

KEYSIGHT TECHNOLOGIES (AGILENT HP)

33522A

The Keysight (formerly Agilent) 33522A is a 30 MHz, 2-channel function and arbitrary waveform generator belonging to the 33500 Series. It utilizes a true point-by-point arbitrary waveform generation technology to achieve exceptional signal fidelity, low jitter, and alias-protected arbitrary waveforms. It offers differential and combined dual-channel modes, making it highly versatile for dual-tone multi-frequency (DTMF) testing and complex differential signal generation.

SPECIFICATIONS

General

Interfaces	USB 2.0, LAN (LXI Class C compliant), GPIB (optional)
Display	4.3-inch color TFT graphical display, 480 × 272 resolution

Physical

Power Supply	100 V to 240 V (±10%) @ 50 Hz to 60 Hz; 100 V to 120 V @ 400 Hz; max power consumption < 75 VA
Operating Temperature	0 °C to 55 °C °C
Dimensions (W×H×D)	261.2 mm × 103.8 mm × 303.2 mm (with bumpers and handle) mm
Weight	3.4 kg kg

Channel Characteristics

Number of Channels	2
Channel Operating Modes	Independent, coupled (frequency and/or amplitude), differential, combined
Channel-to-Channel Isolation	None (channels share common ground)
Dual-channel Coupling Modes	Frequency, Amplitude, Offset, Phase Tracking, Inverted, and Channel Swap

Waveform Generation

Standard Waveforms	Sine, Square, Ramp, Pulse, Triangle, Noise, PRBS, DC
Arbitrary Waveform Sampling Rate	250 MSa/s
Vertical Resolution	16-bit
Arbitrary Waveform Memory Depth	1 MSa/channel (standard), 16 MSa/channel (optional)

Frequency Specifications

Sine Frequency Range	1 μ Hz to 30 MHz
Square and Pulse Frequency Range	1 μ Hz to 30 MHz
Ramp and Triangle Frequency Range	1 μ Hz to 200 kHz
Frequency Resolution	1 μ Hz
Timebase Stability (Standard)	± 1 ppm (TCXO)
Timebase Stability (Optional)	± 0.1 ppm (OCXO)

Sine Wave Distortion and Purity

Total Harmonic Distortion (THD)	< 0.04% (up to 20 kHz)
Phase Noise	-115 dBc/Hz @ 10 kHz offset (typical, 10 MHz carrier)

Pulse & Square Wave Characteristics

Pulse and Square Jitter (RMS)	< 40 ps
Rise/Fall Time (Square/Pulse)	< 8.4 ns
Pulse Width Range	16 ns to 1,000,000 s

Amplitude and Output Characteristics

Amplitude Range (into 50 Ω)	1 mVpp to 10 Vpp
Amplitude Range (into Open Circuit)	2 mVpp to 20 Vpp
Output Impedance	50 Ω (nominal)

Modulation, Sweep, and Burst

Modulation Types	AM, FM, PM, FSK, BPSK, PWM
Sweep Type	Linear, Logarithmic
Burst Type	Triggered, Gated

Clock, Trigger, and Synchronization

External Reference Input Frequency	10 MHz
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Amplitude

Offset Range (50 Ω)	± 5 V
Offset Range (Open Circuit)	± 10 V
Offset Accuracy	$\pm (1\% \text{ of setting} + 0.5\% \text{ of amplitude} + 2 \text{ mV})$
Amplitude Flatness (< 10 MHz)	± 0.1 dB (relative to 1 kHz)
Amplitude Flatness (10 MHz to 30 MHz)	± 0.15 dB (relative to 1 kHz)
Amplitude Resolution	4 digits

Phase

Phase Range	-360° to +360°
Phase Resolution	0.001°

Spurious & Harmonic Performance

Spurious (Non-Harmonic) (< 10 MHz)	<-75 dBc (typical)
Spurious (Non-Harmonic) (10 to 30 MHz)	<-70 dBc (typical)

Square & Pulse Performance

Square/Pulse Overshoot	< 4% (typical)
Pulse Duty Cycle Range	0.01% to 99.99% (frequency dependent)

Modulation, Sweep & Burst

FM Max Deviation	15 MHz
Sweep Time Range	1 ms to 250,000 s

Arbitrary Waveform Options

Arbitrary Waveform Memory (Standard)	1 MSa per channel
Arbitrary Waveform Memory (Optional)	16 MSa per channel (Option MEM)

Sync Output

Sync Output Level	TTL compatible into > 1 k Ω
Sync Output Impedance	50 Ω nominal

External Inputs & Outputs

External Modulation Input Range	± 5 V full scale
External Modulation Input Impedance	5 k Ω
External Modulation Bandwidth	150 kHz
External Trigger Input Impedance	> 10 k Ω
External Trigger Input Level	TTL compatible
Trigger Output Level	TTL compatible into > 1 k Ω
Trigger Output Impedance	50 Ω nominal

General & Environmental

Storage Temperature Range	-30 °C to 70 °C
Warm-up Time	1 hour
LXI Compliance	LXI Class C (LXI Core 2011)
Command Language	SCPI-1999, IEEE-488.2

Physical & Environmental

Maximum Floating Voltage	42 Vpk relative to earth ground
Operating Humidity Range	5% to 80% RH (non-condensing)
Operating Altitude	Up to 3,000 meters
Storage Altitude	Up to 15,240 meters

Noise Waveform Performance

Noise Bandwidth	30 MHz
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Modulation Characteristics

AM Modulation Depth Range	0% to 120%
AM Modulation Source	Internal, External, or Other Channel

Trigger Characteristics

Trigger Sources	Internal, External, Manual, Bus
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Compliance

Safety Compliance	EN 61010-1, UL 61010-1, CAN/CSA-C22.2 No. 61010-1
EMC Compliance	EN 61326-1, ICES-001, AS/NZS CISPR 11

TECHNOLOGY

Direct Digital Synthesis & Trueform technology

APPLICATIONS

Dual-tone multi-frequency (DTMF) testing, cardiac device testing, differential signal generation, general-purpose electronic testing

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