

FREQUENCY, FUNCTION & WAVEFORM SYNTHESIZERS

Two Channel Synthesizer, DC to 13 MHz

HP 3326A

429



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HP 3326A Two-Channel Synthesizer

The HP 3326A Two-Channel Synthesizer combines two independent synthesizers, flexible modulation and control circuitry into a single, powerful package. This single instrument provides precise phase offset, two-tone sweep, fast frequency switching, internal modulation, and pulse signals for bench or systems use.

With multiple channels and modes, the HP 3326A does the job of several sources. Phase continuous sweeps are available in linear and multielement discrete modes. DC offset is available in all modes, and all outputs are floating. Frequency resolution is 11 digits, with flexible triggering for frequency, amplitude and phase changes and sweeps.

Complete Two-Phase, Two-Tone

The HP 3326A can provide two signals with phase is adjustable to 0.01° and calibrated to 0.2°. This is possible anywhere in the 13 MHz frequency range without an external phasemeter.

The HP 3326A is also the single-source answer for producing a wide variety of broadband two-tone signals. The two channels can be offset up to ±100 kHz in the CW mode or while sweeping, from separate outputs or the built-in signal combiner.

High Performance Modulation and Pulses

Amplitude and phase modulation are easy with the two-channel HP 3326A. One channel can modulate the other or each channel can be used with simultaneous AM and PM.

In the pulse mode, both pulse and pulse-complement outputs are provided. Symmetry range is 1 to 99% in 0.1% steps. In addition, both pulse amplitudes and their offsets can be set independently.

Specifications Summary

For complete specifications, refer to the HP 3326A data sheet.

Operating modes

Two channel: channels A and B are independent.

Two-phase: channels A and B are the same frequency, with calibrated phase offset between the two signals.

Two-tone: channel B frequency offset 0 to 100 kHz from channel A frequency.

Pulse: channel B is the complement of channel A.

Frequency (waveforms are sine, square, pulse, and dc)

Range: 0 Hz to 13 MHz.

Resolution: 1 μHz below 100 kHz, 1 mHz at and above 100 kHz. Stability: ± 5x10⁻⁶/year, 20° to 30°C. See also option 001, High Stability Frequency Reference.

Accuracy: ± 5x10⁻⁶/year, 20° to 30°C, at time of calibration with standard frequency reference. Integrated phase noise: -63 dBc (Option 001 only, for a 30 kHz band centered on a 10 MHz carrier excluding ±1 MHz about the carrier).

Sinewave spectral purity

Harmonics: harmonically related signals will be less than the following levels relative to the fundamental, or -90 dBm, whichever is greater:

	10 Hz	50 Hz	100 kHz	1 MHz	13 MHz
+23.98 dBm					
+13.98 dBm	-80 dBc	-70 dBc	-55 dBc	-30 dBc	
-36.02 dBm	-80 dBc	-80 dBc	-65 dBc	-50 dBc	
-56.02 dBm					

Output amplitude (sine mode)

Range: 1 mVpp to 10 Vpp in 8 ranges without DC offset. See also option 002 High Voltage Output.

Units: volts peak-to-peak, Volts rms, dBm 50Ω, dBV.

Accuracy: relative to programmed value after self-calibration

	0.001 Hz	100 kHz	1 MHz	13 MHz
+23.98 dBm				
+3.98 dBm	±0.1 dB	±0.3 dB	±0.6 dB	
-36.02 dBm	±0.2 dB	±0.5 dB	±0.8 dB	
-56.02 dBm	±0.2 dB	±0.5 dB	±1.0 dB	

Squarewave and pulse characteristics

Rise/fall time: ≤15 ns, 10% to 90% at full output.

Overshoot: ≤5% of peak-to-peak amplitude at full output.

Pulse width range: 1% to 99% of period or 20 ns, whichever is greater.

DC Offset

Range: (See also option 002, high voltage output).

dc only: 0 to ±5 V.

dc+ac: dc+ac peak ±5V; Max. dc offset is affected by ac range, maximum is ±4.5 V decreasing to ±4.5 mV on lowest range.

Phase offset

(channel A vs B in two-phase mode)

Range: ±720 degrees.

Resolution: 0.01 degree.

Accuracy: after self-calibration, for equal-level sinewaves 1 V to 10 V peak-to-peak.

0.1 Hz to 10 Hz ±0.5 degrees

10 Hz to 100 kHz ±0.2 degrees

100 kHz to 1 MHz ±0.3 degrees

1 MHz to 13 MHz ±2.0 degrees

Amplitude, phase modulation

Both channels can be modulated externally or channel B can be used to modulate channel A.

Waveforms: sine, square, or (external only) pulse, dc, etc.

Frequency range:

Carrier: dc to 13 MHz

Modulation: dc-100 kHz (AM), dc-5 kHz (PM)

Frequency sweep

Sweep types: linear, discrete (2-63 discrete elements)

Sweep time: 5 ms to 1000 s, Linear or per element.

Frequency reference (10 MHz)

+3 dBm output to lock other instruments to the HP 3326A

+3 dBm oven-stabilized reference output (Opt 001 only)

1, 2, 5, 10 MHz reference input; 0 to +20 dBm

Output combiner

Channel A and B are combined on the channel A output.

HP-IB remote control

Compatible with IEEE standard 488-1978.

Option 001 High Stability Frequency Reference

Stability: ±5x10⁻⁸/week after 72 hours continuous operation.

±1x10⁻⁷/month after 15 days continuous operation. Option 002

High Voltage Output

Frequency range: dc to 1 MHz

Amplitude range: 4 mV to 40 Vpp into > 1k Ω, < 200 p Fload.

dc offset: ±20 V, independent of amplitude range. dc + ac peak must not exceed 20V.

General

Power: 100/120/220/240 V, +5%, -10%, 48 to 66 Hz; 290 VA max.

Weight: net, 2kg (60lb); shipping, 37kg (81lb)

Size: 177H x 425.5W x 497.8mmD (7" x 16 3/4" x 19 5/8")

Ordering Information

HP 3326A Two-Channel Synthesizer

Opt 001 High Stability Frequency Reference

Opt 002 High Voltage Output

Opt 003 Rear Terminal Outputs (Rear only)

Opt W30 Extended Repair Service. See page 725.

Price

\$10,250

+ \$665

+ \$305

\$0

+ \$250