KEYSIGHT TECHNOLOGIES

Waveform and Function Generator Solutions Catalog

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Waveform and Function Generator Solutions

GAIN DEEPER MEASUREMENT INSIGHTS WITH TRUEFORM TECHNOLOGY

Keysight's Trueform technology provides key advantages over direct digital synthesis (DDS), the incumbent technology used in today's waveform generators. Trueform's benefits include a lower waveform jitter for less test uncertainty and a true representation of the selected waveform, rather than an approximation.

GET SUPERIOR SIGNAL FIDELITY

Trueform technology gives you the highest resolution, lowest distortion, and lowest jitter when compared to DDS function / arbitrary waveform generators at a comparable price.

Our Trueform technology embedded in the Keysight 33600A / 33500B Series represents the next leap in waveform generation to give you a predictable low-noise waveform without any skipped waveform points.

- Generate the full range of signals you need for the most demanding measurement.
- Test your devices with confidence knowing the waveform generator is outputting the signals you require and expect.
- Select just the capabilities you want now, then upgrade easily when your requirements change.

33500B Series
Waveform Generator

GENERATE WAVEFORMS FASTER WITH KEYSIGHT PATHWAVE BENCHVUE PC SOFTWARE

BenchVue PC software applications for the 33600A / 33500B Series waveform generators can help you configure a wide range of controls and measurements.

- Easily connect, record results, and visualize measurements across multiple instruments simultaneously, without the need for programming.
- Quickly create automated test sequences with minimal instrument knowledge.
- Get easy access to extensive data, screen captures, trace, and measurement logging capabilities.
- Export your data in multiple formats in just a few clicks.

Pathwave BenchVue Software Suite

Gain Accurate Measurement Insights

Keysight's exclusive Trueform technology gives you the confidence to produce the exact waveforms you need with best-in-class signal fidelity, surpassing the performance of direct digital synthesis (DDS) technology.

With Trueform Series waveform and function generators, you can define any waveform shape and length with point-by-point arbitrary waveform capability. Anti-aliasing technology ensures your waveforms are accurate and playable at any rate you select. Play signals, as defined, at the exact sample rate, without missing short-duration anomalies critical for testing device reliability.

BETTER SIGNAL INTEGRITY

Get the waveform you want, regardless of frequency or sample rate. Get the highest signal fidelity so you can generate the exact waveforms you need for your most challenging measurements.

LOWER HARMONIC DISTORTION

Measure your design characteristics, not those of your waveform generator. Trueform wave generators offer up to 5x better fidelity than other generators with clean, spurious-free signals that will not introduce noise or artifacts.

REDUCED JITTER

Less jitter gives you an exceptionally low phase noise for the most accurate representation of signals. With better jitter performance, you can place edges more accurately to reduce timing errors in your circuit design.

VARIABLE BANDWIDTH NOISE

Adjust the bandwidth of the built-in noise generator to control the frequency content of your signal. Trueform lets you test with clean, precise, low-noise signals.

WAVEFORM SUMMING AND COMBINING CAPABILITY

Create dual-tone multifrequency signals without a dual-channel generator. On a two-channel model, you can sum and combine up to four signals.

ENABLED WITH KEYSIGHT PATHWAVE BENCHVUE SOFTWARE

Intuitively control your waveform generators, build automated tests, and design custom waveforms from your PC with easy-to-use creation tools. BenchVue Waveform Builder Pro enables you to sequence multiple waveforms together.

CLEAN, LOW-DISTORTION, STABLE, AND RELIABLE SIGNALS

The 33500B Series waveform generators provide unmatched capabilities for generating a broad range of signals for the most demanding measurements. The 33500B Series waveform generators with exclusive Trueform signal generation technology offers more capability, fidelity, and flexibility than traditional direct digital synthesis (DDS) generators.

- Get up to 250 MSa/s sampling rate for higher time resolution arbitrary waveforms.
- Experience less than 40 ps jitter — 10x better than DDS generators.
- Generate true point-by-point arbitrary waveforms with sequencing for an accurate representation of user-defined signals.
- Create pure signal sine waves with 5x lower harmonic distortion.
- Achieve greater amplitude accuracy with 16-bit resolution with 1 mV_{PP} to 10 V_{PP} amplitude.

33500B Series
Waveform Generator

View all function generators

Model	33509B	33510B	33511B	33512B	33519B	33520B	33521B	33522B
Number of channels	1	2	1	2	1	2	1	2
Frequency	20 MHz				30 MHz			
Standard waveforms	Sine, square, ramp, pulse, triangle, Gaussian noise, PRBS (pseudorandom binary sequence), DC							
Arbitrary waveforms	Optional arbitrary waveforms		Trueform arbitrary waveforms with sequencing; 1 MSa / channel standard, 16 MSa / channel optional		Optional arbitrary waveforms		Trueform arbitrary waveforms with sequencing; 1 MSa / channel standard, 16 MSa / channel optional	
Sampling rate, resolution	160 MSa / second, 16 bits				250 MSa / second, 16 bits			
Modulation types	Amplitude modulation (AM), frequency modulation (FM), phase modulation (PM), fequency-shift key modulation (FSK), binary phase-shift key modulation (BPSK), pulse width modulation (PWM), sum (carrier and modulation)							
Burst	Counted or gated							
Sweep	Linear, logarithmic, and frequency list							
Total harmonic distortion and jitter	< 0.04% Total harmonic distortion (THD) and < 40 ps jitter (rms)							
Timebase	Temperature compensated crystal oscillator (TCXO) standard, oven controlled crystal oscillator (OCXO) - optional for higher stability							
Options and security	National Industrial Security Program Operating Manual (NISPOM) and file security, OCXO high-stability time base							
Connectivity	Universal serial bus (USB), local area network (LAN), general purpose interface bus (GPIB)							

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EASILY GENERATE SIGNALS

The 33600A Trueform Series waveform generators provide unmatched capabilities for generating a full range of signals for your most demanding measurements. These waveform generators with exclusive Trueform signal generation technology offers more capabilities, fidelity, and flexibility than traditional direct digital synthesis (DDS) generators. Trueform technology provides an alternative that blends the best of DDS and point per clock architectures to give you the benefits of both without the limitations of either.

- Get higher time resolution arbitrary waveforms with sampling rates up to 1 GSa/s.
- Reduce timing errors in your circuit design with less than 1ps jitter — 200x better than DDS generators.
- Create pure signal sine waves with 5x lower harmonic distortion.
- Achieve greater amplitude accuracy with 14-bit resolution with 1 V_{pp} to 10 V_{pp} amplitude.
- Simplify the operation of a 2-channel function generator with dual-channel coupling.

33600A Trueform Series
Waveform Generator

View all function generators

Model	33611A	33612A	33621A	33622A
Number of channels	1	2	1	2
Frequency	1 µHz to 80 MHz sine		1 µHz to 120 MHz sine	
Standard waveforms	Standard on all models: Sine, square, ramp, pulse, triangle, Gaussian noise, PRBS, and DC I/Q baseband standard for 2-channel arbitrary capable models only. Not available for 1-channel models.			
Arbitrary waveforms	Trueform arbitrary waveforms with sequencing, 4 MSa / channel memory, optional 64 MSa / channel			
Sampling rate, resolution	660 MSa / second, 14-bit		1 GSa / second, 14-bit	
Modulation types	Amplitude modulation (AM), frequency modulation (FM), phase modulation (PM), frequency-shift key modulation (FSK), binary phase-shift key modulation (BPSK), pulse width modulation (PWM), sum (carrier and modulation)			
Burst	Counted or gated			
Sweep	Linear, logarithmic, and frequency list			
Total harmonic distortion and jitter	< 0.03% THD and < 1 ps jitter			
Time base	Temperature-compensated crystal oscillator (TCXO) standard, oven-controlled crystal oscillator (OCXO) optional for higher stability			
Options and security	National Industrial Security Program Operating Manual (NISPOM) and file security, OCXO high-stability time base			
Connectivity	Universal serial bus (USB), local area network (LAN), general-purpose interface bus (GPIB)			
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Performance Meets Versatility

33210A Waveform
and Function Generator

The Keysight 33210A waveform and function generator brings uncompromising performance to an entry-level instrument. Get all the basic functions and waveforms with the most stable, lowest distortion function generator in its class. The 33210A can generate primary waveforms, and an optional upgrade is available so you can generate 8 K points of complex arbitrary waveforms.

- Get fast rise and fall times up to 10 MHz with ramp waves up to 100 kHz 10 MHz sine and square waveforms.
- Perform internal AM, FM, and pulse width modulation to generate variable-width pulses without the need for a separate modulation source.
- Use the easy-to-use front panel operation with graphical display for visual verification of signal settings, softkeys, and number pad.
- Measure high fidelity waveforms, including sine, square, pulse, triangle, noise, and ramp.
- Perform programming using SCPI commands along with standard GPIB, LAN, and USB interfaces.

View all function generators

Features	33210A
Number of channels	1
Frequency	1 MHz to 10 MHz
Standard waveforms	Pulse, ramp, triangle, noise, and DC waveforms
Arbitrary waveforms	Built-in arbitrary waveforms (available with Option 002 ARB)
Sampling rate, resolution	14-bit resolution and a sampling rate of 50 MSa/s
Modulation types	Amplitude modulation (AM), frequency modulation (FM), and pulse width modulation (PWM) modulation type
Burst	Count from 1 to 50,000 cycles, infinite, gated
Sweep	Linear or logarithmic
Total harmonic distortion	0.04% total harmonic distortion (THD) DC to 20 kHz
Connectivity	Connect via universal serial bus (USB), local area network (LAN), general-purpose interface bus (GPIB)

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EDU33210 SERIES 20 MHZ FUNCTION / ARBITRARY WAVEFORM GENERATOR

The Keysight EDU33210 Series function / arbitrary waveform generator offers the standard signals and features you expect — such as modulation, sweep, and burst. Additional features provide the capabilities and flexibility you need to get your job done quickly, no matter how complex. An intuitive, information-packed front-panel interface enables you to easily resume where you left off.

- 7-inch color display for simultaneous parameter setup, signal viewing, and editing
- six built-in modulation types and 17 popular waveforms to simulate typical applications for testing
- 16-bit arbitrary waveform capability with memory up to 8 M samples per channel
- USB and LAN input / output interface for remote connectivity

EDU33212A

View all function generators

Models and options	EDU33211A	EDU33212A
Number of channels	One	Two
Frequency	20 MHz	
Standard waveforms	Sine, square, ramp, pulse, triangle, Gaussian noise,(pseudrandom binary sequence(PRBS) DC	
Arbitrary waveforms	Cardiac, exponential fall, exponential rise, Gaussian pulse, haversine, Lorentz, D-Lorentz, negative ramp, sinc	
User-defined arbitrary	Up to 8 MSa per channel; with up to 1 MSa per waveform	
Sampling rate	1 µSa/s to 250 MSa/s, 1 µSa/s resolution	
Modulation types	AM, FM, PM, FSK, BPSK, PWM	
Pulse width	16 ns minimum (adjustable with 100 ps resolution)	
Duty cycle	0.01% to 99.99%, 0.01% resolution	
Total harmonic distortion	f_{out}= 10 Hz to 20 kHz: < 0.075%	
Jitter (rms) (measured) 4	≤ 5 MHz: 2 ppm of the period + 100 ps > 5 MHz: 100 ps	
Connectivity	Front-panel BNC, shell connected to chassis; all inputs and output BNC connectors are chassis referenced	

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