

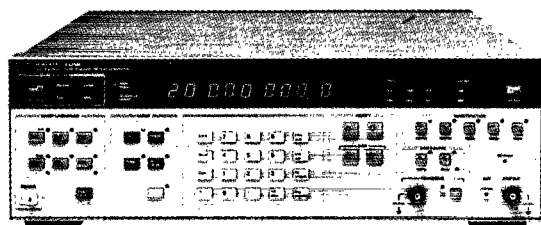
FUNCTION GENERATORS & WAVEFORM SYNTHESIZERS

Synthesizer/Function Generators, 1 μ Hz to 21 MHz

HP 3325B

449

- Fully synthesized microhertz resolution
- Functions—sine, square, triangle, ramps, arbs, dc offset
- Internal programmable modulation source
- LOG, LIN, discrete sweep
- Excellent signal purity
- dc to 60 MHz sync output



HP 3325B



DESIGNED FOR
MATE
SYSTEMS

HP 3325B Synthesizer/Function Generator

Synthesizer Precision, Function Generator Versatility

HP 3325B frequency accuracy is determined by a precision frequency reference and can be set with a resolution of 1 μ Hz. The phase of the output signal can be precisely controlled $\pm 719.9^\circ$ with 0.1° resolution, and multiple HP 3325Bs can be locked together for multi-phase applications.

Use the modulation source as an arbitrary function generator via HP-IB to provide user-defined waveshapes. Save-recall memory includes ten nonvolatile memory locations for simple and rapid access to frequently used test setups.

A built-in programmable modulation source provides sine, square, and arbitrary waveshapes for internal amplitude or phase modulation, or for use as a second source. In addition, a rear panel sync output provides a TTL compatible dc to 60 MHz signal.

All functions, including frequency, amplitude, phase, modulation, sweep, and waveshapes, are programmable via HP-IB or RS-232 interface. The HP 3325B is fully compatible in form, fit, and function with the HP 3325A. All HP-IB programs written for the HP 3325A are fully compatible with the HP 3325B.

Specifications

Waveforms: Sine, square, triangle, negative, and positive ramps

Frequency

Range

Sine: 1 μ Hz to 20.999 999 999 MHz

Square, triangle/ramps: 1 μ Hz to 10.999 999 999 MHz

Resolution: 1 μ Hz, < 100 kHz; 1 mHz \geq 100 kHz

Accuracy: $\pm 5 \times 10^{-5}$, 20° to 30° C at time of calibration

Warm-up time: 20 minutes to within specified accuracy

Main Signal Output (all waveforms)

Impedance: 50 Ω

Connector: BNC; switchable to front or rear panel, nonswitchable with Opt 002, except by internal cable change.

Amplitude

Range: 1 mV to 10 V p-p in 8 amplitude ranges, 1-3-10 sequence (10 dB steps), into 50 Ω load

| Function | Sine | | Square | | Triangle/ramps | |
|----------------------------------|--------------------------------|------------------------------|--------------------------------|------------------------------|--------------------------------|------------------------------|
| | Min | Max | Min | Max | Min | Max |
| Peak-peak rms dBm (50 Ω) | 1.000 mV 0.354 mV -56.02 | 10.00 V 3.536 V +23.98 | 1.000 mV 0.500 mV -53.01 | 10.00 V 5.000 V +26.99 | 1.000 mV 0.289 mV -57.78 | 10.00 V 2.887 V +22.22 |

Resolution: 0.03% of full range or 0.01 dB (4 digits)

Amplitude accuracy

(without dc offset, relative to programmed amplitude and accuracy)

Sine wave amplitude accuracy

1 MHz to 100 kHz: ± 0.1 dB, ≥ 3 V p-p; ± 0.2 dB, < 3 V p-p

100 kHz to 20 MHz: ± 0.4 dB, ≥ 3 V p-p; ± 0.6 dB, 0.1 to 3 V p-p

Sine Wave Spectral Purity

Phase noise: -60 dB for a 30 kHz band centered on a 20 MHz carrier (excluding ± 1 Hz about the carrier) with high-stability Opt 001 installed.

Spurious: All non-harmonically related output signals will be more than 70 dB below the carrier (60 dB with dc offset) or less than -90 dBm, whichever is greater.

Sine wave harmonic distortion: Harmonically related signals will be less than the following levels (relative to the fundamental) at full output for each range:

| 0.1 Hz | 50 kHz | 200 kHz | 2 MHz | 15 MHz | 20 MHz |
|--------|--------|---------|--------|--------|--------|
| -65 dB | -60 dB | -40 dB | -30 dB | -25 dB | -25 dB |

Square Wave Characteristics

Rise/fall time: ≤ 20 ns, 10% to 90% at full output

Overshoot: $\leq 5\%$ of peak-to-peak amplitude, at full output

Settling time: < 1 μ s to settle to within .05% of final value

Offset

Range: dc only (no ac signal): 0 to ± 5.0 V/50 Ω

dc + ac: Maximum dc offset ± 4.5 V on highest range, decreasing to ± 4.5 mV on lowest range.

Resolution: 4 digits

Sine Wave Amplitude Modulation

Modulation depth at full output for each range: 0 to 100%

Modulation frequency range: dc to 400 kHz (for 0 to 21 MHz carrier)

Sensitivity: ± 5 V peak for 100% modulation

Sine Wave Phase Modulation

Range: $\pm 850^\circ$, ± 5 V input

Modulation frequency range: dc -5 kHz

Frequency Sweep

Sweep Time

Linear: 0.01 s to 1000s

Logarithmic: 1 s to 1000s single, 0.1 s to 1000s continuous

Discrete Sweep

Number of segments: 100 maximum

Time/Segment: 0.01 s to 1000s, 0.01 s resolution

Maximum Sweep Width: Full frequency range for the waveform in use; min log start frequency 1 Hz.

Phase: Continuous over the full frequency range

Modulation Source

Frequency Range: Sine 0.1 Hz to 10 kHz, square 0.1 Hz to 2 kHz

Frequency Accuracy: 0.1%, typical

Impedance: Drives 10 k Ω or greater load

Sinewave Purity: -34 dBc or better, typical

Waveforms: Sine, square, arbitrary

Auxiliary Inputs and Outputs

Auxiliary Frequency Output: 21 MHz to 60.999 999 999 MHz; 0 dBm; output impedance 50 Ω .

Sync Output: Square wave with V (high) ≥ 1.2 V, V (low) ≤ 0.2 V into 50 Ω . Frequency range is the same as main signal for front panel sync and dc to 60 MHz for rear panel sync.

X-Axis Drive: 0 to $> +10$ Vdc linear ramp proportional to sweep frequency, linearity, 10-90%, $\pm 0.1\%$ of final value

Opt 001 High Stability Frequency Reference

Aging Rate: $\pm 5 \times 10^{-8}$ /week (72 hr warm up); $\pm 1 \times 10^{-7}$ /month (after 15 days continuous operation).

Ambient Stability: $\pm 5 \times 10^{-8}$ (0° C to +55° C)

Warm-Up Time: Reference will be within $\pm 1 \times 10^{-7}$ of final value 15 minutes after turn-on for an off time of less than 24 hours.

Opt 002 High Voltage Output

Frequency Range: 1 μ Hz to 1 MHz

Amplitude

Range: 4.00 mV p-p to 40.00 V p-p (≥ 500 Ω , ≤ 500 pF load)

Accuracy: $\pm 2\%$ of full output for each range at 2 kHz

Output impedance: < 2 Ω at dc, < 10 Ω at 1 MHz

dc offset range: Four times the specified range of the standard instrument.

General Specifications

Weight: Net, 9 kg (20 lb); shipping, 14.5 kg (32 lb)

Size: 132.6 mm H \times 425.5 mm W \times 497.8 mm D (5.25 in \times 16.75 in \times 19.63 in)

Ordering Information*

HP 3325B Frequency Synthesizer

Opt 001 High Stability Frequency Reference

Opt 002 High Voltage Output

Opt H05 Internal MATE Programming

Opt W30 Extended Repair Service (see page 624)

Price

\$5,500

+ \$850

+ \$350

(call HP)

+ \$115

*HP-IB cable not supplied.

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

For the most current prices and product information, contact your local Hewlett-Packard sales office—see page 654.