

HP 83711B
HP 83712B
HP 83731B
HP 83732B



Typical single-sideband phase noise at 50 MHz, 1 GHz and 20 GHz, 25° C, CW mode. Offsets less than 100 Hz require the high stability timebase, Option 1E5.

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HP 83711B/12B and HP 83731B/32B Signal Sources



The HP 83711B/12B synthesized CW generators and HP 83731B/32B synthesized signal generators set new standards for performance at prices that are surprisingly affordable. No longer will you have to give up frequency coverage, modulation, or reliability to meet your budget. These signal sources will perform beyond your expectations at a price within your reach.

Clean Signals with Plenty of Power

Choose the HP 83711B/83731B, 1 to 20 GHz, or the HP 83712B/ 83732B, 10 MHz to 20 GHz, for your receiver and system test applications. Fundamental oscillators and switched low-pass filters deliver < -55 dBc harmonics, eliminate subharmonics, and suppress spurious to < -60 dBc. These signal sources provide plenty of output power (typically > +14 dBm), while spectral purity is maintained even at high power levels (typical output power at frequencies below 1 GHz is +20 dBm). These signal sources deliver >100 dB dynamic range. Level resolution is 0.01 dB with typical accuracy of ±1.0 dB at any frequency or power level. User Level Correction simplifies generating accurate, leveled power at distant test ports.

HP 83731B and HP 83732B Provide Unmatched Modulation Performance

Sophisticated modulation lets you simulate real-world signals. Test state-of-the-art radar and EW receivers with high-fidelity pulse modulation. < 10 ns pulse rise/fall times, < 25 ns pulse width, and > 80 dB pulse on/off ratio give you the performance you need to verify modern receivers. A built-in multimode pulse generator adds the flexibility to generate triggered, doublet and gated burst pulse modes.

In addition, logarithmic and linear AM is a standard feature in the HP 83731B/32B. Use the > 60 dB depth log AM and the fast pulse modulation simultaneously (scan modulation) for accurate simulation of antenna scanning patterns, or sweep power linearly and accurately to test power-sensitive devices.

The HP 83731B/32B offer unmatched performance for testing satellite communications and telemetry receivers. 10 MHz peak FM and optional 100 radians peak phase modulation deviations, combined with the highest-modulation index available (> 300 for FM), simplify simulation of these difficult-to-generate signals. The HP 83731B/32B remain fully synthesized even at high-modulation indices, eliminating the troublesome frequency drift of other signal sources.

Real-world signals often combine two or more modulations. The HP 83731B/32B let you use all three modulations simultaneously with optional independent internal modulation generator without any degradation in performance. FM and phase modulation cannot be applied simultaneously.

Versatile and Reliable

The HP 83711B/12B and HP 83731B/32B signal sources are the recommended local oscillators for the HP 8970B noise figure meter. Low broadband noise minimizes errors in measurements of low gain devices. Use these signal sources with the HP 83550 series millimeter-wave modules to generate signals to 110 GHz. All front-panel functions are completely GPIB-programmable and SCPI-compatible.

These signal sources are designed to remain within factory specifications for the entire life of the instrument. The recommended two-year performance verification cycle minimizes downtime and cost of ownership. If a unit ever drifts, automated adjustment routines can be run to return the unit to factory performance in less than six hours. Extensive use of surface-mount technology and a minimum number of adjustments combine to deliver an estimated MTBF of more than 20,000 hours. Built-in functional verification routines speed servicing.

Key Literature

HP 83711B/12B and HP 83731B/32B Technical Data Sheet, p/n 5963-6615E

Specifications

Frequency Characteristics

Frequency Range:

- HP 83711B, 1.0 to 20 GHz
- HP 83712B, 10 MHz to 20 GHz
- HP 83731B, 1.0 to 20 GHz
- HP 83732B, 10 MHz to 20 GHz

Frequency Resolution: 1 kHz, 1 Hz with Option 1E8

Internal Reference Oscillator

Frequency: 10 MHz

Timebase Stability:

	Standard Timebase	Option 1E5
Aging Rate	< 1.0 x 10 ⁻⁸ /day	< 1.5 x 10 ⁻⁹ /day
Temperature	< 5 x 10 ⁻⁸	< 1 x 10 ⁻⁷
Line Voltage	N/A	< 5 x 10 ⁻¹⁰ (10% change in voltage)

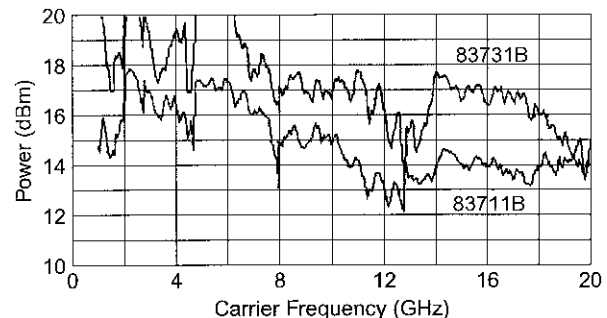
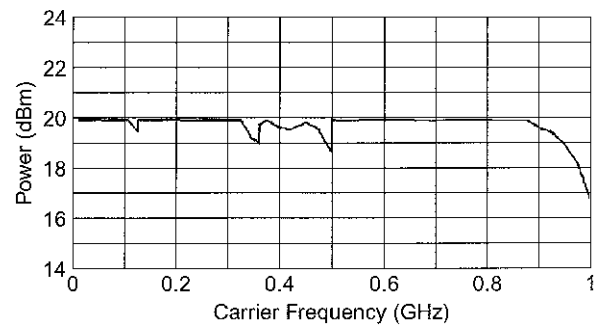
Timebase Accuracy = ± aging rate ± temperature effects ± line voltage effects

Output Characteristics

Output Power (with Option 1E1): 0.01 to 1 GHz +13 dBm

Maximum Leveled Output Power: 1 to 18 GHz +10 dBm; 18 to 20 GHz +8 dBm

Minimum Leveled Output Power: -4 dBm; with Option 1E1, -110 dBm



Resolution: 0.01 dB

Accuracy (–4 dBm to maximum specified leveled output power):
10 MHz to 50 MHz, ± 1.3 dB
50 MHz to 20 GHz, ± 1.0 dB

Accuracy (over all specified temperatures, and power levels):
10 MHz to 50 MHz, ± 2.3 dB
50 MHz to 20 GHz, ± 2.0 dB

Flatness: ± 0.5 dB

Spectral Purity

Harmonics:

HP 83711B/83712B, < –50 dBc (at levels < + 6 dBm)

HP 83731B/83732B, < –55 dBc (at levels < + 6 dBm)

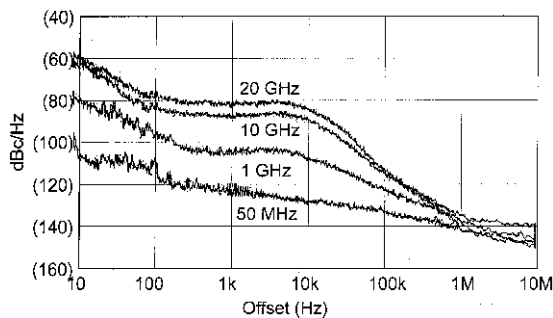
Sub-Harmonics: None

Non-Harmonic Spurious (> 3 kHz): –60 dBc

Phase Noise (@ 10 kHz offset): 500 MHz: –103 dBc/Hz;

2 GHz: –92 dBc/Hz; 18 GHz: –76 dBc/Hz

(Phase noise decreases 6 dB/octave below 500 MHz and reaches a floor of < –140 dBc/Hz)



Typical single-sideband phase noise at 50 MHz, 1 GHz, 10 GHz and 20 GHz, 25° C, CW mode. Offsets less than 100 Hz require the high-stability timebase, Option 1E5.

SSB phase noise (dBc/Hz, CW mode):

Carrier Freq.	Offsets			
	100 Hz	1 kHz	10 kHz	100 kHz
0.5 to <1 GHz	-78	-92	-103	-115
1 to <2 GHz	-73	-83	-92	-107
2 to <5 GHz	-70	-78	-83	-100
5 to <10GHz	-69	-78	-82	-100
10 to 20 GHz	-65	-73	-76	-100

Phase noise decreases 6 dB/octave below 500 MHz and reaches a floor of < –140 dBc/Hz.

General Specifications

Operating Temperature Range: 0° to + 55° C

Size: 426 mm W x 133 mm H x 498 mm D (16.8 in x 5.2 in x 19.6 in)

Weight: < 16 kg (35 lb)

Power: 90 to 132 V, 48 to 440 Hz; 198 to 264 V, 48 to 66 Hz; 400 VA max.

EMC: Meets or exceeds EN55011/CISPR 11/1990, Class A and MIL-STD-461C Part 2 RE02, CE03, CS02, RS03

HP 83731B, 83732B Modulation Specifications

Pulse Modulation

On/Off Ratio: > 80 dB

Rise/Fall Times: < 10 ns

Minimum Pulse Width: < 25 ns, 1 to 20 GHz

Internal Multimode Pulse Modulation Source

Modes: Internal free-run, triggered, doublet, and gated burst modes

Pulse Repetition Frequency: 3 Hz to > 3 MHz

Pulse Width: 25 ns to 419 ms

Pulse Delay: –419 ms to +419 ms, free-run mode; 225 ns to 419 ms, triggered mode

Minimum Pulse Parameter Resolution: 25 ns

Frequency Modulation

Rates: 1 kHz to 1 MHz

Maximum Deviation: 10 MHz pk, 2 to 20 GHz; 5 MHz pk, 1 to 2 GHz; decreases by a factor of 2 for each octave below 1 GHz

Maximum Modulation Index: > 300

Option 800 Analog Phase Modulation

Sensitivity: Two ranges

Maximum Deviation:

Frequency	Low range	High range
2 to 20 GHz	4 rad	200 rad
1 to 2 GHz	2 rad	100 rad
0.5 to 1 GHz	1 rad	50 rad
0.256 to 0.5 GHz	0.5 rad	25 rad

Logarithmic Amplitude Modulation

Depth: > 60 dB

Sensitivity: –10 dB/V

Step Response: < 5 μ s for 50 dB step

Linear Amplitude Modulation

Sensitivity: Two ranges selectable: 30% V_{pk} + 100% V_{pk}

Maximum Depth: 90% (> 90% typical)

Key Literature

HP 83711B/12B and HP 83731B/32B Technical Data, p/n 5963-6615E

Ordering Information

HP 83711B Synthesized CW Generator

HP 83712B Synthesized CW Generator

HP 83731B Synthesized Signal Generator

HP 83732B Synthesized Signal Generator

The following options apply to all models:

Opt 1E1 Add 110 dB Output Step Attenuator

Opt 1E2 Add High-Performance Modulation Generator¹

Opt 1E5 Add High-Stability Timebase

Opt 1E8 Add 1 Hz Frequency Resolution

Opt 1E9 3.5 mm RF Output Connector

Opt 800 Add Analog Phase Modulation¹

Opt 0B0 Delete Manual Set

Opt 0B1 Extra User's Guide

Opt 0BV Service Manual (Component Level)

Opt 0BW Service Manual (Assembly Level)

Opt 0BX Service Manual (Assembly and Component Level)

Opt 1CM Rackmount Kit (HP p/n 5062-3977)

Opt 1CP Rackmount and Handle Kit (HP p/n 5062-3983)

Opt 1CR Rack Slide Kit (HP p/n 1494-0059)

Opt W30 Three Additional Years Return-to-HP Service:

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¹ Available on the HP 83731B/32B only.