Frequency

Specifications describe warranted instrument performance over the 0 to 55°C temperature range, except as noted otherwise. Specifications apply after Full User Calibration, and in coupled attenuator mode of operation (ALC level greater than -10 dBm). Supplemental characteristics, denoted typical or nominal, are intended to provide information useful in applying the instrument, but are non-warranted parameters.

Range

HP 83620A:	10 MHz to 20 GHz
HP 83622A:	2 to 20 GHz
HP 83623A:	10 MHz to 20 GHz High Power
HP 83624A:	2 to 20 GHz High Power
HP 83640A:	10 MHz to 40 GHz
HP 83642A:	2 to 40 GHz

Resolution

Standard:	1 kHz
Option 008:	1 Hz

Frequency Bands

(for CW signals)[1]:

Band	Frequency Range	n
0	10 MHz to <2.3 GHz	1
1	2.3 to <7 GHz	1
2	7 to <12.5 GHz	2
3	12.5 to 20 GHz	3
4	>20 to <25.5 GHz	4
5	25.5 to <32 GHz	6
6	32 to 40 GHz	6

CW and Manual Sweep Modes

Accuracy: Same as time base

Internal 10 MHz Time Base

Accuracy

Calibration ± Aging Rate ± Temperature Effects ± Line Voltage Effects

Stability

Aging Rate: 5×10^{-10}/day, 1×10^{-7}/year

With Temperature: 1×10^{-10}/°C, typical

With Line Voltage: 5×10^{-10} for line voltage change of 10%, typical

Switching Time

For Steps Within a Frequency Band: 15 ms + 5 ms/GHz step size

Maximum, or Across Band Switchpoints: 70 ms

Step or List Modes (steps ≤100 MHz within a frequency band): 5 ms

Swept Mode

Accuracy (sweep times ≥100 ms and ≤5 s)

Upper Frequencies ≤20 GHz

Sweep Widths ≤n x 10 MHz: 0.1% of sweep width ± time base accuracy

Sweep Widths >n x 10 MHz and ≤300 MHz: 1% of sweep width

Sweep Widths >300 MHz and ≤3 GHz: 3 MHz

Sweep Widths >3 GHz: 0.1% of sweep width

Upper Frequencies >20 GHz

Sweep Widths ≤n x 10 MHz: 0.1% of sweep width ± time base accuracy

Sweep Widths >n x 10 MHz and ≤600 MHz: 1% of sweep width

Sweep Widths >600 MHz and ≤6 GHz: 6 MHz

Sweep Widths >6 GHz: 0.1% of sweep width

Sweep Time: 10 ms to 100 seconds, 300 MHz/ms maximum rate

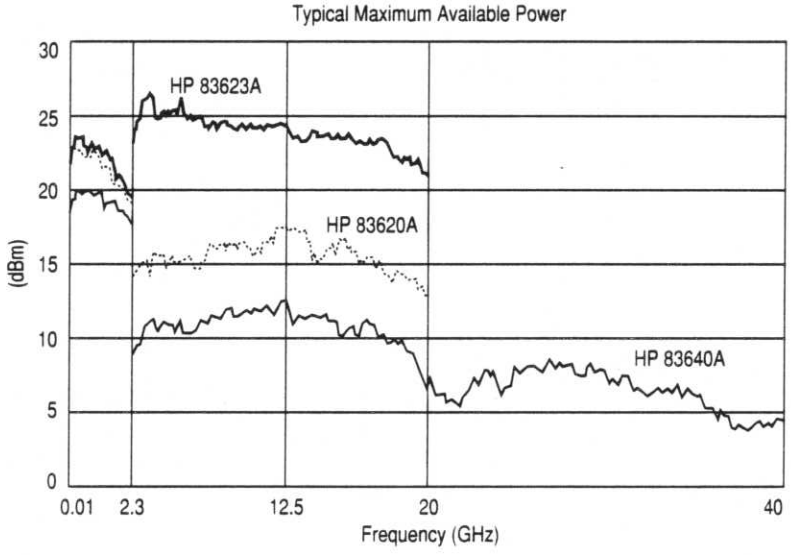
[1] In models with a lower frequency limit of 2 GHz, band 0 does not exist and band 1 begins at 2.0 GHz.

RF Output

Output Power

Maximum Leveled (dBm)[2]	Standard	Option 006
HP 83620A, 83622A	+10	+13
HP 83623A	+17	
HP 83624A	+20	
HP 83640A, 83642A		
Output Frequencies <12.5 GHz	+7	+10
Output Frequencies ≥12.5 and ≤20 GHz	+2	+7
Output Frequencies >20 GHz	+2	+2

Option 001: Lowers maximum leveled output power by 1.5 dB to 20 GHz, and 2 dB above 20 GHz.



Minimum Settable
Standard: –20 dBm
Option 001: –110 dBm

Resolution: 0.02 dB

Switching Time (without attenuator change): 10 ms, typical

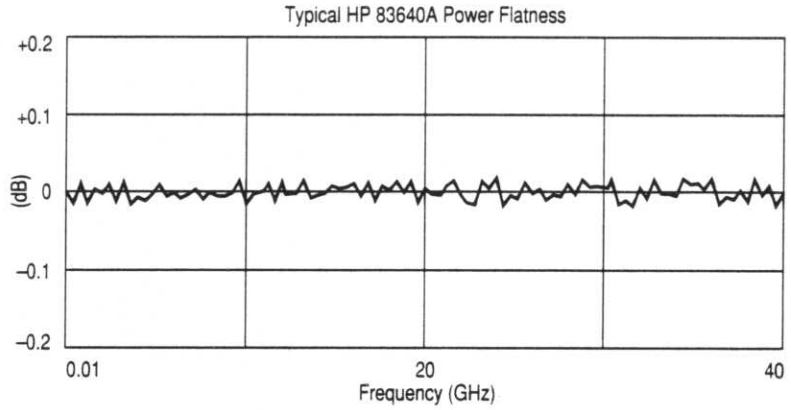
Temperature Stability: 0.01 dB/°C, typical

[2] Specification applies over the 0 to 35°C temperature range (0 to 25°C for output frequencies >20 GHz). Maximum leveled output power over the 35 to 55°C temperature range typically degrades by less than 2 dB.

	HP 83620A HP 83622A	HP 83623A HP 83624A	HP 83640A HP 83642A
Accuracy (dB)[3]:			
Output Frequencies <2.3 GHz			
Power Levels >+10 dBm	±1.2	±1.2	±1.4
Power Levels >–10 dBm[4]	±0.6	±0.6	±0.8
Power Levels >–60 dBm	±0.9	±0.9	±1.1
Power Levels ≤–60 dBm	±1.4	±1.4	±1.6
Output Frequencies ≥2.3 and ≤20.0 GHz			
Power Levels >+10 dBm	±1.3	±1.3	±1.3
Power Levels >–10 dBm[4]	±0.7	±0.7	±0.7
Power Levels >–60 dBm	±1.0	±1.0	±1.0
Power Levels ≤–60 dBm	±1.5	±1.5	±1.5
Output Frequencies >20.0 GHz			
Power Levels >–10 dBm[4]			±0.9
Power Levels >–60 dBm			±1.2
Power Levels ≤–60 dBm			±1.7
Flatness (dB):			
Output Frequencies <2.3 GHz			
Power Levels >+10 dBm	±0.9	±0.9	±1.1
Power Levels >–10 dBm	±0.5	±0.5	±0.7
Power Levels >–60 dBm	±0.7	±0.7	±0.9
Power Levels ≤–60 dBm	±1.1	±1.1	±1.3
Output Frequencies ≥2.3 and ≤20.0 GHz			
Power Levels >+10 dBm	±1.0	±1.0	±1.0
Power Levels >–10 dBm	±0.6	±0.6	±0.6
Power Levels >–60 dBm	±0.8	±0.8	±0.8
Power Levels ≤–60 dBm	±1.2	±1.2	±1.2
Output Frequencies >20.0 GHz			
Power Levels >–10 dBm			±0.8
Power Levels >–60 dBm			±1.0
Power Levels ≤–60 dBm			±1.4

[3] Specifications apply over the 15 to 35°C temperature range for output frequencies <50 MHz. In models with a lower frequency limit of 2 GHz, specifications <2.3 GHz do not apply, and specifications ≥2.3 to ≤20.0 GHz apply over the range ≥2.0 to ≤20.0 GHz.

4 Specifications apply over the 15 to 35°C temperature range and are degraded 0.3 dB outside of that range.



Analog Power Sweep

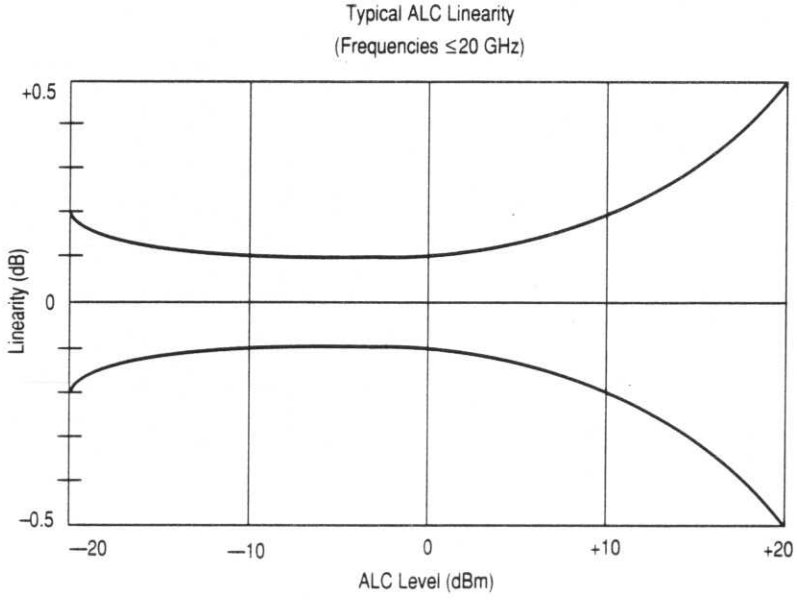
Range: –20 dBm to maximum available power, can be offset using step attenuator.

External Leveling

Range
At External HP 33330D/E Detector: –36 to +4 dBm
At External Leveling Input: –200 μV to –0.5 volts
Bandwidth
External Detector Mode: 10 or 100 kHz (sweep speed and modulation mode dependent), nominal
Power Meter Mode: 0.7 Hz, nominal

Source Match

1.6:1 SWR (internally leveled), typical[5]



[5] Typically 1.8:1 SWR at frequencies below 2.3 GHz in HP 83640A/83642A.

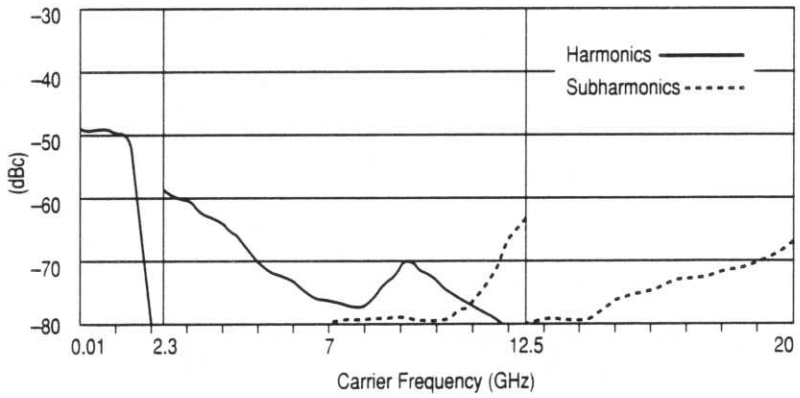
Spectral Purity

Spurious Signals
(dBc)

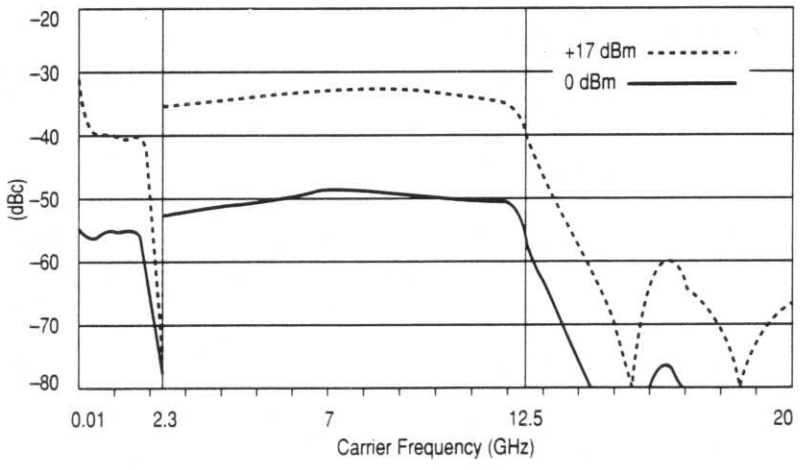
Specifications apply in CW, Step, List and Manual Sweep Modes of operation.

	HP 83620A HP 83622A	HP 83623A HP 83624A	HP 83640A HP 83642A
Harmonics			
Output Frequencies <1.8 GHz			
Standard	–35	–25[6]	–30[6]
Option 006	–25		–25[6]
Output Frequencies ≥1.8 GHz			
Standard	–50	–25	–50
Option 006	–20		–20

Typical HP 83620A Harmonics & Subharmonics



Typical HP 83623A Harmonics



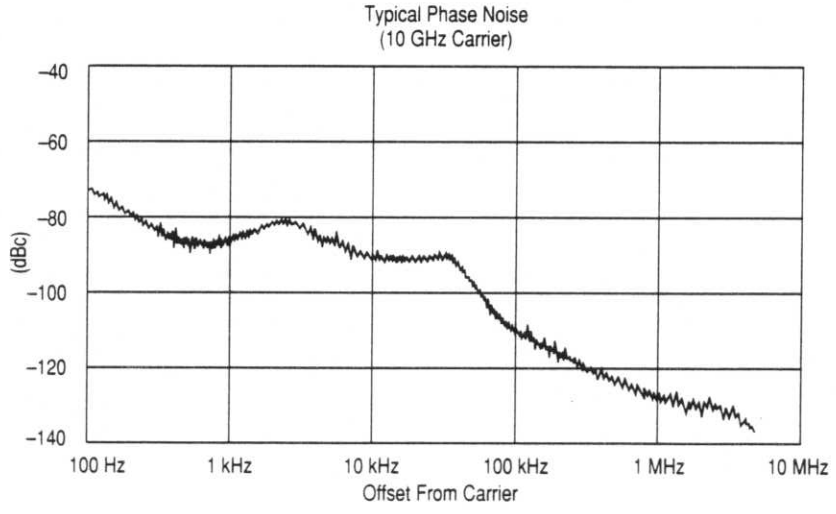
[6] Specification is degraded 5 dB below 50 MHz.

	HP 83620A HP 83622A	HP 83623A HP 83624A	HP 83640A HP 83642A
Subharmonics			
Output Frequencies <7.0 GHz	None	None	None
Output Frequencies ≥7.0 and ≤20.0 GHz	–50	–50	–50
Output Frequencies >20.0 GHz			–40
Non-Harmonically-Related			
Output Frequencies <2.3 GHz[7]	–60	–60	–54
Output Frequencies ≥2.3 and ≤20.0 GHz	–60	–60	–60
Output Frequencies >20.0 GHz			–54

Power-Line-Related (<300 Hz offset from carrier)
Bands 0,1: –55
Band 2: –49
Band 3: –45
Band 4: –43
Bands 5,6: –39

Single-Sideband Phase Noise
(dBc/Hz)

Band(s)	Offset from Carrier 100 Hz	1 kHz	10 kHz	100 kHz
0,1	–70	–78	–86	–107
2	–64	–72	–80	–101
3	–60	–68	–76	–97
4	–58	–66	–74	–95
5,6	–54	–62	–70	–91



Residual FM
(RMS, 50 Hz to 15 kHz bandwidth)

CW Mode or Sweep Widths ≤n x 10 MHz: n x 60 Hz, typical
Sweep Widths >n x 10 MHz: n x 15 kHz, typical

[7] Specification applies at output levels 0 dBm and below.

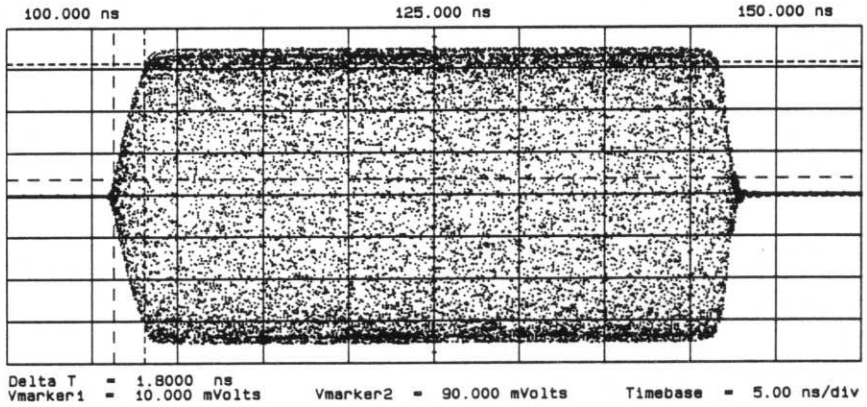
Modulation

Pulse

Pulse modulation specifications apply for output frequencies 400 MHz and above.

	Standard	Option 006
On/Off Ratio	80 dB[8]	80 dB
Rise/Fall Times	50 ns	10 ns
Minimum Width		
Internally Leveled	1 µs	1 µs
Unleveled		
Output Frequencies <2.3 GHz	100 ns	50 ns
Output Frequencies ≥2.3 GHz	100 ns	20 ns
Minimum Repetition Frequency		
Internally Leveled	10 Hz	10 Hz
Unleveled	DC	DC
Level Accuracy		
(dB, relative to CW level)		
Widths ≥1 µs	±0.3, leveled	±0.3, leveled
Widths <1 µs (Search mode)	±0.5, typical	±0.5, typical
Video Feedthrough		
Output Frequencies <2.3 GHz		
Power Levels ≤10 dBm	2%	2%
Power Levels >10 dBm	5%	5%
Output Frequencies		
≥2.3 GHz and ≤20.0 GHz	2 mv	20 mv
Output Frequencies >20.0 GHz	0.3%	2%
Overshoot, Ringing	15%, typical	10%, typical
Delay		
Output Frequencies <2.3 GHz	65 ns, typical	65 ns, typical
Output Frequencies ≥2.3 GHz	95 ns, typical	30 ns, typical
Compression	±10 ns, typical	±5 ns, typical

Typical Option 006 Pulse Envelope



Internal Pulse Generator

Width Range: 1 µs to 65 ms
Period Range: 2 µs to 65 ms
Resolution: 1 µs

[8] In the HP 83623A/83624A, specification applies at ALC levels 0 dBm and above and over the 20 to 55°C temperature range. Specification degrades 5 dB below 20°C, and 1 dB per dB below ALC level 0 dBm in those models.

AM and Scan

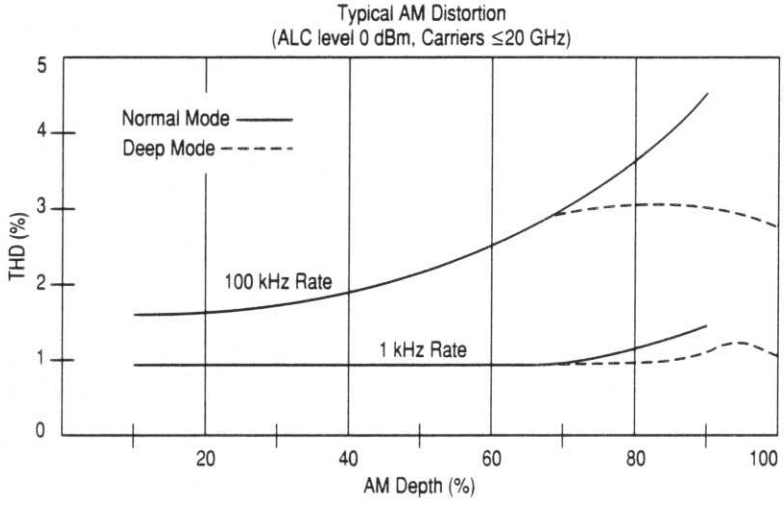
Bandwidth (3 dB)	Standard	Option 006
HP 83620A, 83622A	DC to 250 kHz	DC to 100 kHz
HP 83623A, 83624A	DC to 100 kHz	
HP 83640A, 83642A		
Output Frequencies ≤20 GHz	DC to 250 kHz	DC to 100 kHz
Output Frequencies >20 GHz	DC to 100 kHz	DC to 100 kHz

Dynamic Range

(ALC levels noted, can be offset using step attenuator)
Normal Mode: –20 dBm to 1 dB below maximum available power
Deep Mode[9]: –50 dBm to 1 dB below maximum available power
Unleveled Mode[10]: –50 dBm to 1 dB below maximum available power

Sensitivity

Linear: 100%/volt
Accuracy (1 kHz rate, 30% depth): 5%
Exponential: 10 dB/volt
Accuracy: 0.25 dB ± 5% of depth in dB
Incidental Phase Modulation: 0.2 radians peak, typical
Incidental FM: Incidental phase modulation x modulation rate, typical



[9] Deep mode offers reduced distortion for very deep AM. Waveform is DC-coupled and feedback-leveled at ALC levels above –13 dBm. At ALC levels below –13 dBm, output is DC-controllable, but subject to typical sample-and-hold drift of 0.25 dB/second.

[10] The HP 8360 has two unleveled modes, ALC Off and Search. In ALC Off mode, modulator drive can be controlled from the front panel to vary quiescent RF output level. In Search mode, the instrument microprocessor momentarily closes the ALC loop to find the modulator drive setting necessary to make the quiescent RF output level equal an entered value, then opens the ALC loop while maintaining that modulator drive setting. Neither of these modes is feedback leveled.

FM

Locked Mode

Maximum Deviation: ±8 MHz
Rates (6 dB bandwidth, 1 MHz deviation): 50 kHz to 10 MHz
Maximum Modulation Index (deviation/rate): n x 5

Unlocked Mode

Maximum Deviation
At Rates ≤100 Hz: ±75 MHz
At Rates >100 Hz: ±8 MHz
Rates (6 dB bandwidth, 1 MHz deviation): DC to 10 MHz

Sensitivity

100 kHz, 1 MHz, or 10 MHz/volt, switchable.
Accuracy (1 MHz rate, 1 MHz deviation): 10%

Simultaneous Modulations

Full AM bandwidth and depth is typically available at any pulse rate or width. FM is completely independent of AM and pulse modulation.

General

Environmental

Operating Temperature Range: 0 to 55°C

EMC: Within limits of VDE 0871/6.78 Level B, FTZ 1046/1984, and Mil-Std-461B Part 7 RE02

Warm-Up Time

Operation: Requires 30 minute warm-up from cold start at 0 to 55°C. Internal temperature equilibrium reached after 2 hour warm-up at stable ambient temperature.

Frequency Reference: Reference time base is kept at operating temperature with the instrument connected to AC power. Instruments disconnected from AC power for more than 24 hours require 30 days to achieve time base aging specification. Instruments disconnected from AC power for less than 24 hours require 24 hours to achieve time base aging specification.

Power Requirements

48 to 66 Hz; 115 volts (+10/–25%) or 230 volts (+10/–15%); 400 VA maximum (30 VA in STANDBY).

Weight & Dimensions

Net Weight: 27 kg (60 lb)
Shipping Weight: 36 kg (80 lb)
Dimensions: 178 H x 425 W x 648 mm D (7.0 x 16.75 x 25.5 inches)

Adapters Supplied

HP 83620A, 83622A, 83623A, 83624A

Type N (female) - 3.5mm (female)	Part Number 1250-1745
3.5 mm (female) - 3.5 mm (female)	Part Number 5061-5311

HP 83640A, 83642A

2.4 mm (female) - 2.92 mm (female)	Part Number 1250-2187
2.4 mm (female) - 2.4 mm (female)	Part Number 1250-2188

Inputs & Outputs

RF Output
Nominal output impedance 50 ohms. (Precision 3.5 mm male on 20 GHz models, 2.4 mm male on 40 GHz models, front panel.)

External ALC Input
Used for negative external detector or power meter leveling. Nominal input impedance 100 kohms, damage level ±15 volts. See RF Output specifications. (BNC female, front panel.)

Pulse Input/Output
TTL-low-level signal turns RF off. When using internal pulse generator, a TTL-level pulse sync signal preceeding the RF pulse by nominally 80 ns is output at this connector. Nominal input impedance 50 ohms, damage level +5.5, –0.5 volts. See Modulation specifications. (BNC female, front panel.)

AM Input
Nominal input impedance 50 ohms (internally switchable to 2 kohms), damage level ±15 volts. See Modulation specifications.
(BNC female, front panel.)

FM Input
Nominal input impedance 50 ohms (internally switchable to 600 ohms), damage level ±15 volts. See Modulation specifications.
(BNC female, front panel.)

Trigger Input
Activated on a TTL rising edge. Used to externally initiate an analog sweep or to advance to the next point in step or list mode. Damage level +5.5, –0.5 volts. (BNC female, rear panel.)

Trigger Output
Outputs a one-microsecond-wide TTL-level pulse at 1601 points evenly spaced across an analog sweep, or at each point in step or list mode.
(BNC female, rear panel.)

10 MHz Reference Input
Accepts 10 MHz ±100 Hz, 0 to +10 dBm reference signal for operation from external time base. Nominal input impedance 50 ohms. Damage level +10, –5 volts. (BNC female, rear panel.)

10 MHz Reference Output
Nominal signal level 0 dBm, nominal output impedance 50 ohms.
(BNC female, rear panel.)

Sweep Output
Supplies a voltage proportional to the sweep ranging from 0 volts at start of sweep to +10 volts at end of sweep, regardless of sweep width. In CW mode, voltage is proportional to percentage of full instrument frequency range. Minimum load impedance 3 kohms. Accuracy ±0.25%, ±10 mv, typical.
(BNC female, rear panel.)

Stop Sweep Input/Output
Sweep will stop when grounded externally. TTL-high while sweeping, TTL-low when HP 8360 stops sweeping. Damage level +5.5, –0.5 volts.
(BNC female, rear panel.)

Z–Axis Blanking/Markers Output
Supplies positive rectangular pulse (approximately +5 volts into 2 kohms) during the retrace and band switchpoints of the RF output. Also supplies a negative pulse (–5 volts) when the RF is at a marker frequency (intensity markers only). (BNC female, rear panel.)

Volts/GHz Output
Supplies voltage proportional to output frequency at 0.5 volts/GHz (internally switchable to 0.25 or 1 volt/GHz). Maximum output 18 volts. Minimum load impedance 2 kohms. Accuracy ±0.5%, ±10 mv, typical.
(BNC female, rear panel.)

Inputs & Outputs
(continued)

Source Module Interface
Provides bias, flatness correction, and leveling connections to HP 83550-series millimeter-wave Source Modules. (Special, front and rear panels.)

Auxiliary Interface
Provides control signal connections to HP 8516A S-parameter Test Set. (25-pin D-subminiature recepticle, rear panel.)

Models

HP 83620A 10 MHz to 20 GHz
HP 83622A 2 to 20 GHz
HP 83623A 10 MHz to 20 GHz High Power
HP 83624A 2 to 20 GHz High Power
HP 83640A 10 MHz to 40 GHz
HP 83642A 2 to 40 GHz

Options

Option 001 Add Step Attenuator
With this option, minimum settable output power is –110 dBm. Maximum leveled output power is lowered by 1.5 dB to 20 GHz, and 2 dB above 20 GHz.

Option 003 Delete Keyboard/Display
For security, tamper–resistance, and cost savings in automated system applications, this option deletes the keyboard and display. Option 003 does NOT move the front panel connectors to the rear panel, however, so in most cases, Option 004 should be ordered in conjuction with Option 003.

Option 004 Rear Panel RF Output
Moves RF Output, External ALC Input, Pulse Input/Output, AM Input, and FM Input connectors to the rear panel.

Option 006 Fast Pulse Modulation
Improves pulse rise/fall time to 10 ns. Also affects maximum leveled output power and harmonic performance. Not available on HP 83623A and HP 83624A.

Option 008 1 Hz Frequency Resolution
Provides frequency resolution of 1 Hz.

Option 700 MATE System Compatibility
Provides CIIL programming commands for MATE system compatibility.

Option 806 Rack Slide Kit
Used to rack mount HP 8360 while permitting access to internal spaces.

Option 908 Rack Flange Kit
Used to rack mount HP 8360 without front handles.

Option 910 Extra Operating & Service Manuals
Provides a second copy of Operating and Service manuals.

Option 913 Rack Flange Kit
Used to rack mount HP 8360 with front handles. Front handles are standard on the HP 8360.

Option W30 Two Years Additional Return-To-HP Service
Does not include bi-annual calibration.