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FUNCTION GENERATORS & WAVEFORM SYNTHESIZERS

Synthesizer/Function Generator 1 μHz to 21 MHz

HP 3325B

- 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 3325 Synthesizer/Function Generator

The HP 3325B is a 1 μHz to 21 MHz synthesizer/function generator with high performance, exceptional versatility and value. Testing is made fast and efficient in general purpose applications whether on the bench or in ATE systems.

Synthesizer Precision

HP 3325B frequency accuracy is determined by a precision frequency reference and can be set with a resolution of 1 μHz. It has up to −65 dBc harmonic and −70 dBc spurious levels for precision measurements. The phase of the output signal can be precisely controlled ±719.9 deg with 0.1 deg resolution, and multiple HP 3325Bs can be locked together for multi-phase applications.

Function Generator Versatility

Precision squarewaves to 10.999,999 MHz have 20 ns rise times with synthesizer accuracy and precision. Triangle and ramp waveshapes are also available with .05 percent linearity up to 10.999,999 kHz. DC and phase offset can be added to these waveshapes. The modulation source can be used as an arbitrary function generator via HP-IB, providing user-defined waveshapes. These features make the HP 3325B one of the most versatile sources for bench or ATE system applications. Save-recall memory includes 10 nonvolatile memory locations for simple and rapid access to frequently used test setups.

Discrete Sweep

The enhanced feature set of the HP 3325B includes 100-segment discrete sweep capability which allows arbitrarily defined multi-segment linear or stepped sweeps and tone sequences. This compliments its linear and log, phase continuous sweep capability.

Internal Modulation Source

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 with 1 μHz resolution for use as a precision, high-resolution clock signal, and extended frequency coverage.

ATE Systems Compatibility

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 μHz to 20.999 999 999 MHz
Square: 1 μHz to 10.999 999 999 MHz
Triangle/ramps: 1 μHz to 10.999 999 999 kHz
Resolution: 1 μHz, < 100 kHz
1 mHz ≥ 100 kHz
Accuracy: $\pm 5 \times 10^{-6}$, 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 Option 002, except by internal cable change.

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

Function	Sine		Square		Triangle/Ramps	
Units Displayed	min	max	min	max	min	max
peak-peak	1.000 mV	10.00 V	1.000 mV	10.00 V	1.000 mV	10.00 V
rms	0.354 mV	3.536 V	0.500 mV	5.000 V	0.289 mV	2.887 V
dBm (50 Ω)	−56.02	+23.98	−53.01	+26.99	−57.78	+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 Vpp; ±0.2 dB, <3 Vpp
100 kHz to 20 MHz: ±0.4 dB, ≥3 Vpp; ±0.6 dB, 0.1 to 3 Vpp

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 Option 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	

Square wave characteristics
Rise/fall time: ≤20 ns, 10% to 90% at full output
Overshoot: ≤5% of peak-to-peak amplitude, at full output
Settling time: <1 μs to settle to within .05% of final value

DC 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 (0 to 21 MHz carrier frequency)
Sensitivity: ±5 V peak for 100% modulation

Sine wave phase modulation
Range: ±850°, ±5 V input
Modulation frequency range: dc −5 kHz

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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 of the main signal output for the waveform in use, except minimum log start frequency is 1 Hz.
Phase continuity: Sweep is phase continuous over the full frequency range of the main output.

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 kΩ 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, under range coverage to 19.000 000 001 MHz, frequency selection from front panel; 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 V dc linear ramp proportional to sweep frequency, linearity, 10-90%, ± 0.1% of final value

MATE/CIIL Compatibility

For MATE system applications, Option H05 provides internal CIIL compatibility.

Option 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.

Option 002 high voltage output

Frequency range: 1 μHz to 1 MHz
Amplitude
Range: 4.00 mVpp to 40.00 Vpp (≥500 Ω, ≤ 500 pF load)
Accuracy: ± 2% of full output for each range at 2 kHz
Output impedance: < 2 Ω at dc, < 10 Ω at 1 MHz
dc offset range: 4 times the specified range of the standard instrument.

General

Operating environment
Temperature: 0° C to 55° C
Relative humidity: 95%, 0° C to 40° C
Altitude: ≤ 15,000 ft
Power: 100, 120, 220, 240 V, +5%, −10%, 48 to 66 Hz; 90 VA, 120 VA with all options; 10 VA standby
Weight: 9 kg (20 lb) net; 14.5 kg (32 lb) shipping
Size: 132.6 mm H × 425.5 mm W × 497.8 mm D (5.25 in × 16.75 in × 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

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