KEYSIGHT TECHNOLOGIES (AGILENT HP)

3326A

The HP 3326A is a high-performance two-channel synthesized function generator from Keysight Technologies (formerly Agilent / Hewlett-Packard). It integrates two independent synthesizers into a single instrument under microprocessor control, enabling versatile multi-channel signal generation, coordinated sweeps, and precise phase offset control.

SPECIFICATIONS

General

Interfaces	HP-IB (GPIB)
Display	LED

Physical

Power Supply	100 / 120 / 220 / 240 V AC (selectable), 48 - 66 Hz
Operating Temperature	0 to 55 °C °C
Dimensions (W×H×D)	425.5 mm × 132.6 mm × 497.8 mm mm
Weight	19 kg kg

Frequency Characteristics

Frequency Range (Sine)	1 µHz to 13 MHz
Frequency Range (Square)	1 µHz to 1 MHz
Frequency Resolution (below 100 kHz)	1 µHz
Frequency Resolution (at or above 100 kHz)	1 mHz
Available Waveforms	Sine, Square, and DC

Amplitude and DC Offset

AC Amplitude Range	1 mV to 10 Vp-p
DC Offset Range	±4.5 mV to ±4.5 V (dependent on selected AC amplitude)
Output Impedance	50 Ω
DC Offset Availability	Can be added to either output in any mode

Dual-Channel and Phase Control

Operating Modes	Two-Channel, Two-Tone, Two-Phase, Pulse
Two-Channel Mode	Channels A and B operate independently
Two-Tone Mode	Channel B frequency must be within 100 kHz of Channel A
Two-Phase Mode	Channels A and B operate at the exact same frequency with a calibrated phase difference
Pulse Mode	Channel B is the complement of the Channel A output
Channel-to-Channel Phase Offset Range	±720°
Phase Resolution	0.01°

Modulation and Sweep Capabilities

Modulation Types	Amplitude Modulation (AM), Phase Modulation (PM)
Internal Amplitude Modulation	Available on Channel A in Two-Channel mode (Channel B as sine/square source)
External Amplitude Modulation	Available on all modes, independent for each channel
Internal Phase Modulation	Available on Channel A in Two-Channel mode (Channel B as source)
External Phase Modulation (Two-Channel)	Available on either or both channels
External Phase Modulation (Other Modes)	Applied to both channels simultaneously
Synchronous Phase Modulation	Available on both channels in Two-Tone, Two-Phase, and Pulse modes
Sweep Types	Linear (Linear Ramp, Triangular) and Discrete
Sweep Phase Continuity	Phase continuous frequency sweep
Linear Sweep Directions	Frequency can increase or decrease (up-down continuous in Triangular mode)
Discrete Sweep Sequence Capacity	Up to 63 frequency pairs
Discrete Sweep Switching Time (<1 MHz change)	Typically 10 ms
Coordinated Sweeping	Microprocessor-controlled coordinated sweeping of both outputs

Options

Option 002 High Voltage Frequency Range	DC to 1 MHz
Option 002 High Voltage Amplitude Range	4 mV to 40 Vp-p
High Stability Timebase Option	Option 001
High Voltage Output Option	Option 002

Timebase and Reference Oscillator

External Reference Input	1, 2, 5, or 10 MHz
Reference Output	10 MHz

System Interfaces and Control

Instrument Calibration	Microprocessor-controlled internal self-calibration
Microprocessor Control	Simultaneous control of both synthesizers with simplified operation

Performance

Harmonic Distortion (Sine)	≤ -80 dBc (0.1 Hz to 100 Hz), ≤ -70 dBc (100 Hz to 100 kHz), ≤ -50 dBc (100 kHz to 1 MHz), ≤ -40 dBc (1 MHz to 13 MHz)
Spurious Signals (Non-Harmonic)	≤ -80 dBc
Phase Noise	≤ -115 dBc/Hz at 10 kHz offset from carrier
Amplitude Flatness (Sine)	±0.1 dB (100 Hz to 100 kHz, relative to 10 kHz)

Standard Timebase

Reference Output Frequency	10 MHz
Reference Output Level	≥ 0 dBm into 50 Ω
Aging Rate	±5 × 10^-6 per year

High Stability Timebase (Option 001)

Option 001 Aging Rate	±5 × 10^-10 per day (after 72 hours warm-up)
Option 001 Temperature Stability	±1 × 10^-8 (0 °C to 55 °C)

Rear Panel Connections

External Modulation Inputs	BNC, AM and PM inputs for Channel A and Channel B
Sweep Control Outputs	BNC, X-Drive (0 to 10 V sweep voltage ramp) and Z-Blank (TTL)
External Sweep Trigger Input	BNC, TTL-compatible

Sweep

Sweep Time Range (Linear)	20 ms to 1000 s
Sweep Time Range (Log)	1 s to 1000 s

Inputs & Outputs

Sweep X-Drive Output	0 to +10 V ramp
Rear Panel Sync Outputs	TTL compatible into ≥ 50 Ω, 0.1 Hz to 13 MHz
Z-Axis Blanking Output	TTL level
Marker Output	TTL level

Modulation

AM Modulation Depth Range	0% to 100%

Reference & Timebase

Standard Timebase Temperature Stability	±5 × 10^-6 (0 °C to 55 °C)

Power Requirements

Power Consumption	150 VA maximum
Line Voltage Selection	100 V / 120 V / 220 V / 240 V (selectable, +5% to -10%)
Line Frequency Range	48 Hz to 66 Hz

Environmental

Operating Humidity	< 95% relative humidity (0 °C to 40 °C)
Storage Temperature	-40 °C to +75 °C

Interfaces

GPIB Interface Functions	SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0, E1

TECHNOLOGY

Synthesized Function Generator

APPLICATIONS

Coordinated multi-channel signal generation, two-tone testing, and phase-locked signal simulation