

- Frequency ranges of 1 GHz, 2 GHz, 3 GHz, 4.2 GHz, or 6 GHz
- Lowest overall noise and spurious
- AM, FM, and pulse modulation
- Lowest specified leakage (optional)
- Internal modulation source for complex waveforms
- Onsite repair and calibration

- HP 8643A
- HP 8644B
- HP 8664A
- HP 8665A
- HP 8665B



HP 8643A, 8644B, 8665B

These signal generators offer RF designers and manufacturers a selection of frequency range and high performance. The HP 8643A, 8644B, and 8664A are for traditional out-of-channel receiver test applications. The HP 8665A/B are for high-performance applications up to 6 GHz, particularly radar, telemetry and spurious testing of UHF receivers. All signal generators within this performance family have options that allow them to be configured to meet specific application needs.

HP 8643A 1 GHz/2 GHz Signal Generator UD HP-IB

HP has optimized the HP 8643A's configuration with the performance necessary for out-of-channel receiver tests while maintaining a low price. Options have been limited on the HP 8643A, but many performance/feature capabilities have been included as standard.

Standard Electronic Attenuator and Advanced Modulation Source

Reliability is enhanced by the use of an electronic attenuator on the 1 GHz version. Instead of using mechanical relays for setting levels, the HP 8643A uses solid-state components accurate to within ± 1.0 dB. The HP 8643A comes standard with an advanced internal modulation synthesizer that provides coverage to 400 kHz and two-tone capability with the selection of sine, square, sawtooth, and white Gaussian noise waveforms.

HP 8644B 1 GHz/2 GHz High-Performance Signal Generator UD HP-IB

The HP 8644B represents the highest overall performance in HP's line of 1 GHz and 2 GHz signal generators. The HP 8644B builds on the HP 8643A's performance by lowering SSB phase noise (-136 dBc/Hz versus -130 dBc/Hz) and lowering spurious (-105 dB versus -100 dB). The HP 8644B can be used either for specific tests that require the lowest SSB phase noise or for applications with diversified performance requirements.

Specifications

	HP 8643A	HP 8644B	HP 8664A; HP 8665A/B
Frequency Range	0.252 to 1030 MHz 0.252 to 2060 MHz (Option 002)	0.252 to 1030 MHz 0.252 to 2060 MHz (Option 002)	0.1 to 3000 MHz (HP 8664A) 0.1 to 4200 MHz (HP 8665A) 0.1 to 6000 MHz (HP 8665B)
Resolution Accuracy	0.01 Hz Timebase stability $\times f_c$	0.01 Hz Timebase stability $\times f_c$	0.01 Hz Timebase stability $\times f_c$
Switching speed (typical)	< 90 ms; < 200 ms with FM on	< 350 ms	< 100 ms (Option 004)

Internal Reference Oscillator

Output: 10 MHz, $> 0.15 V_{rms}$ into 50 Ω ; (IES) $> 1 V_{rms}$ into 50 Ω

Timebase Stability

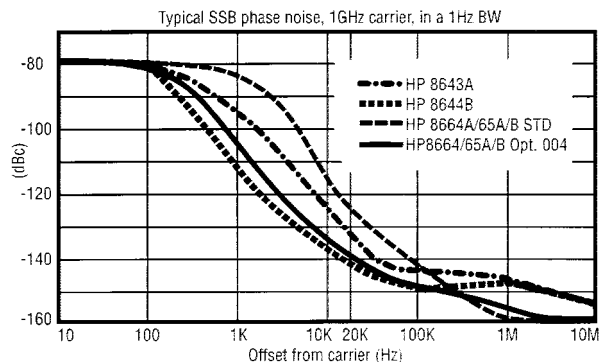
	Standard Timebase	High Stability (Opt. 001)
Aging Rate:	1.5×10^{-8} /day	3×10^{-10} /day
Temperature Effects:	7×10^{-10}	6×10^{-10}
Line Voltage Effects:	2×10^{-10}	1×10^{-10}

HP 8664A 3 GHz, HP 8665A 4.2 GHz and HP 8665B 6 GHz High-Performance Signal Generators UD HP-IB

These three signal generators offer identical performance except for frequency coverage and price. Your application will dictate which instrument is required. The HP 8664A and HP 8665A/B are suited for out-of-channel receiver measurements through the use of Option 004 (low-noise enhancement) and for such applications as radar testing through the use of Option 008 (pulse modulation).

Wideband FM and Optional Pulse Modulation

FM rates of up to 2 MHz and deviations to 20 MHz peak are suitable for many applications such as higher-rate digital communications. An optional pulse modulator with on/off ratio of > 80 dB and rise/fall times of < 5 ns is available. Pulse width and delay can be internally adjusted between 50 ns and 999 ms, eliminating the need for an external pulse generator.



Typical SSB Phase Noise, at 1 GHz Carrier, in a 1 Hz BW

Signal Sources

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High-Performance RF Signal Generators (cont'd)

Specifications, cont'd










	HP 8643A	HP 8644B	HP 8664A, HP 8665A/B
Spectral Purity			
SSB phase noise @ 1 GHz (20 kHz offset)	-130 dBc/Hz	-136 dBc/Hz	-117 dBc/Hz; -134 dBc/Hz (Option 004)
Nonharmonics: (>10 kHz offset)	< -100 dBc, 0.252 to 1030 MHz < -94 dBc, 1030 to 2060 MHz	< -105 dBc, 0.252 to 1030 MHz < -100 dBc, 1030 to 2060 MHz	< -100 dBc, 187.5 to 2060 MHz < -90 dBc, 2060 to 6000 ¹ MHz, 0.1 to 187.5 MHz
Harmonics	< -25 dBc, output ≤ +8 dBm	< -25 dBc, output ≤ +10 dBm	< -30 dBc, output ≤ +10 dBm
Subharmonics	None, 0.252 to 515 MHz < -52 dBc, 515 to 1030 MHz < -40 dBc, 1030 to 2060 MHz	None, 0.252 to 515 MHz < -52 dBc, 515 to 1030 MHz < -40 dBc, 1030 to 2060 MHz	< -75 dBc, 0.1 to 1500 MHz < -40 dBc, 1500 to 3000 MHz < -50 dBc, 3000 to 6000 ¹ MHz
Residual FM @ 1 GHz: 0.3 to 3 kHz post det. BW	< 2 Hz rms	< 1 Hz rms	< 7.5 Hz rms; < 1.2 Hz rms (Option 004)
Output Level			
Range	+13 to -137 dBm	+16 to -137 dBm, +13 dBm (Option 002, 005)	+13 to -139.9 dBm, +9 dBm (Option 008)
Resolution	0.1 dB	0.1 dB	0.1 dB
Absolute accuracy	± 1 dB, output ≥ -127 dBm	± 1 dB, output ≥ -127 dBm	± 1 dB, output ≥ -119.9 dBm, 1 to 1000 MHz ± 1.5 dB, output ≥ -119.9 dBm, 1000 to 3000 MHz ± 2 dB, output ≥ -119.9 dBm, > 3000 ¹ MHz, < 1 MHz
Reverse power protection	50 W	50 W	25 W ² , 0.1 to 2060 MHz; 1 W, > 2060 ¹ MHz
Amplitude Modulation			
Depth: (@ ≤ +7 dBm)	0 to 100%	0 to 100%	0 to 100%
Resolution	0.1%	0.1%	0.1%
Bandwidth (3 dB) ≤ +7 dBm	dc to 100 kHz, 128 MHz < f _c < 1030 MHz	dc to 100 kHz, 128 MHz < f _c < 1030 MHz	dc to > 10 kHz, > 10 MHz
Accuracy: 1 kHz rate	± (7% of setting + 1%) up to 80% depth	± (7% of setting + 1%) up to 80% depth	± (6% of setting + 1%) up to 90% depth
Distortion: 30% depth, 1 kHz rate	< 2%; < 4% (Option 002)	< 2%; < 4% (Option 002)	< 4%
Frequency Modulation			
Maximum peak deviation (Deviation halves per lower octave)	2 MHz, 1030 to 2060 MHz; 1 MHz, 515 to 1030 MHz	20 MHz/200 kHz ² , > 1030 MHz; 10 MHz/100 kHz ² , > 515 MHz	20 MHz, 3000 to 6000 ¹ MHz; 10 MHz, 1500 to 3000 MHz
Resolution	2.5% of setting	2.5% of setting	2.5% of setting
Bandwidth (3 dB)	dc to 100 kHz	dc to 100 kHz	dc to 800 kHz
Carrier accuracy in FM	± 0.5% of setting	± 0.5% of setting	± 0.6% of setting
Indicator accuracy	< 5%, < 30 kHz rates; < 10%, < 100 kHz rates	< 5%, < 30 kHz rates; < 10%, < 100 kHz rates	± 9%, < 20 kHz rates
Distortion	< 5%, 20 Hz to 100 kHz rates	< 5%, 20 Hz to 100 kHz rates	< 1%, 20 Hz to 20 kHz rates
Pulse Modulation			Option 008
On/off ratio	> 50 dB; > 80 dB, > 1030 MHz	> 35 dB; > 80 dB, > 1030 MHz	> 80 dB
Rise/fall time, 10 to 90%	< 100 ns	< 100 ns	< 8 ns
Repetition rate	dc to 1 MHz	dc to 1 MHz	dc to 10 MHz
Internal width/delay	N/A	N/A	Variable, 50 ns to 1 s
Internal Modulation Source			
Waveforms and rates	Sine; white Gaussian noise (0.1 Hz to 400 kHz); Triangle, sawtooth, square (0.1 Hz to 50 kHz)		
Frequency accuracy	Same as timebase		
Output level (into 600 Ω)	1 V pk, 2 V pk for HP 8643A and 8644B		
Output resolution	2 mV pk		
Frequency Sweep			
Digital sweep	Digitally stepped sweep over entire frequency range. Linear/log selection. 0.5 to 1000 s sweeps.		
Markers/Z-axis output	3 markers available/Z-axis output nominally +5 V/X-axis output nominally 0 to 10 V		
Phase continuous sweep	40 MHz of span available at maximum carrier frequency. 20 ms to 10 s sweep times.		
Remote Programming			
Interface	HP-IB (IEEE 488.2-1987)		
Control language	Hewlett-Packard Systems Language (HP-SL). All functions controlled except power.		
IEEE-488 functions	SH1, AH1, T6, TE0, L4, LE0, SR1, RL1, PP0, DC1, DT0, CG, E2		
General			
Power requirements	± 10% of 100 V, 120 V, 220 V, or 240 V; 48 to 440 Hz; 500 VA (except HP 8643A/44B: 400 VA)		
Operation temperature	0° to 55° C		
Leakage	Conducted and radiated interference meets MIL-STD-461B RE0 < None > 2 and FTZ 1046		
Calibration interval	Recommended 3 years (MTBC)		
Weight	HP 8643A: 23 kg (50 lb). HP 8644B: 30 kg (67 lb). HP 8664A/65A/B: 35 kg (78 lb).		
Size	177 mm H x 426 mm W x 624 mm D (7 in x 16.8 in x 24.6 in). Option 010 adds 35 mm (1.4 in) to D.		

¹ 3000 MHz for HP 8664A, 4200 MHz for HP 8665A, 6000 MHz for HP 8665B

² N/A to HP 8665B

³ Low-noise mode

Ordering Information

	HP 8643A	HP 8644B	HP 8664A	HP 8665A	HP 8665B
Base Price	\$16,670	\$24,370	\$31,200	\$41,295	\$42,310
Options					
001 High-Stability Timebase	+\$1,745	+\$1,745	+\$1,745	+\$1,745	+\$1,745
002 2 GHz Doubled Output	+\$5,815	+\$3,050	N/A	N/A	N/A
004 Low-Noise Option	N/A	Standard	+\$4,625	+\$4,625	+\$4,623
005 Electronic Attenuator (N/A with Option 002)	Standard	+\$566	N/A	N/A	N/A
008 Pulse Modulation	Standard ¹	Standard ¹	+\$4,055	+\$4,055	+\$4,055
009 Specified VOR/ILS ²	+\$1,695	+\$1,695	N/A	N/A	N/A
011 2 GHz Internal Frequency Counter	+\$1,125	+\$1,125	N/A	N/A	N/A
Service Kit	\$1,150 (08645-61116)	\$1,150 (08645-61116)	\$1,700 (08665-61116)	\$1,700 (08665-61116)	\$1,700 (08665-61116)
003 Rear-Panel Input/Output	\$444	\$459	\$459	\$459	\$459
010 Reduced-Leakage Configuration	\$1,695	\$1,695	\$1,695	\$1,695	\$1,695
W30 Add 3 Years to Return Warranty	\$375	\$565	\$700	\$835	\$950
907 Front-Handle Kit (5062-3990)	\$67 	\$67 	\$67 	\$67 	\$67
908 Rack Flange Kit (5062-3978)	\$37 	\$37 	\$37 	\$37 	\$37 
909 Combined Front/Rack Flange Kit (5061-9684)	\$94	\$94	\$94	\$94	\$94

 Indicates QuickShip availability.

¹ See Specifications

² Not compatible with Options 002 or 005