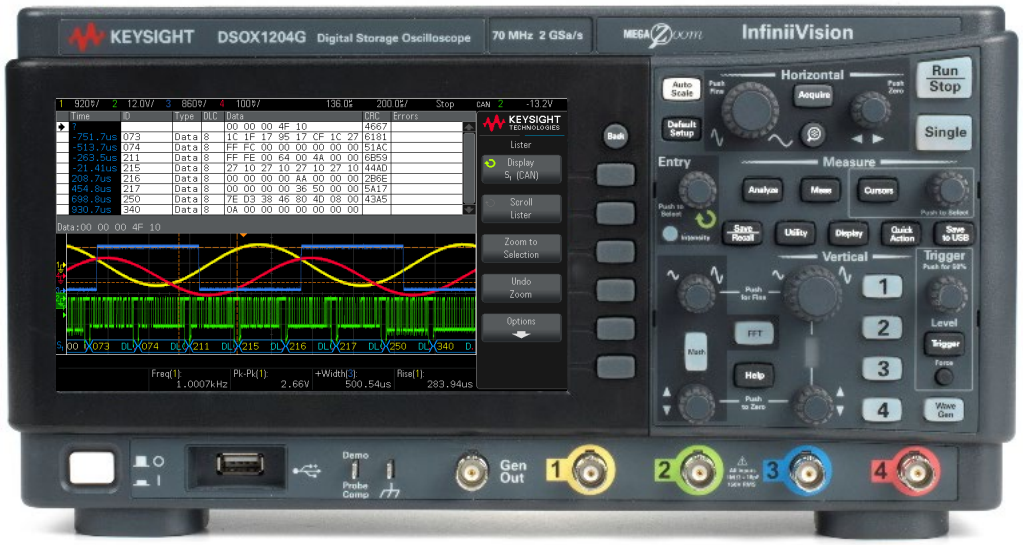
DATA SHEET

InfiniiVision 1000 X-Series Oscilloscopes

2-channel and 4-channnel models with 50 MHz to 200 MHz bandwidth



KEYSIGHT TECHNOLOGIES

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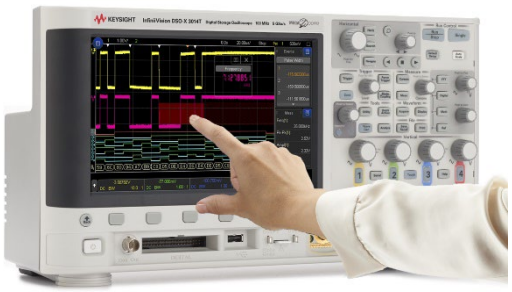
Need More Bandwidth, Sampling Rate, and Analysis?



Consider the InfiniiVision 3000T X-Series

- 350 MHz, 500 MHz and 1 GHz
- 5 GSa/s
- Uncompromised 1,000,000 waveform update rate
- Capacitive touch screen
- Industry exclusive zone touch trigger
- Additional serial decode/trigger
- Gated FFT

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Leading Technology in a Value-Priced Oscilloscope (DSOX models)

Keysight's InfiniiVision 1000 X-Series oscilloscopes are engineered to give you quality, industry-proven technology at unbelievably low prices. Now it's easy to get professional measurements and accessible expertise at your fingertips. Don't settle for less – and test to impress.

- 70 to 200 MHz bandwidth (DSOX models)
- Frequency response analysis (Bode gain & phase plots), included in models with WaveGen
- See more signal detail with 200,000 waveforms/sec update rate
- Have confidence in your measurements with Keysight-custom technology that leverages more than 60 years of oscilloscope expertise
- Test quickly and easily with a simple, intuitive user-interface and built-in help and training signals
- Get professional-level functionality with industry-leading software analysis including standard serial bus analysis for the most popular serial bus standards, and 6-in-1 instrument integration

	DSOX1202A 2 channels	DSOX1202G 2 channels with function generator	DSOX1204A 4 channels	DSOX1204G 4 channels with function generator
Bandwidth	70 MHz (base bandwidth) 100 MHz (D1202BW1A) 200 MHz (D1202BW2A)		70 MHz (base bandwidth) 100 MHz (D1200BW1A) 200 MHz (D1200BW2A)	
Analog channels	2		4	
External trigger	Front panel input (Displayable as a 3rd digital channel)		Back panel input (not displayed)	
Sample rate per channel (max)	2 GSa/s (one- or two-channel operation) 1 GSa/s (if external trigger view is turned on)		2 GSa/s (one- or half-channel[1] operation) 1 GSa/s (three- or four-channel operation)	
Memory depth per channel (max)	2 M points (one- or two-channel operation) 1 M points (if external trigger view is turned on)		2 M points (one- or half-channel[1] operation) 1 M points (three- or four-channel operation)	
WaveGen	Not available	20-MHz function generator	Not available	20-MHz function generator
Bode plot	Not available	Standard	Not available	Standard
Waveform update rate	200,000 waveforms per second			
Serial protocol analysis	Standard : I²C, SPI, UART/RS-232, CAN, LIN			
Segmented memory	Standard			
Mask/limit testing	Standard			
Built-in training signals	Standard			
Integrated digital voltmeter	Standard			
Frequency counter	Standard			
Waveform math	Add, subtract, multiply, divide, FFT (magnitude and phase), low pass filter			
Automatic measurements	14 amplitude, 14 timing, and 4 pulse count measurements			
Display	7-inch TFT LCD WVGA			
Connectivity	USB 2.0 (host and device), LAN			

1. Half-channel operation on a 4-channel model refers to two-channel operation when using channel-1 or channel-2 AND channel-3 or channel-4. Example: If viewing just channel-1 and channel-3, maximum sample rate is 2 GSa/s and maximum memory is 2 M points. But if viewing channel-1 and channel-2, maximum sample rate is 1 GSa/s and maximum memory is 1 M points.

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Leading Technology in a Value-Priced Oscilloscope (EDUX models)

EDUX1052A and EDUX1052G

Provide a quality education for students and prepare them for industry with professional level instruments. The 1000 X-Series leverages the same technology as our higher-end oscilloscopes, allowing students to learn on the same hardware and software being used in leading R&D labs. Don't settle for less – set your students up for success.

- Built-in training signals that enable students to quickly learn to capture and analyze signals.
- The educator's resource kit includes dynamic teaching labs; a comprehensive lab guide; a tutorial written specifically for undergraduate students; and an oscilloscope fundamentals PowerPoint slide set for professors and lab assistants.
- IoT systems design applied courseware. The 1000 X-Series oscilloscope can be used with the U3800A Internet of Things(IoT) Systems Design Applied Courseware.
- Bode plots are fundamental concepts. The 1000 X-Series' frequency response analyzer capability is the perfect tool to help students understand the gain and phase performance of passive RLC circuits or active op-amps (available in "G" model only).
- Optional DSOXBODE Bode plot training kit available. See page 8 for additional details.
- BenchVue Software with the BV0004B BenchVue Oscilloscope app (standard) lets you control and visualize the 1000X-Series and multiple measurements simultaneously.

	EDUX1052A 2 channels	EDUX1052G 2 channels with function generator
Bandwidth	50 MHz	
Analog channels	2 + 1 (ext. trigger viewable as digital channel)	
External trigger (or 3rd digital channel)	1	
Maximum sample rate	1 GSa/s (all channels)	
Maximum memory depth	200,000 points (all channels)	
Waveform update rate	100,000 waveforms per second	
WaveGen	Not available	20-MHz function generator
Bode plot	Not available	Standard
Serial protocol analysis	Standard: I²C, UART/RS-232	
Integrated digital voltmeter	Standard	
Frequency counter	Standard	
Built-in training signals	Standard	
Waveform math	Add, subtract, multiply, divide, FFT (magnitude and phase), low pass filter	
Automatic measurements	14 amplitude, 14 timing, and 4 pulse count measurements	
Display	7-inch TFT LCD WVGA	
Connectivity	USB 2.0 (host and device), LAN	

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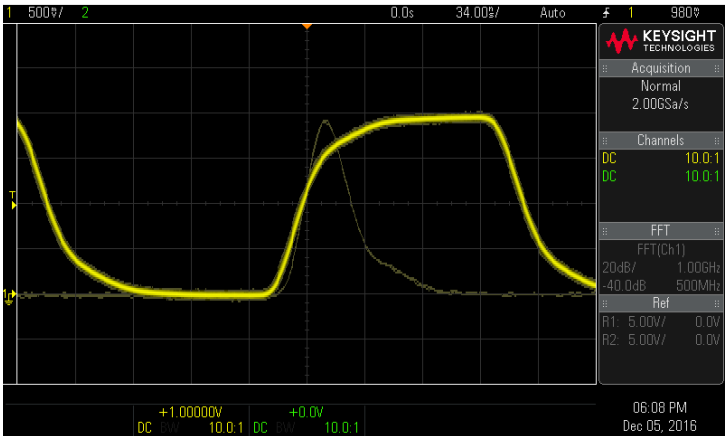
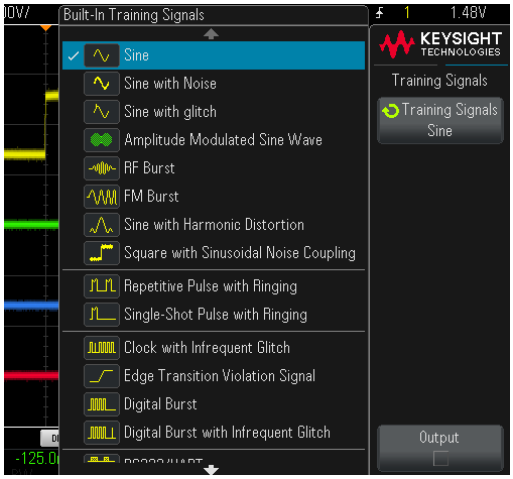
Leading Technologies

(Click on ▷ below to be redirected to videos on Keysight's YouTube channel)

Have confidence in your measurements with Keysight-custom technology that leverages more than 60 years of oscilloscope expertise.

Low-cost oscilloscopes don't have to be low quality. Designing premier test solutions has been the goal and passion of Keysight Technologies ever since we made our first oscillator in 1939, and now we're bringing you a professional-quality oscilloscope for a fraction of the price.





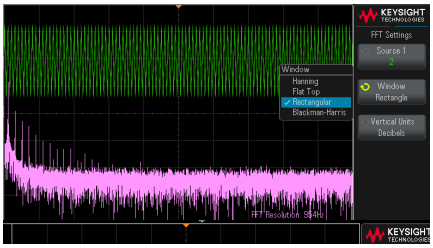
Up to 200,000 waveforms/sec update rate captures glitch easily.

▷ **Training Signals**

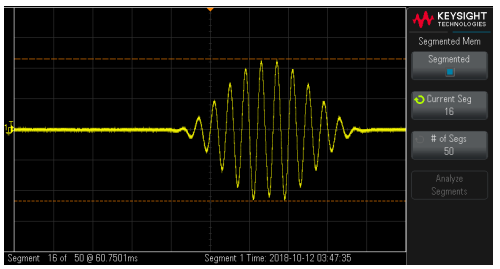
▷ **Superior Measurements**

▷ **Memory Performance**

▷ **FFT**



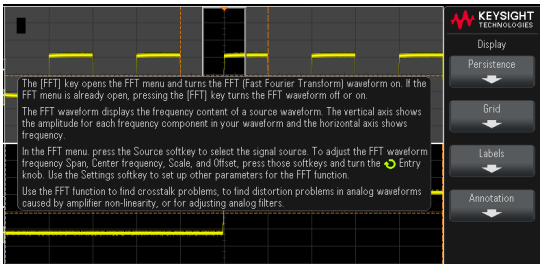
MegaZoom IV ASIC

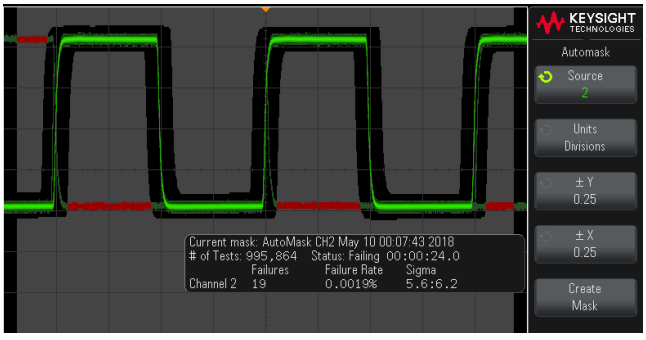


Segment Memory.

▷ **Mask test**

▷ **Intuitive Controls / Built-in Help**





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6-in-1 Instrument Integration

Get professional-level oscilloscope functionality with industry-leading software analysis and 6-in-1 instrument integration. The 1000 X-Series gives you the following functionality that will save you money and valuable bench space.

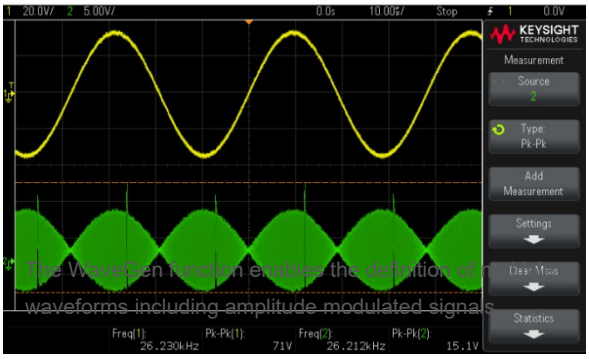
OSCILLOSCOPE

The 1000 X-Series is a family of low-cost oscilloscopes that don't compromise on quality. Each model has measurement and standard software analysis capability that rivals oscilloscopes 3x the price.

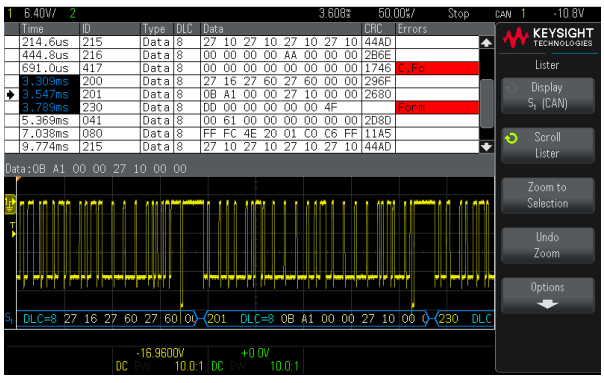
WaveGen (built-in 20 MHz function generator with modulation capability)

(EDUX1052G, DSOX1202G, and DSOX1204G models only)

The 1000 X-Series offers an integrated 20 MHz function generator with modulation capability. It's ideal for educational or design labs where bench space and budget are at a premium. The integrated function generator provides stimulus output of sine, square, ramp, pulse, DC and noise waveforms to your device under test. Add modulation to the signal with customizable AM, FM and FSK settings. No need to buy a separate function generator when you can get one integrated into your new oscilloscope.



Hardware-based serial protocol decode and triggering



The 1000 X-Series is a powerful protocol analyzer that enables hardware-based specialized serial communication analysis (standard). Other vendors' oscilloscopes use software post-processing techniques that slow down the waveform and decode update rate, but the 1000 X-Series has faster decoding based on hardware technology that enhances scope usability and the probability of capturing infrequent serial communication errors.

The EDUX models support I^2C and UART/RS232 (standard). The DSOX models support I^2C, SPI, UART/RS232, CAN and LIN (standard).

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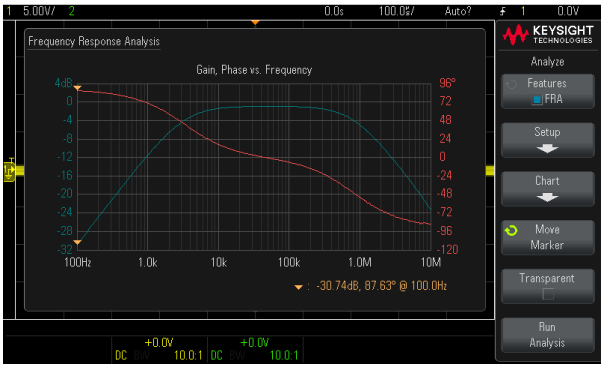
6-in-1 Instrument Integration (continued)

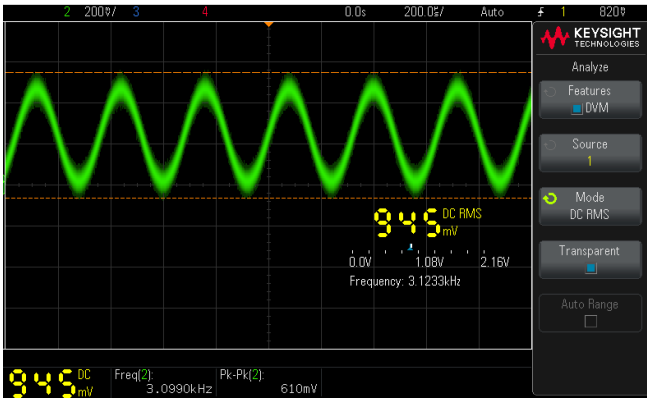
Frequency Response Analyzer (EDUX1052G, DSOX1202G, and DSOX1204G models only)



Frequency response analysis (gain & phase Bode plots) is a critical measurement to characterize amplifiers, passive networks, and power supply feedback networks. Bode plots are also fundamental concepts that every electrical engineering student should learn. The 1000 X-Series' frequency response analyzer capability (standard in "G" models) is the perfect tool to help students understand the gain and phase performance of passive RLC circuits and amplifiers. This capability is achieved with a gain and phase measurement versus frequency (Bode plot). Vector network analyzers (VNAs) and low-cost frequency response analyzers are typically used for these measurements, but now an easy-to-use and affordable gain and phase analysis is possible by utilizing the 1000 X-Series' built-in WaveGen and Bode plot capability.

Also available is the DSOXBODE Bode plot training kit along with a downloadable tutorial and lab guide for engineering students learning about frequency response measurements (Bode plots).

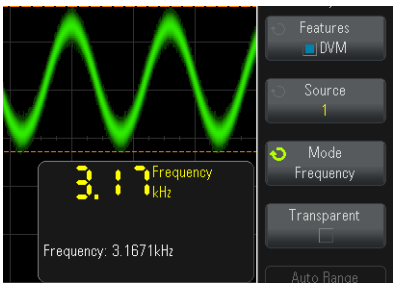
Digital Voltmeter



The 1000 X-Series has an integrated 3-digit voltmeter (DVM) inside each oscilloscope. The voltmeter operates through probes connected to the oscilloscope channels, but its measurement is decoupled from the oscilloscope triggering system so both the DVM and triggered oscilloscope measurements can be made with the same connection. You can quickly measure AC RMS, DC, and DC RMS without configuring the oscilloscope capture. The voltmeter results are always displayed, keeping these quick characterization measurements at your fingertips. The built-in DVM comes standard in 1000 X-Series oscilloscopes.

Frequency Counter

There is an integrated 5-digit frequency counter inside each oscilloscope. The frequency counter operates through probes connected to the oscilloscope channels so that both the counter and triggered oscilloscope measurements can be made with the same connection. You can quickly measure frequency without configuring the oscilloscope capture. The high-resolution frequency measurement results are always displayed, keeping these quick characterization measurements at your fingertips.



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More Productivity Tools

Localized GUI and help

Operate the oscilloscope in the language most familiar to you. The graphical user interface (GUI), built-in help system, front panel overlays, and user's manual are available in English, Simplified Chinese, Traditional Chinese, Japanese, Korean, French, German, Italian, Portuguese, Russian and Spanish. The GUI and front panel overlay are also available in Polish, Thai, and Czech, and the built-in help is also available in Polish and Thai during operation. Access the built-in help system by simply pressing and holding any button.

Probe solutions

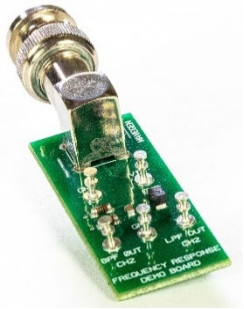
Get the most out of your 1000 X-Series oscilloscope by using the right probes and accessories for your application. Keysight offers a complete family of innovative probes and accessories for the InfiniiVision 1000 X-Series. InfiniiVision 1000 X-Series oscilloscopes come standard with switchable 1:1/10:1 high-impedance passive probes for each channel of the oscilloscope

Educator's Oscilloscope Training Kit

The Educator's Oscilloscope Training Kit (standard) provides an array of built-in training signals so that electrical engineering and physics students can learn what an oscilloscope does and how they can perform basic oscilloscope measurements. Also included in the kit is a comprehensive oscilloscope lab guide and tutorial written specifically for the undergraduate student. Keysight also provides a PowerPoint slide-set that professors and lab assistants can use as a pre-lab lecture on oscilloscope fundamentals. This lecture takes about 30 minutes and should be presented before electrical engineering and physics students begin their first circuits lab. Note that this PowerPoint slide-set also includes a complete set of speaker notes.

Bode Plot Training Kit

The DSOXBODE Bode plot training kit consists of a series R-L-C circuit board with a BNC input that attaches directly to the output of the oscilloscope's WaveGen function generator. There are clearly labeled test points for probing VIN and BPFOUT (bandpass filter output) or LPFOUT (low-pass filter output). Also included with this training kit is a comprehensive tutorial and lab guide that engineering students and professors can download. This training guide begins with a tutorial on frequency response measurements with fill-in-the-blank questions, and then provides step-by-step lab instructions on how to perform Bode plots. The DSOXBODE Bode plot training kit is compatible with all "G" model InfiniiVision 1000 X-Series oscilloscopes.



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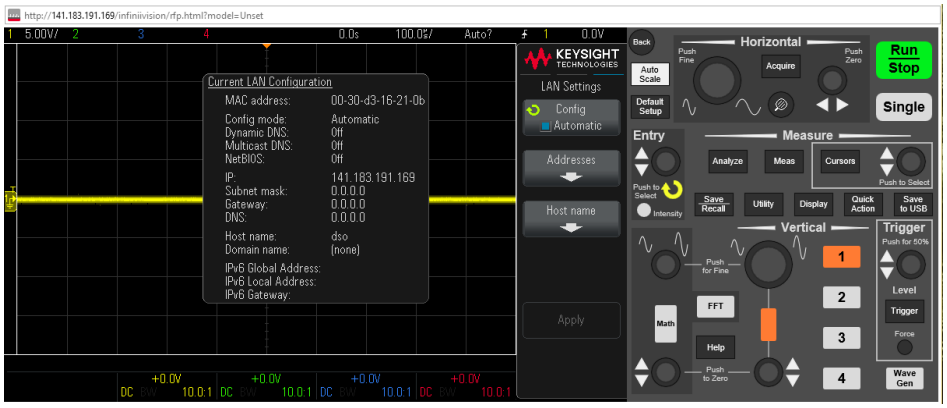
More Productivity Tools (continued)

Connectivity and remote control

Built-in USB host and USB device ports make PC connectivity easy. BenchVue Software with the BV0004B BenchVue Oscilloscope app (standard) lets you control and visualize the 1000 X-Series and multiple measurements simultaneously. Build automated test sequences just as easy as using your front panel. Save time with the ability to export measurement data to Excel, Word, and MATLAB in three clicks. Monitor and control your 1000 X-Series with a mobile device from anywhere.

Standard LAN port supports remote web-based virtual front panel to control and to save data or images.



Web-based virtual front panel.

Offline oscilloscope analysis software

Keysight's D9010BSEO Infiniium Offline PC-based oscilloscope analysis software lets you do additional signal viewing, analysis, and documentation tasks while you're away from your oscilloscope. You can capture waveforms on your scope, save to a file and recall the waveforms into the Infiniium Offline software on your PC.

BenchVue oscilloscope app

The Oscilloscope App within BenchVue (standard) enables control of oscilloscopes to quickly capture and annotate screen images, record trace data and data log measurements (included in model BV0000A). Build automated test sequences just as easy as using your front panel. Save time with the ability to export measurement data to Excel, Word, and MATLAB in three clicks. Monitor and control your 1000 X-Series with a mobile device from anywhere.

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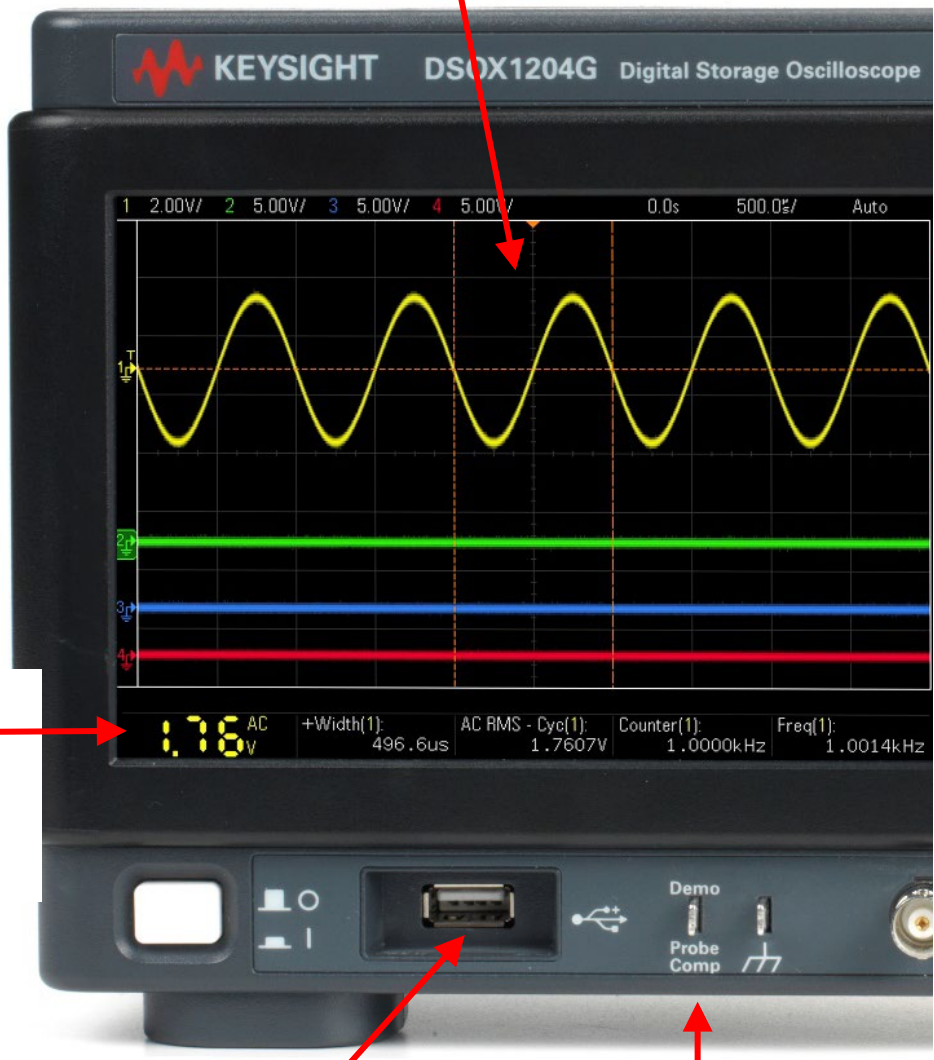
A real oscilloscope

Fast Waveform Update Rate

Fast 200,000 waveforms/sec update rate helps you quickly see random and infrequent signal glitches and errors



DVM/Counter

Integrated 3-digit voltmeter
5-digit frequency counter

USB

Screenshots and data can be quickly and easily saved with built-in USB port and your USB storage device.

Training Signals

Built-in education training kit signals with downloadable training guide.

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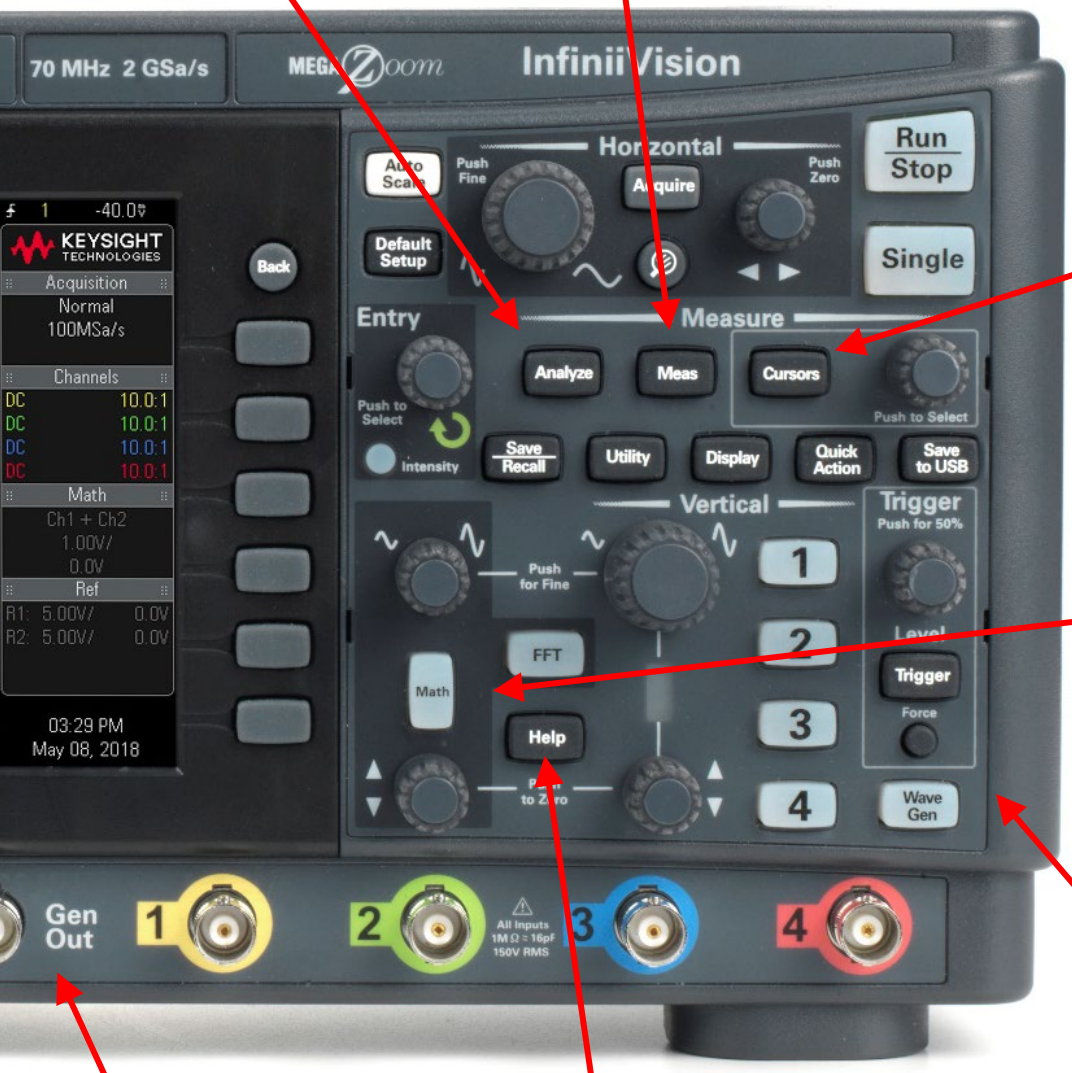
Measurements

Press the measure key to access 32 built-in automatic measurements

Analyze Features

Mask Limit Testing
DVM
Frequency Response Analysis
Serial Bus Decode
Reference waveforms (2)



Cursors

Custom measurements are easily accomplished by cursors. Measure any value or the difference using four powerful cursors

Waveform Math Tools

Quick access to waveform math (+ – × ÷), FFT (gain and phase), and low-pass filter.

Industry leading user Interface

Fast and easy operation with the common oscilloscope controls right at your fingertips.

Function Generator

Built-in generator enables you to generate the signals you need to quickly simulate your design and perform gain & phase Bode plots.

Built-in localized-help

All buttons provide instant access to language-localized help by simply holding down the button you want explained

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Performance Characteristics

Oscilloscope overview

	EDUX1052A/EDUX1052G	DSOX1202A/DSOX1202G	DSOX1204A/DSOX1204G
Bandwidth (–3 dB) [1, 2]	50 MHz	70 MHz	70 MHz
		100 MHz (option D1202BW1A)	100 MHz (option D1200BW1A)
		200 MHz (option D1202BW2A)	200 MHz (option D1200BW2A)
Calculated rise time (10 to 90%)	≤ 7 ns	≤ 5 ns (70 MHz base model)	≤ 5 ns (70 MHz base model)
		≤ 3.5 ns (with 100 MHz option)	≤ 3.5 ns (with 100 MHz option)
		≤ 1.7 ns (with 200 MHz option)	≤ 1.7 ns (with 200 MHz option)
Input channels	2	2	4
Maximum sample rate	1 GSa/s (all channels)	2 GSa/s (all channels) 1 GSa/s (if ext. trigger is displayed)	2 GSa/s (one- or half-channel[3] operation) 1 GSa/s (three- or four-channel operation)
Maximum memory depth	200 k points (all channels)	2 M points (all channels) 1 M points (if ext. trigger is displayed)	2 M points (one- or half-channel[3] operation) 1 M points (three- or four-channel operation)
Waveform update rate	≥ 100,000 waveforms/sec	≥ 200,000 waveforms/sec	≥ 200,000 waveforms/sec

Vertical system

	All Models
Input coupling	DC, AC (10 Hz cutoff frequency)
Input impedance/capacitance	1 MΩ ± 2%, 16 pF ±3 pF
Input sensitivity range[4]	500 µV/div to 10 V/div
Standard probes	N2142A 1/10 switchable 75 MHz (2 included in EDUX1052A/EDUX1052G) N2140A 1/10 switchable 200 MHz (2 included in DSOX1202A/DSOX1202G) N2140A 1/10 switchable 200 MHz (4 included in DSOX1204A/DSOX1204G)
Probe attenuation factor	0.1X to 10,000X in 1-2-5 sequence; (–20 dB to +80 dB in 0.1 dB steps)
Hardware bandwidth limits	Approximately 20 MHz (selectable)
Vertical resolution	8 bits
Invert signal	Selectable
Maximum input voltage	150 Vrms, 200 Vpk
DC vertical accuracy	± [DC vertical gain accuracy + DC vertical offset accuracy + 0.25% full scale]
DC vertical gain accuracy [1]	+3% full scale (≥ 10 mV/div)
	+4% full scale (< 10 mV/div)
DC vertical offset accuracy	± 0.1 div ± 2 mV ± 1% of offset setting
Skew	Channel to channel: 1 ns (without deskew)
	Channel to external: 2 ns (without deskew)
Offset range	500 uV/div to 200 mV/div: +2 V
	> 200 mV/div to 10 V/div: +100 V

1. Denotes warranted specifications; All others are typical. Specifications are valid after a 30-minute warm-up period and from ± 10 °C user calibration temperature.
2. Bandwidth specifications apply for 1 mV/div to 10 V/div vertical settings. Bandwidth at the 500 µV/div vertical setting is limited to 20 MHz.
3. Half-channel operation on a 2-channel model refers to two-channel operation when using channel-1 or channel-2 AND channel-3 or channel-4.
4. 500 µV/div is a 2X digital magnification of 1 mV/div setting.

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Performance Characteristics (continued)

Horizontal system

	All Models
Time base range	5 ns/div to 50 s/div (50 MHz, 70 MHz , and 100 MHz models), 2 ns/div to 50 s/div (200 MHz models)
Horizontal resolution	2.5 ps
Timebase accuracy [5]	50 ppm ± 5 ppm per year (aging)
Timebase delay time range	Pre-trigger: Greater of 1 screen width or 200 µs
	Post-trigger: 1 to 500 s
Channel to channel deskew range	± 100 ns
Δ Time accuracy (using cursors)	± (time base acc. x reading) ± (0.0016 x screen width) ± 200 ps (same channel)
Modes	Main, zoom, roll, XY
XY	X = channel 1, Y = channel 2, Z = external trigger, 1.4 V blanking
	Bandwidth: Maximum bandwidth. Phase error at 1 MHz: < 0.5 degree

Acquisition system

		EDUX1052A/EDUX1052G	DSOX1202A/DSOX1202G DSOX1204A/DSOX1204G
Maximum sample rate		1 GSa/s	2 GSa/s (2 ch operation), 1 GSa/s (4 ch operation)
Maximum record length		200 k points	2 M points (2 ch operation), 1 M points (4 ch operation)
Acquisition mode	Normal	Default mode	Default mode
	Peak Detect	Capture glitches as narrow as 10 ns at all time base settings	Capture glitches as narrow as: 70 MHz model: 10 ns at all time base settings 100 MHz model: 5 ns at all time base settings 200 MHz model: 2.5 ns at all time base setting
	Averaging	Selectable from 2, 4, 8, 16, 64, ... to 65,536	Selectable from 2, 4, 8, 16, 64, ... to 65,536
	High Resolution	Real-time boxcar averaging reduces random noise and effectively increases vertical resolution to 12 bits of resolution when ≥ 20 µs/div at 1 GSa/s	Real-time boxcar averaging reduces random noise and effectively increases vertical resolution to 12 bits of resolution when ≥ 20 µs/div at 2 GSa/s
	Segmented	Not available	Segmented memory optimizes available memory for data streams that have long dead times between activity. Maximum number of segments = 500 Minimum trigger re-arm time = 1 µs (1,000,000 waveforms/sec in Segmented acquisition mode)
Time mode	Normal	Default mode	Default mode
	Roll	Displays the waveform moving across the screen from right to left. Available at the timebase settings of 50 ms/div or slower	Displays the waveform moving across the screen from right to left. Available at the timebase settings of 50 ms/div or slower
	XY	Displays the volts-versus-volts display	Displays the volts-versus-volts display
		X = Channel 1, Y = Channel 2	X = Channel 1, Y = Channel 2
		Z = External trigger, 1.4 V blanking	Z = External trigger, 1.4 V blanking
		Phase error at 1 MHz: < 0.5 degree	Phase error at 1 MHz: < 0.5 degree
Autoscale		Finds and displays all signals connected to analog input channels and the external trigger input. Sets trigger type to rising edge at ~50% on external (highest priority source), or lowest numbered channel with a signal that exceeds ~10 mVpp. Optimizes vertical scaling for stacked waveforms and sets timebase to display ~ 1.8 periods. Can be customized to function on just channels that are previously turned on and displayed.	Finds and displays all signals connected to analog input channels and the external trigger input. Sets trigger type to rising edge at ~50% on external (highest priority source), or lowest numbered channel with a signal that exceeds ~10 mVpp. Optimizes vertical scaling for stacked waveforms and sets timebase to display ~ 1.8 periods. Can be customized to function on just channels that are previously turned on and displayed.

5. Denotes warranted specifications; All others are typical. Specifications are valid after a 30-minute warm-up period and from ± 10 °C user calibration temperature.

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Performance Characteristics (continued)

Trigger system

	All Models
Trigger sources	Analog channels, line[6], external, WaveGen, WaveGen modulation FM/FSK
Trigger modes	Normal (triggered): Requires trigger event for oscilloscope to trigger
	Auto: Triggers on selected source or automatically triggers (asynchronously) in absence of a valid trigger event
	Single: Triggers only once upon detection of a valid trigger event
	Force: Front panel button that forces an asynchronous trigger while in the Normal trigger mode
Trigger coupling	DC: DC coupled trigger
	AC: AC coupled trigger, cutoff frequency: ~ 10 Hz
	HF reject: High frequency reject, cutoff frequency ~ 50 kHz
	LF reject: Low frequency reject, cutoff frequency ~ 50 kHz
	Noise reject: Selectable OFF or ON, decreases trigger sensitivity 2X
Trigger holdoff range	60 ns to 10 s

Trigger sensitivity

	EDUX1052A/EDUX1052G	DSOX1202A/DSOX1202G DSOX1204A/DSOX1204G
Internal [7]	Greater of: 0.6 div or 2.5 mV (≤ 10 MHz) 0.9 div or 3.8 mV (10 to 50 MHz)	Greater of: 0.6 div or 2.5 mV (≤ 10 MHz) 0.9 div or 3.8 mV (10 to 70 MHz) 1.2 div or 5 mV (70 to 200 MHz)
External	≤ 10 MHz: 250 mVpp	≤ 10 MHz: 20 mVpp (1.6 V range) 100 mVpp (8 V range)
	10 to 50 MHz: 500 mVpp	10 to 200 MHz: 100 mVpp (1.6 V range) 500 mVpp (8 V range)

Trigger level range

	EDUX1052A/EDUX1052G	DSOX1202A/DSOX1202G DSOX1204A/DSOX1204G
Internal	± 6 div from center-screen	± 6 div from center-screen
External [8]	± 8 V	± 1.6 V or ± 8 V selectable

6. Line trigger to ≤ 60 Hz.
7. Denotes warranted specifications; All others are typical. Specifications are valid after a 30-minute warm-up period and from ± 10 °C firmware calibration temperature.
8. Input voltage must remain within these limits for proper operation.

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Performance Characteristics (continued)

Trigger type selections

	EDUX1052A/EDUX1052G	DSOX1202A/DSOX1202G DSOX1204A/DSOX1204G
Edge	Trigger on a rising, falling, alternating or either edge of any source	
Pattern/state	Not available	Trigger when a specified pattern/state on any combination inputs is entered [9]
Pulse width	Trigger on a pulse of a selected channel with a time duration that is 'less than a value,' 'greater than a value' or 'inside a time range' Range minimum: 10 ns, 10 s max	
Setup and hold	Not available	Trigger and clock/data setup and/or hold time violation. Setup time can be set from –7 ns to 10 s. Hold time can be set from 0 s to 10 ns
Rise/fall time	Not available	Trigger on rise-time or fall-time edge-speed violations (< or >) based on a user-selectable threshold and time setting range between 5 ns and 10 s
Video	Trigger on all lines or individual lines; odd/even or all fields from the composite video; or broadcast standards (NTSC, PAL, SECAM, and PAM-M)	
I^2C	Trigger at a start/stop condition or user-defined frame with address and/or data values. Also, trigger on missing acknowledge, restart, EEPROM read and 10-bit write	
RS-232/422/485/UART	Trigger on Rx or Tx start bit, stop bit, data content or parity error	
SPI	Not available	Trigger on SPI (Serial Peripheral Interface) data pattern during a specific framing period. Supports positive and negative chip select framing as well as clock idle framing. Supports MOSI or MISO (4-channel models) data as half duplex data
CAN	Not available	Trigger on CAN (controller area network) version 2.0A and 2.0B signals. Trigger on the start of frame (SOF) bit, remote transfer request frame ID (RTR), data frame ID (~RTR), remote or data frame ID, data frame ID + data, error frame, all errors, acknowledge error, or overload frame.
LIN	Not available	Trigger on LIN (Local Interconnect Network) sync break, frame ID, frame ID + data, parity error, or checksum error

9. The pattern must have stabilized for a minimum of 5 ns to qualify as a valid trigger condition.

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Performance Characteristics (continued)

Serial protocol analysis/decode (standard)

	EDUX1052A/EDUX1052G	DSOX1202A/DSOX1202G DSOX1204A/DSOX1204G
I²C	Baud Rate: Up to 3.4 Mbps Address size: 7-bit or 8-bit Number of time-correlated decode traces: One plus protocol lister/table	Baud rate: Up to 3.4 Mbps Address size: 7-bit or 8-bit Number of time-correlated decode traces: One plus protocol lister/table
UART/RS232	Baud Rate: 100 bps to 10 Mbps Number of bits: 5 to 9 Bit order: lsb or msb Decode formats: Hex, binary, or ASCII Number of time-correlated decode traces: Two (Tx and Rx) plus protocol lister/table	Baud rate: 100 bps to 10 Mbps Number of bits: 5 to 9 Bit order: lsb or msb Decode formats: Hex, binary, or ASCII Number of time-correlated decode traces: Two (Tx and Rx) plus protocol lister/table
SPI[10]	Not available	Baud rate: Up to 25 Mbps Chip select: low, high, or time-out Number of time-correlated decode traces on 4-channel models: Two (MISO and MOSI) plus protocol lister/table Number of time-correlated decode traces on 2-channel models: One (Data) plus protocol lister/table
CAN	Not available	Baud rate: 10 kbps to 5 Mbps Standard: “Classic” CAN 2.0 Real-time totalizer: Number of frames, number of error frames, number of overload frames, bus load (%) Number of time-correlated decode traces: One plus protocol lister/table
LIN	Not available	Baud rate: 2.4 kbps to 625 kbps Standards: LIN 1.3 and 2.x Number of time-correlated decode traces: One plus protocol lister/table

10. 4-channels models (DSOX1204A or DSOX1204G) recommended for 4-wire SPI measurement applications.

Waveform measurements

	All Models
Cursors	Single cursor accuracy: ± [DC vertical gain accuracy + DC vertical offset accuracy + 0.25% full scale]
	Dual cursor accuracy: ± [DC vertical gain accuracy + 0.5% full scale]
	Units: Seconds(s), Hz (1/s), phase (degrees)
Automatic measurements	Select up to 4 continuously updated measurements from a list of 32 available amplitude, timing, and count measurements
	Cursors track last selected measurement
	Use default (relative/%) or customizable measurement threshold levels (absolute or relative)
	Measurements automatically gated by zoom window
	Vertical/amplitude measurements (14): Peak-to-peak, maximum, minimum, amplitude, top, base, overshoot, preshoot, average-N cycles, average-full screen, DC RMS-N cycles, DC RMS-full screen, AC RMS-N cycles, AC RMS-full screen (standard deviation)
	Timing measurements (14): Period, frequency, counter, +width, -width, +duty cycle, -duty cycle, bit rate, rise time, fall time, delay, phase, X at min Y, X at max Y
	Count measurements (4): +pulse count, -pulse count, rising edge count, falling edge count
	Snapshot: Performs 24 parametric measurements once (not updated) on a single source (ch1, ch2, ch3, or ch4) one time
	Automatic measurement logging: Available via BenchVue BV0004B (standard)

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Performance Characteristics (continued)

Waveform math

	All Models
Math functions	Add, subtract, multiply, divide, FFT (magnitude), FFT (phase), low-pass filter
Record size	Up to 64 k points resolution
FFT	Window types: Hanning, Flat top, Rectangular, Blackman-Harris Vertical scaling: dB (logarithmic) or RMS (linear) Horizontal scaling: User-defined span and center frequency settings, or Auto Setup

Digital voltmeter (standard)

	All Models
Functions	DC, AC-rms, DC-rms
Resolution	3 digits
Measuring rate	100 times/second
Auto ranging	Automatic adjustment of vertical amplification to maximize the dynamic range of measurements
Range meter	Graphical display of most recent measurement, plus extrema over the previous 3 seconds

Frequency counter (standard)

	All Models
Functions	Frequency
Resolution	5 digits
Measuring rate	100 times/second
Auto ranging	Automatic adjustment of vertical amplification to maximize the dynamic range of measurements
Range meter	Graphical display of most recent measurement, plus extrema over the previous 3 seconds

Frequency response analysis - Bode plot (standard on “G” models)

	EDUX1052G/ DSOX1202G/ DSOX1204G
Dynamic range	> 80 dB (typical, based on 0 dBm (630 mVpp) input into 50-Ω load
Input test source	WaveGen out
V_{IN} and V_{OUT}	Channel 1, 2, 3, and 4 (channel 3 and 4 on 4-channel models only)
Frequency range	10 Hz to 20 MHz
Number of test points	1 to 1000 points across selected frequency range
Test amplitude	1 mVpp to 9 Vpp into 50-Ω
Test results	Overlaid logarithmic gain (dB) and linear phase (degrees) plots versus logarithmic frequency
Manual measurements	A single pair of tracking gain and phase markers at user-defined frequency setting
Plot scaling	Auto-scaled during test with user-defined scaling after test

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Performance Characteristics (continued)

WaveGen – Built-in function generator (standard on “G” models)

Note: Only available on WaveGen models EDUX1052G, DSOX1202G, and DSOX1204G. WaveGen is not upgradeable.

	EDUX1052G/ DSOX1202G/ DSOX1204G
WaveGen out	Front-panel BNC connector
Waveforms	Sine, square, ramp, pulse, DC, noise
Modulation	Modulation types: AM, FM, FSK
	Carrier waveforms: Sine, ramp
	Modulation source: Internal (no external modulation capability)
	AM:
	– Modulation: sine, square, ramp
	– Modulation frequency: 1 Hz to 20 kHz
	– Depth: 0 to 100%
	FM:
	– Modulation: sine, square, ramp
	– Modulation frequency: 1 Hz to 20 kHz
	– Minimum carrier frequency: 10 Hz
	– Deviation: 1 Hz to carrier frequency or (2e12 / carrier frequency), whichever is smaller
	FSK:
	– Modulation: 50% duty cycle square wave
	– FSK rate: 1 Hz to 20 kHz
	– Hop frequency: 2 x FSK rate to 10 MHz
Sine	Frequency range: 0.1 Hz to 20 MHz
	Amplitude flatness: ± 0.5 dB (relative to 1 kHz)
	Harmonic distortion: —40 dBc
	Spurious (non-harmonics): —40 dBc
	Total harmonic distortion: 1%
	SNR (50 Ω load, 500 MHz bandwidth): 40 dB (typical); 30 dB (min)
Square wave /pulse	Frequency range: 0.1 Hz to 10 MHz
	Duty cycle: 20 to 80%
	Duty cycle resolution: Larger of 1% or 10 ns
	Pulse width: 20 ns minimum
	Rise/fall time: 18 ns (10 to 90%)
	Pulse width resolution: 10 ns or 5 digits, whichever is larger
	Overshoot: < 2%
	Asymmetry (at 50% DC): ± 1% ± 5 ns
	Jitter (TIE RMS): 500 ps
Ramp /triangle wave	Frequency range: 0.1 Hz to 200 kHz
	Linearity: 1%
	Variable symmetry: 0 to 100%
	Symmetry resolution: 1%
Noise	Bandwidth: 20 MHz typical

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Performance Characteristics (continued)

WaveGen – Built-in function generator (continued)

Note: Only available on WaveGen models EDUX1052G, DSOX1202G, and DSOX1204G. WaveGen is not upgradeable.

	EDUX1052G/ DSOX1202G/ DSOX1204G
Frequency	Sine wave and ramp accuracy:
	130 ppm (frequency < 10 kHz)
	50 ppm (frequency > 10 kHz)
	Square wave and pulse accuracy:
	[50 + frequency/200] ppm (frequency < 25 kHz)
	50 ppm (frequency ≥ 25 kHz)
	Resolution: 0.1 Hz or 4 digits, whichever is larger
Amplitude	Square, Pulse, Ramp:
	2 mVpp to 20 Vpp into Hi-Z (offset ≤ ±0.4 V)
	1 mVpp to 10 Vpp into 50 Ω (offset ≤ ±0.4 V)
	50 mVpp to 20 Vpp into Hi-Z (offset > ±0.4 V)
	25 mVpp to 10 Vpp into 50 Ω (offset > ±0.4 V)
	Sine:
	2 mVpp to 12 Vpp into Hi-Z (offset ≤ ± 0.4 V)
	1 mVpp to 9 Vpp into 50 Ω (offset ≤ ± 0.4 V)
	50 mVpp to 12 Vpp into Hi-Z (offset > ± 0.4 V)
	25 mVpp to 9 Vpp into 50 Ω (offset > ± 0.4 V)
	Resolution: ≤ 1% of the amplitude
	Accuracy: 2% (Frequency = 1 kHz)
DC offset	Square, Pulse, Ramp:
	± [10 V – ½ amplitude] into Hi-Z
	± [5 V – ½ amplitude] into 50 Ω
	Sine:
	± [8 V – ½ amplitude] into Hi-Z
	± [4.5 V – ½ amplitude] into 50 Ω
	Resolution: Larger of 100 µV or 3 digits
	Accuracy: ± 1.5% of offset setting ± 1.5% of amplitude ± 1 mV
Main output	Impedance: 50 Ω typical
	Isolation: Not available, main output BNC is grounded
	Protection: Overload automatically disables output
	Sine, square, ramp, pulse, DC, noise

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Performance Characteristics (continued)

Connectivity

	All Models
Standard Ports	One USB 2.0 hi-speed device port on rear panel. Supports USBTMC protocol
	One USB 2.0 hi-speed host port on front panel. Supports memory devices
	One Ethernet 10/100Base-T port on rear panel

Nonvolatile storage

	All Models
Reference waveform display	Two internal waveforms or USB thumb drive
Waveform/data storage	Setups (.scp), images (.bmp, .png), channel waveforms (.csv, .bin), reference waveforms (.h5), mask (.msk), serial protocol data (.csv), Bode gain & phase data (.csv)
Max USB flash drive size	Supports industry standard flash drives
Setups without USB flash drive	10 internal setups
USB drive format	FAT32 , NTFS, EXT2/3/4

General and environmental characteristics

	All Models
Power line consumption	50 W max
Power voltage range	100 to 120 V, 50/60/400 Hz; 100 to 240 V, 50/60 Hz
Environmental rating	0 to +50 °C, 3,000 m Max
	Maximum Relative Humidity (non-condensing): 95%RH up to 40°C, decreases linearly to 45%RH at 50°C [11]
Electromagnetic compatibility	Meets EMC directive (2004/108/EC), meets or exceeds IEC 61326-1:2005/EN61326-1:2013 (basic)
	IEC 61000-4-2/EN 61000-4-2
	IEC 61000-4-3/EN 61000-4-3
	IEC 61000-4-4/EN 61000-4-4
	IEC 61000-4-5/EN 61000-4-5
	IEC 61000-4-6/EN 61000-4-6
	IEC 61000-4-8/EN 61000-4-8
	IEC 61000-4-11/EN 61000-4-11
	Canada: ICES/NMB-001:2006
	Australia/New Zealand: AS/NZS CISPER 11:2011
Safety	ANSI/UL Std. No. 61010-1:2012; CAN/CSA-C22.2 No. 61010-1-12
	ANSI/UL Std. No. 61010-2-030:2012; CAN/CSA-C22.2 No. 61010-2-030-12
Dimensions (W x H x D)	314 mm (12.4 in) x 165 mm (6.5 in) x 130 mm (5.1 in)
Weight	Net: 3.23 kg (7.1 lbs.), shipping: 4.2 kg (9.2 lbs.)
Display	7.0” diagonal color TFT LCD WVGA

11. From 40 °C to 50 °C, the maximum % relative humidity follows the line of constant dew point.

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Configuring your InfiniiVision 1000 X-Series Oscilloscope

Step 1: Choose your oscilloscope

EDUX1052A	50 MHz, 2 channels
EDUX1052G	50 MHz, 2 channels with function generator
DSOX1202A	70/100/200 MHz, 2 channels
DSOX1202G	70/100/200 MHz, 2 channels with function generator
DSOX1204A	70/100/200 MHz, 4 channels
DSOX1204G	70/100/200 MHz, 4 channels with function generator

Step 2: Select bandwidth options

Model: DSOX1202A/G (2-channel models)

DSOX1202-070	70 MHz bandwidth option	Compatible with DSOX1202A or DSOX1202G
DSOX1202-100	100 MHz bandwidth option	Compatible with DSOX1202A or DSOX1202G
DSOX1202-200	200 MHz bandwidth option	Compatible with DSOX1202A or DSOX1202G

Model: DSOX1204A/G (4-channel models)

DSOX1200-070	70 MHz bandwidth option	Compatible with DSOX1204A or DSOX1204G
DSOX1200-100	100 MHz bandwidth option	Compatible with DSOX1204A or DSOX1204G
DSOX1200-200	200 MHz bandwidth option	Compatible with DSOX1204A or DSOX1204G

Step 3: Select optional accessories

DSOXBODE	Bode plot training kit	Option
N2137A	User's Guide (hardcopy) for InfiniiVision 1000 X-Series	Option (electronic copy downloadable at no charge)
N2738A	Soft carrying case for 1000 X-Series oscilloscopes	Option
N2138A	Rackmount kit for 1000 X-Series oscilloscopes	Option

Step 4: Select optional PC-based test automation and documentation software

BV0004B	BenchVue oscilloscope application	Standard
D9010UDAA	User-defined Application (UDA) software	Option
D9010BSEO	Infiniium Offline Oscilloscope Analysis Software	Option

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Configuring your InfiniiVision 1000X-Series Oscilloscope (continued)

Step 5: Select optional probes

Passive Probes

N2142A	1:1, 10:1 switchable 75 MHz passive probe	2 probes included standard with EDUX1052A/G
N2140A	1:1, 10:1 switchable 200 MHz passive probe	2 probes included standard with DSOX1202A/G 4 probes included standard with DSOX1204A/G
N2842A	10:1, 300 MHz passive probe	Option
N2889A	1:1, 10:1 switchable 350 MHz passive probe	Option
10070D	1:1, 20 MHz passive probe	Option
N2870A	1:1, 35 MHz passive probe	Option
N7007A	10:1 400 MHz extreme temperature passive probe	Option
10076C	100:1 500 MHz 3.7 KV high voltage passive probe	Option

Differential Probes

N2791A	25 MHz, 10:1, 100:1 switchable high voltage up to ± 700V	Option
N2891A	70 MHz, 100:1, 1000:1 switchable high voltage up to ± 7000V	Option

Current Probes

1146B	100 kHz, 100A, AC/DC current probe	Option
N2780B	2 MHz, 500A, AC/DC current probe (with N2779A power supply)	Option
N2781B	10 MHz, 150A, AC/DC current probe (with N2779A power supply)	Option
N2783B	50 MHz, 30A, AC/DC current probe (with N2779A power supply)	Option
N2783B	100 MHz, 30A, AC/DC current probe (with N2779A power supply)	Option
N7040A	23 MHz, 3 kA, AC current probe (Rogowski coil)	Option
N7041A	30 MHz, 600A, AC current probe (Rogowski coil)	Option
N7042A	30 MHz, 300A, AC current probe (Rogowski coil)	Option

Step 6: Select language options (hard copy of user's guide is not included unless ordered)

	Front panel overlay (EDUX1052A/G, DSOX1202A/G)	Front panel overlay (DSOX1204A/G)	User's guide (All models)
English	Standard	Standard	N2137A-ABA
Chinese (Simplified)	DSOX1202-AB2	DSOX1200-AB2	N2137A-AB2
Chinese (Traditional)	DSOX1202-AB0	DSOX1200-AB0	N2137A-AB0
Czech	DSOX1202-AKB	DSOX1200-AKB	Not available
French	DSOX1202-ABF	DSOX1200-ABF	N2137A-ABF
German	DSOX1202-ABD	DSOX1200-ABD	N2137A-ABD
Italian	DSOX1202-ABZ	DSOX1200-ABZ	N2137A-ABZ
Japanese	DSOX1202-ABJ	DSOX1200-ABJ	N2137A-ABJ
Korean	DSOX1202-AB1	DSOX1200-AB1	N2137A-AB1
Polish	DSOX1202-AKD	DSOX1200-AKD	Not available
Portuguese	DSOX1202-AB9	DSOX1200-AB9	N2137A-AB9
Russian	DSOX1202-AKT	DSOX1200-AKT	N2137A-AKT
Spanish	DSOX1202-ABE	DSOX1200-ABE	N2137A-ABE
Thai	DSOX1202-AB3	DSOX1200-AB3	Not available
Turkish	DSOX1202-AB8	DSOX1200-AB8	Not available

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Configuring your InfiniiVision 1000X-Series Oscilloscope (continued)

Included standard

Standard passive probes	(Two N2142A for EDUX1052A/G; Two N2140A for DSOX1202A/G; Four N2140A for DSOX1204A/G)
Standard secure erase	
Interface language support GUI: English, Japanese, Simplified Chinese, Traditional Chinese, Korean, German, French, Spanish, Russian, Portuguese, Italian, Polish, Czech, Thai, and Turkish	
Built-in help language support for English, Japanese, Simplified Chinese, Traditional Chinese, Korean, German, French, Spanish, Russian, Portuguese, Italian, Polish, and Thai	
Localized Power cord	
Standard 3-year warranty (90 days for non-serialized accessories)	
Soft copy of Certificate of Calibration (CoC) downloadable from https://service.keysight.com/infoline/public/details.aspx?i=DOCI	

After-purchase bandwidth upgrades

Model: DSOX1202A/G (2-channel models)

D1202BW1A	Upgrade bandwidth from 70 to 100 MHz	Compatible with DSOX1202A or DSOX1202G
D1202BW2A	Upgrade bandwidth from 70 to 200 MHz	Compatible with DSOX1202A or DSOX1202G
D1202BW3A	Upgrade bandwidth from 100 to 200 MHz	Compatible with DSOX1202A or DSOX1202G

Model: DSOX1204A/G (4-channel models)

D1200BW1A	Upgrade bandwidth from 70 to 100 MHz	Compatible with DSOX1204A or DSOX1204G
D1200BW2A	Upgrade bandwidth from 70 to 200 MHz	Compatible with DSOX1204A or DSOX1204G
D1200BW3A	Upgrade bandwidth from 100 to 200 MHz	Compatible with DSOX1204A or DSOX1204G

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