 100	\pm 0.2 \pm 50 \pm 200 \pm 100 \pm 100 \pm 100	\pm 0.4 \pm 100 \pm 400 \pm 200 \pm 200 \pm 200	\pm 0.6 \pm 150 \pm 600 \pm 300 \pm 300 \pm 300	\pm 0.8 \pm 200 \pm 800 \pm 400 \pm 400 \pm 400	\pm 0.8 \pm 200 \pm 800 \pm 400 \pm 400 \pm 400
Output Characteristics Maximum Leveled Power ^D : (mW) (25°C) Opt 002	10,(20) ^B 10,(16) ^B	10,(20) ^B (4) ^C 7,(14) ^B (3,2) ^C	10,(20) ^B (4) ^C 6,3,(14) ^B (2,5) ^C	10,(2,5) ^C 5,(1,4) ^C	10,(2,5) ^C 3,2,(1,4) ^C	10 10	10 7	10 6.3	10 5	2.5 1.25	2.5 1.25
Power Level Accuracy (Internally Leveled): (dB) Minimum Settable Power: (dBm) With Opt 002 Remote Programming Resolution Displayed: (dB) Settable (dB)	\pm 1.5 -5 -75,(-60) ^C 0.1 .02	\pm 1.3 -5 -75,(-60) ^C 0.1 .02	\pm 1.3 -5 -75,(-60) ^C 0.1 .02	\pm 1.4 -5 -75,(-60) ^C 0.1 .02	\pm 1.5 -5 -75,(-60) ^C 0.1 .02	\pm 1.5 -5 -60 0.1 .02	\pm 1.3 -5 -60 0.1 .02	\pm 1.3 -5 -60 0.1 .02	\pm 1.4 -5 -60 0.1 .02	\pm 1.7 -5 -60 0.1 .02	\pm 1.8 -5 -60 0.1 .02
Power Variation (Max. Rated Pwr) Internally Leveled: (dB) Externally Leveled (Excludes Coupler/Detector Variation) (For Negative Crystal Detector and Power Meter: (dB) With Temperature: (dB/ $^{\circ}$ C)	\pm 0.9 \pm 2 0.1	\pm 0.7 \pm 2 0.1	\pm 0.7 \pm 2 0.1	\pm 0.8 \pm 2 0.1	\pm 0.9 \pm 2 0.1	\pm 0.9 \pm 2 0.1	\pm 0.7 \pm 2 0.1	\pm 0.7 \pm 2 0.1	\pm 0.8 \pm 2 0.1	\pm 0.9 \pm 2 0.1	\pm 1.0 \pm 2 0.1
Residual AM in 100 kHz Bandwidth: (dBc)	\pm 50	\pm 50	\pm 50	\pm 50	\pm 50	\pm 50	\pm 50	\pm 50	\pm 50	\pm 50	\pm 50
Spurious Signals Harmonically Related: (dBc) Typically: (dBc) Non-Harmonics: (dBc)	\pm 25,(20) ^{B,E} \pm 35 ^F \pm 25	\pm 25,(\pm 55) ^E \pm 40,(\pm 60) ^C \pm 50,(\pm 55) ^C	\pm 25,(\pm 55) ^C \pm 35,(\pm 60) ^C \pm 50,(\pm 55) ^C	\pm 25,(\pm 55) ^C \pm 35,(\pm 60) ^C \pm 50,(\pm 55) ^C	\pm 25 \pm 35 \pm 25	\pm 25 \pm 35 \pm 25	\pm 25 \pm 35 \pm 25	\pm 25 \pm 35 \pm 25	\pm 25 \pm 35 \pm 25	\pm 25 \pm 35 \pm 25	\pm 20 \pm 35 \pm 20

^A Band 1 on the HP 83590A and the HP 83594A covers 2.0-7.0 GHz, and Full Band on the HP 83590A and 83594A covers 2-20 GHz and 2-26.5 GHz.
^B HP 83592B only.
^C HP 83592C only.
^D 0.5 dB lower with Opt 004.

^E HP 83592C only: \pm 25 dBc (0.01-1.4 GHz)
 \pm 45 dBc (1.4-2.4 GHz)
 \pm 50 dBc (2.4-3.5 GHz)
 \pm 55 dBc (3.5-7.0 GHz)
^F HP 83592C \pm 35 dBc (0.01-1.4 GHz); \pm 50 dBc (1.4-2.4 GHz)