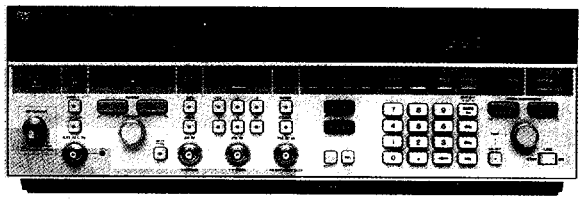
SIGNAL GENERATORS

High-Performance Microwave

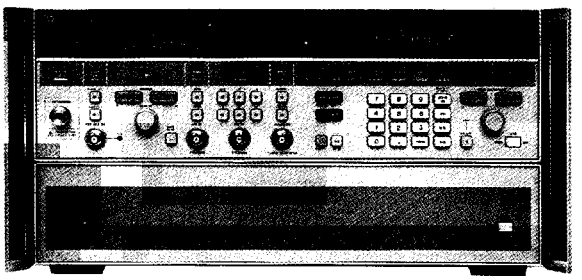
HP 8673B, 8673C, 8673D, 8673E

- 10 MHz to 26.5 GHz frequency range
- < −60 dBc harmonics/subharmonics
- Low spurious and phase noise
- +8 to −100 dBm calibrated output
- Internally leveled AM/FM/pulse modulation
- Frequency extension capability to 110 GHz



HP 8673B

DESIGNED FOR HP-IB SYSTEMS



HP 8673D

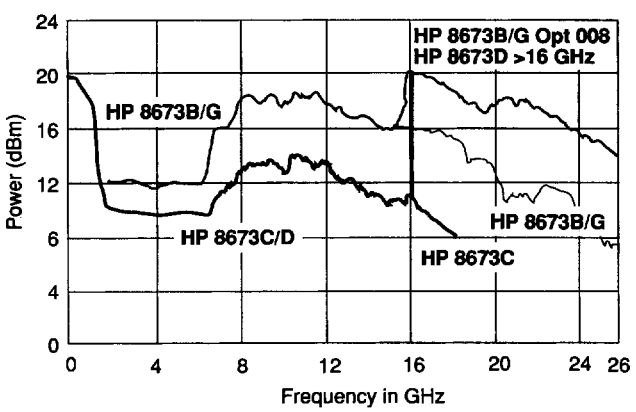
DESIGNED FOR HP-IB SYSTEMS

HP 8673B, 8673C, 8673D, and 8673E Synthesized Signal Generators

The HP 8673B/C/D/E Synthesized Signal Generators are full-performance synthesizers designed to generate precise microwave signals over the 50 MHz to 26.5 GHz frequency range. These generators offer calibrated and leveled power, AM, FM, pulse modulation, digital sweep, programmability, and frequency extension capability to 110 GHz. The HP 8673B covers 2.0 to 26.5 GHz. The HP 8673C/D pair cover 50 MHz to 18.6 GHz and 26.5 GHz respectively and the HP 8673E covers 2.0 to 18.6 GHz.

Excellent Spectral Purity

A variety of applications ranging from microwave radar to communications systems require the frequency stability available from the HP 8673B/C/D/E. The broadband frequency coverage is derived from multiplying a fundamental 2.0 to 6.6 GHz YIG-tuned oscillator. This technique provides the wide frequency coverage in a single instrument. Indirect synthesis phase-locks the YIG-tuned oscillator to a 10 MHz quartz crystal reference to provide excellent long term and short term stability (frequency drift $< 5 \times 10^{-10}$ per day), (HP 8673B/C/D). Phase locked loops are optimized for lowest possible single-sideband phase noise. The HP 8673C and HP 8673D include an internal tracking YIG-filter to further reduce unwanted harmonic, subharmonic, and nonharmonic spurious signals above 1.2 GHz to < −60dBc.



Maximum power typically available from HP 8673B/C/D/G and HP 8673B/G Option 008 at 25° C. HP 8673E and HP 8673H Option 212 and Option 618 typical maximum power is the same as HP 8673B/G over 2.0 to 18.0 GHz.

Wide Dynamic Output Range

For broadband component and receiver testing applications, the HP 8673B/C/D/E deliver exceptionally flat power output across the full frequency ranges. For receiver sensitivity measurements, power is internally (or externally) leveled to −100 dBm (−120 dBm for the HP 8673E). Maximum available power varies with frequency as shown in the figure below.

Internally Leveled Pulse Modulation

The HP 8673B/C/D/E features an internal pulse modulator that provides high-quality pulse modulation over the entire 50 MHz to 26.5 GHz range. Since the modulation is done before the frequency multiplication, the peak pulsed power can be leveled and calibrated to within typically +1.5/−1.0 dBm of the set level referenced to CW. External TTL level pulse rates up to 1 MHz and pulse widths as narrow as 100 ns can be easily accommodated by the HP 8673B/C/D/E to provide ON/OFF ratios in excess of 80 dB.

Calibrated AM/FM Modulation

AM and FM capability is included in the HP 8673B/C/D/E to expand the versatility in receiver testing applications. AM depth at rates up to 100 kHz can be accurately set using the front panel meter. Six ranges of metered FM are available at rates and peak deviations up to 10 MHz. The HP 8673E features unlocked mode which allows up to 10 MHz deviation at rates as low as 50 Hz. Both AM depth and FM deviation are linearly controlled by varying the externally supplied modulating input voltage up to 1V peak. Simultaneous modulation of AM, FM, and pulse is possible to simulate complex environments.

Frequency Extension to 110 GHz

The HP 8673B/C/D can be used as microwave drivers for the HP 83550-series millimeter-wave source modules. This combination (with the addition of the HP 8349B Microwave Amplifier) can provide leveled output signals up to 110 GHz with the "System Leveling" mode. The resultant output frequency can be displayed on the HP 8673B/C/D front panel by entering the multiplication factor of the source module.

Full Programmability and Digital Sweep

The HP 8673B/C/D/E provide full programmability of all front panel functions for automatic test applications. Output level can be controlled in steps as fine as 0.1 dB. An internal microprocessor is used to simplify HP-IB program code generation and follow front-panel keystroke sequences. This design allows the implementation of digital sweep. Sweep spans can be set over the entire frequency range with variable rates, step sizes, and selectable markers available.

HP 8673B/C/D/E Specifications

Frequency Characteristics

Frequency Range:
HP 8673B: 2.0 to 26.0 GHz (1.95 to 26.5 GHz in overrange).
HP 8673C: 0.05 to 18.6 GHz (0.01 to 18.6 GHz in overrange).
HP 8673D: 0.05 to 26.0 GHz (0.01 to 26.5 GHz in overrange).
HP 8673E: 2.0 to 18.0 GHz (1.95 to 18.6 GHz in overrange).
Frequency Bands: Band 0: 0.05 to 2.0 GHz. Band 1: 2.0 to 6.6 GHz. Band 2: 6.6 to 12.3 GHz. Band 3: 12.3 to 18.6 GHz. Band 4: 18.6 to 26.0 GHz.
Frequency Resolution: 1 kHz Band 0 and 1 3 kHz Band 3
2 kHz Band 2 4 kHz Band 4
Timebase: Internal 10 MHz ($<5 \times 10^{-10}$/day aging rate for HP 8673 B/C/D, $<1.5\times10^{-9}$/day aging rate for HP 8673E) or ext. 5 or 10 MHz.

Spectral Purity

Single-sideband phase noise (HP 8673B/C/D) (1 Hz BW, CW mode):

F_c	Offset from F_c				
	10 Hz	100 Hz	1 kHz	10 kHz	100 kHz
Band 0	−64 dBc	−70 dBc	−78 dBc	−86 dBc	−105 dBc
Band 1	−58 dBc	−70 dBc	−78 dBc	−86 dBc	−110 dBc
Band 2	−52 dBc	−64 dBc	−72 dBc	−80 dBc	−104 dBc
Band 3	−48 dBc	−60 dBc	−68 dBc	−76 dBc	−100 dBc
Band 4	−46 dBc	−58 dBc	−66 dBc	−74 dBc	−98 dBc

Single-sideband phase noise (HP 8673E) (1 Hz BW, 1 kHz offset, CW mode): < −60 dBc

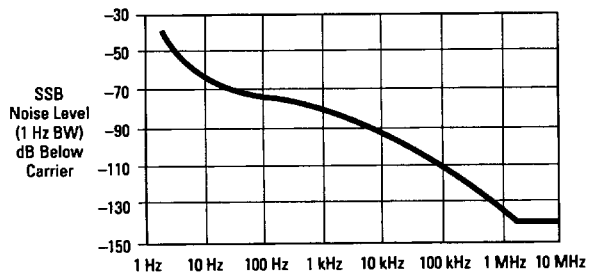


Figure 2. Typical HP 8673B/C/D/E single-sideband phase noise performance using the internal standard, Band 1.

Harmonics (up to maximum frequency, output level meter readings <0 dB on 0 dBm range and below): < −40 dBc (HP 8673B/E). < −35 dBc, 50MHz to 1.2GHz; < −60 dBc, 1.2 to 26.0 GHz (HP 8673C/D).
Sub-harmonics and multiples thereof: < −60 dBc (HP 8673C/D). < −25 dBc, Bands 1 to 3; < −20 dBc, Band 4 (HP 8673B); < −35 dBc, (HP 8673E).
Spurious (CW and AM modes)
Non-harmonically related: < −60 dBc, Band 0; < −70 dBc, Band 1; < −64 dBc, Band 2; < −60 dBc, Band 3; < −58 dBc, Band 4 (HP 8673B/C/D); < −60 dBc (HP 8673E)

Output Characteristics

Output level (+15° C to +35° C):

8673B		8673C		8673D	
Level (dBm)	Freq. (GHz)	Level (dBm)	Freq. (GHz)	Level (dBm)	Freq.(GHz)
+8 to −100	2 to 18	+11 to −100	.05 to 2.0	+11 to −100	.05 to 2.0
+4 to −100	18 to 22	+5 to −100	2 to 16	+5 to −100	2 to 16
0 to −100	22 to 26	+2 to −100	16 to 18.6	+10 to −100	16 to 26

Output level (+15° C to +35° C): +8 dBm to −120 dBm (HP 8673E)
Remote programming output level resolution: 0.1 dB.

Pulse Modulation

ON/OFF ratio: > 80 dB (HP 8673B/C/D.) > 70dB (HP 8673E)
Rise/fall times: <30 ns, Band 0; <40 ns, Bands 1 to 4 (HP 8673 B/C/D); <50 ns (HP 8673E)
Minimum leveled pulse width: <100 ns
Pulse repetition frequency: 50 Hz to 1 MHz
Minimum Duty Cycle: <0.001 for leveled performance

Amplitude Modulation

Rates (3 dB BW, 30% depth): 20 Hz to 100 kHz. (HP 8673 B/C/D); 10 Hz to 50 kHz (HP 8673E).
Sensitivity: 30%/V, 100%/V ranges. Max. input 1 V peak into 600 Ω

Frequency Modulation (8673B/C/D)

Deviation Range	Rate (±3dB BW, typical)	Maximum Peak Deviation
		The smaller of 10 MHz or:
30, 100 kHz/V	100 Hz to 10 MHz	fmod x 5. Band 0 and Band 1
.3, 1, 3 MHz/V	1 kHz to 10 MHz	fmod x 10, Band 2
10 MHz/V	1 kHz to 10 MHz	fmod x 15, Band 3
		fmod x 20, Band 4

Frequency Modulation (8673E)

Deviation Range	Rate (±3dB BW, typical)	Maximum Peak Deviation
		The smaller of 3 MHz or:
30, 100 kHz/V	100 Hz to 2 MHz	fmod x 5. Band 1
.3, 1, 3 MHz/V	3 kHz to 2 MHz	fmod x 10, Band 2
		fmod x 15, Band 3
10 MHz/V (unlocked)	50 Hz to 2 MHz, typical	10 MHz

Digital Sweep Characteristics

Sweep function: Start/stop or ΔF (span) sweep.
Sweep modes: Manual, auto, or single sweep.
Step size: Maximum of 9999 frequency points per sweep; minimum step size equals frequency resolution.
Dwell time: Set from 1 to 255 ms per frequency.
Markers: 5 independent, settable frequency markers.
Sweep outputs: 0 to +10 V ramp start to stop; 0.5 V/GHz ramp; Z-axis blanking/markers; tone marker; penlift.

Remote Programming

All functions HP-IB programmable except line switch.

General

Operating temperature range: 0° C to +55° C.
Power: 100, 120, 220, 240 V, +5%, −10%, 48 to 66 Hz; 400 VA max. (HP 8673B/E), 500 VA max. (HP 8673C/D)
Weight: HP 8673B/E: net 29 kg (64 lb); shipping 34.5 kg (76 lb). HP 8673C/D: net 42.4 kg (94 lb.); shipping 46.5 kg (103 lb).
Size: HP 8673B/E: 146 mm H × 425 mm W × 620 mm D (5.7in × 16.8 in × 24.4 in). HP 8673C/D: 234 mm H × 425 mm W × 620 mm D (9.2 in × 16.8 in × 24.4 in).

Ordering Information

	Price
HP 8673B Synthesized Signal Generator	$44,000
Opt 001 Delete RF Output Attenuator	−$600
Opt 002 Delete Reference Oscillator	−$735
Opt 004 Rear-panel RF Output	+$75
Opt 006 Chassis Slide Kit	+$75
Opt 008 +10 dBm Output Level	+$5,000
Opt 907 Front-panel Handle Kit (5062-3989)	+$55 ☎
Opt 908 Rack Mounting Flange Kit (5062-3977)	+$33 ☎
Opt 909 Front-panel and Rack Mounting Kits (5062-3983)	+$80
Opt 910 Extra Operating and Service Manual (08673-90114) (08673-90116) (08673-60097)	+$65 ☎
Opt W30 Two Additional Years of Return-to-HP Warranty. See page 671.	+$1,050
HP 8673C Synthesized Signal Generator	$55,500
Opts 001, 002, 004, and 006 Same as HP 8673B	
Opt 908 Rack Mounting Flange Kit (5062-3974) (5062-3977)	+$55
Opt 910 Service and Extra Operating Manual (08673-90070) (08673-90138) (08673-60097)	+$85
Opt 913 Rack Flanges for Standard Front Handles (5062-4073)	+$45
Opt 915 Service Manual (08673-90138) (08673-60097)	+$20
Opt 916 Extra Operating Manual (08673-90070)	+$65
Opt W30 Two Additional Years of Return-to-HP Warranty. See page 671.	+$1,170
HP 8673D Synthesized Signal Generator	$59,000
Opts 001, 002, 004, 006, 908, 913, 910, 915, and 916 Same as HP 8673C	
Opt W30 Two Additional Years of Return-to-HP Warranty. See page 671.	+$1,250
HP 8673E Synthesized Signal Generator	$41,000
Opts 001, 002, 004, 006, 907, 908, 909 and 910 Same as HP 8673B	
Opt W30 Two Additional Years of Return-to-HP Warranty. See page 671.	$915
HP 11726A Support Kit (for HP 8673B)	$2,400

☎ For off-the-shelf shipment, call 800-452-4844.