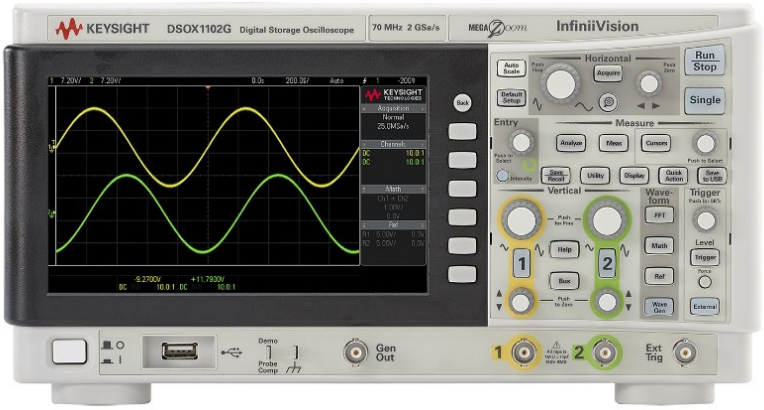
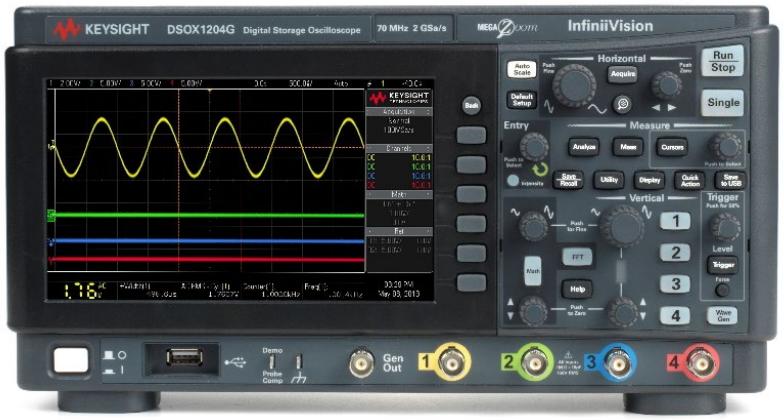
DATA SHEET

InfiniiVision 1000 X-Series Oscilloscopes



2 Channel: EDUX1002A; EDUX1002G; DSOX1102A; DSOX1102A



4 Channel: DSOX1204A; DSOX1204G

KEYSIGHT TECHNOLOGIES

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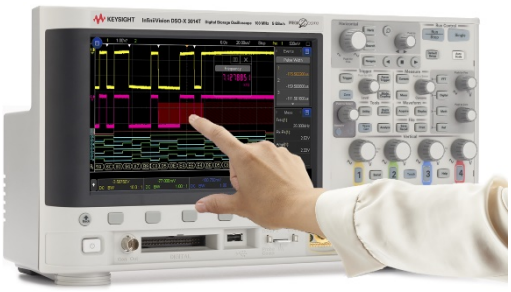
Need more bandwidth, sampling rate, and analysis?



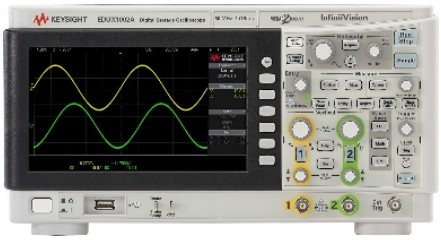
Consider the InfiniiVision 3000T X-Series

- 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
- Plenty decode/trigger and gated FFT

Leading technology in a value-priced oscilloscope

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
- Frequency Response Analysis (Bode gain & phase plots), included in models with WaveGen
- See more signal detail with 50,000 wfms/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 and 6-in-1 instrument integration



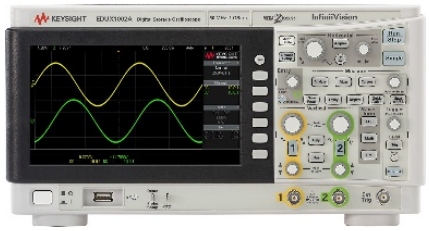
	DSOX1102A **70/100 MHz, 2 channel**	**DSOX1102G** **70/100 MHz, 2 channel with function generator**	**DSOX1204A** **70/100/200 MHz, 4 channel**	**DSOX1204G** **70/100/200 MHz, 4 channel with function generator**
Analog channels	2	2	4	4
External trigger	1(can be used as a 3rd digital channel at the front)	1 (can be used as a 3rd digital channel at the front)	1 (back)	1 (back)
Bandwidth	70 MHz (base)	70 MHz (base)	70 MHz (base)	70 MHz (base)
	100 MHz (DSOX1B7T102)	100 MHz (DSOX1B7T102)	100 MHz (D1200BW1A) 200 MHz (D1200BW2A)	100 MHz (D1200BW1A) 200 MHz (D1200BW2A)
Maximum sample rate	2 GSa/s (all channels)	2 GSa/s (all channels)	2 GSa/s (half channels) 1 GSa/s (all channels)	2 GSa/s (half channels) 1 GSa/s (all channels)
Maximum memory depth	1 Mpts	1 Mpts	1 Mpts	1 Mpts
Segmented memory	Standard	Standard	Standard	Standard
Mask/limit testing	Standard	Standard	Standard	Standard
WaveGen	Not available	20-MHz function generator (includes Bode plot test)	Not available	20-MHz function generator (includes Bode plot test)
Serial protocol analysis	Option: I²C, SPI, UART/RS-232 - (DSOX1EMBD) CAN, LIN - (DSOX1AUTO)		Option: I²C, SPI, UART/RS-232 - (D1200EMBA) CAN, LIN - (D1200AUTA)	
Waveform math	Add, subtract, multiply, divide, FFT (magnitude and phase), low pass filter			
Integrated digital voltmeter	Free with product registration			
Display	7-inch TFT LCD WVGA			
Waveform update rate	50,000 waveforms per second			
Connectivity	USB 2.0 (host and device)		USB 2.0 (host and device) LAN	

Leading technology in a value-priced oscilloscope (education model)

EDUX1002A and EDU1002G

Provide a quality education for students and prepare for the 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 LRC circuits or active op-amps.
- BenchVue Software with the BV0004B BenchVue Oscilloscope app lets you control and visualize the 1000X-Series and multiple measurements simultaneously.



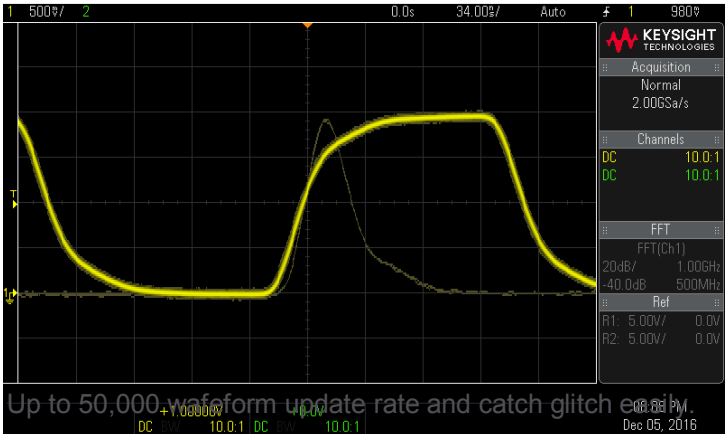
	EDUX1002A **50 MHz, 2 channel**	**EDUX1002G** **50 MHz, 2 channel with function generator**
Analog channels	2	2
External trigger (or 3rd digital channel)	1	1
Bandwidth	50 MHz	50 MHz
Maximum sample rate	1 GSa/s	1 GSa/s
Maximum memory depth	100 kpts	100 kpts
WaveGen	Not available	20-MHz function generator (includes Bode plot test)
Serial protocol analysis	Option: I²C, UART/RS-232 - (EDUX1EMBD)	
Waveform math	Add, subtract, multiply, divide, FFT (magnitude and phase), low pass filter	
Display	7-inch TFT LCD WVGA	
Waveform update rate	50,000 waveforms per second	
Connectivity	USB 2.0 (host and device)	

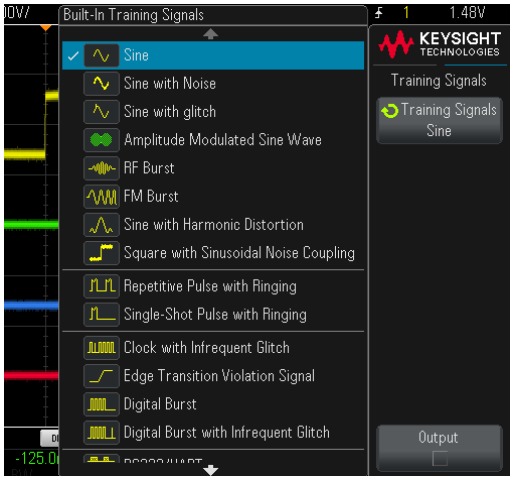
Leading Technologies

(Click on ▷ below, you will be redirected to VIDEO on Keysight 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.



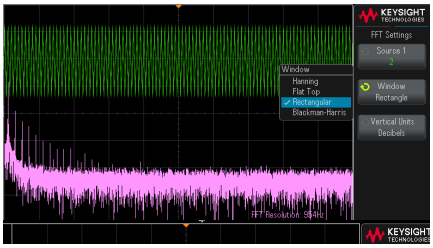


▷ **Training Signals**

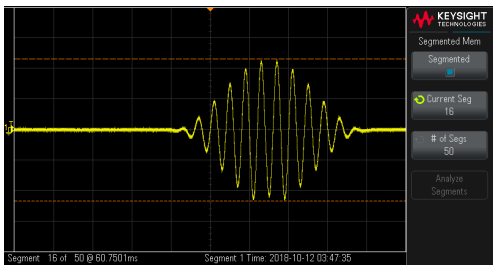
▷ **Superior Measurements**

▷ **Memory Performance**

▷ **FFT**



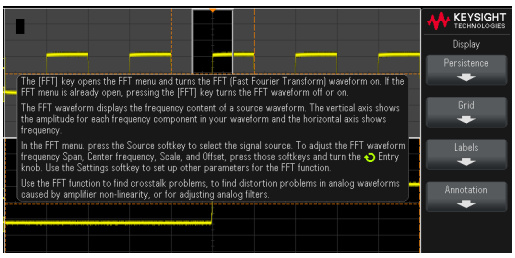
MegaZoom IV ASIC

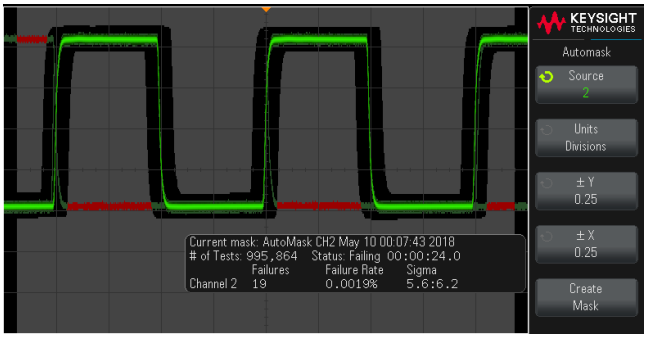


Segment Memory.

▷ **Mask test**

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





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, so you can save money and valuable bench space.

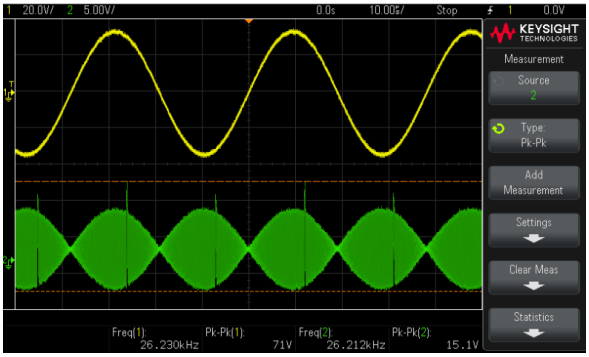
OSCILLOSCOPE

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

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

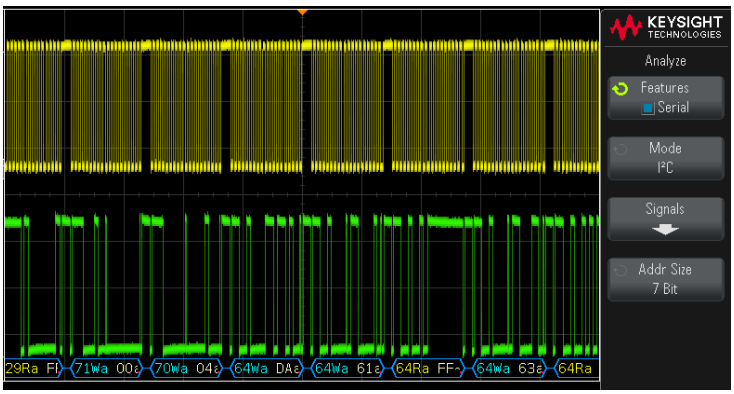
(EDUX1002G, DSOX1102G, and DSOX1204G models only)

The 1000 X-Series offers an integrated 20 MHz function generator with a signal 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. WaveGen is available on EDUX1002G, DSOX1102G, and DSOX1204G models only.



The WaveGen function enables the definition of multiple waveforms including amplitude modulated signals

Hardware-based serial protocol decode and triggering

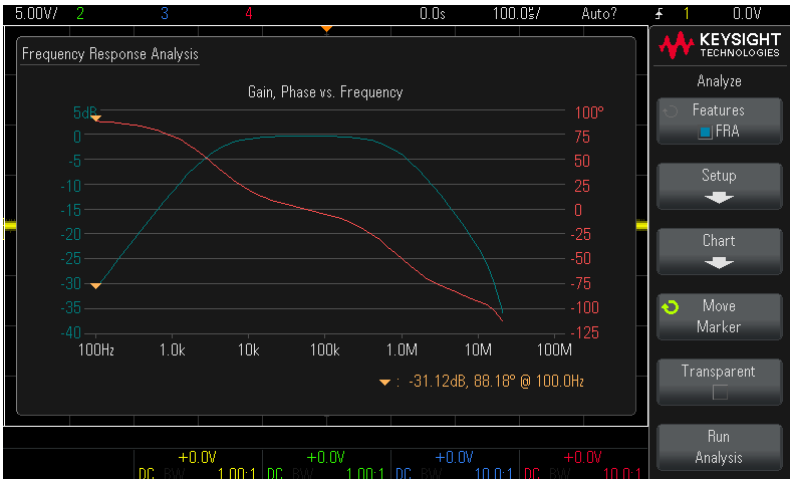


When you add optional software, the 1000 X-Series is a powerful protocol analyzer that can do powerful decode and hardware-based triggering that enables specialized serial communication analysis. Other vendors' oscilloscopes use software post-processing techniques that slow down the waveform and decode update rate, but the 1000 X-Series has faster decoding by using hardware-based technology that enhances scope usability and the probability of capturing infrequent serial communication errors.

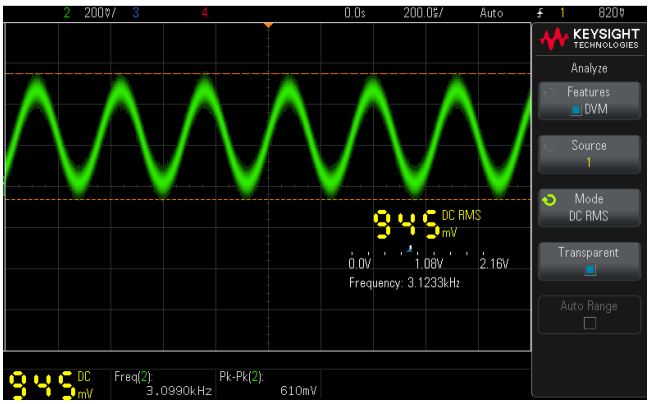
6-in-1 instrument integration (continued)

Frequency Response Analyzer (EDUX1002G, DSOX1102G, and DSOX1204G models only)

Frequency response analysis is a critical measurement to characterize the stability of feedback networks and switch-mode power supplies. Bode plots are fundamental concepts that every electrical engineering student must know. The 1000 X-Series' frequency response analyzer capability is the perfect tool to help students understand the gain and phase performance of passive LRC circuits or active op-amps. 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 gain and phase analysis is possible by utilizing the 1000 X-Series' built-in WaveGen. (EDUX1002G, DSOX1102G, and DSOX1204G models only).



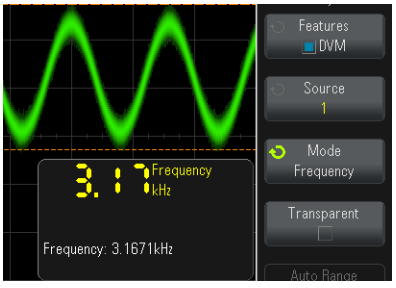
Digital Voltmeter



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. Turn on the DVM capability for no additional cost by registering your oscilloscope.

Frequency Counter

An integrated 5-digit frequency counter inside each oscilloscope. It operates through probes connected to the oscilloscope channels, but its measurement is decoupled from the oscilloscope triggering system, so 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 voltmeter results are always displayed, keeping these quick characterization measurements at your fingertips. Turn on the counter capability for no additional cost by registering your oscilloscope.



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.

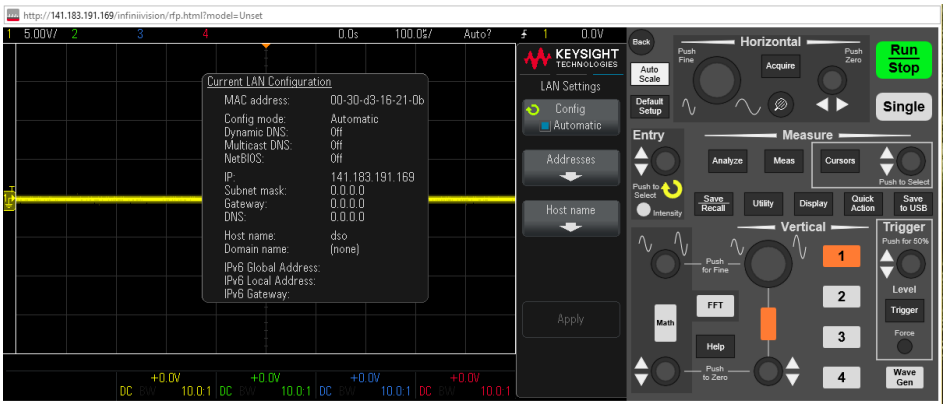
Probe solutions

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.

Connectivity and remote control (LAN connectivity for DSOX1204A/G only)

Built-in USB host and USB device ports make PC connectivity easy. BenchVue Software with the BV0004B BenchVue Oscilloscope app 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 in the 4-channel models (DOSX1204A/G series) supports remote web-based virtual front panel to control and to save data or images.



Web-based virtual front panel. (DSOX1204A/G model only).

More productivity tools (continued)

Offline oscilloscope analysis software

Keysight's N8900A 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

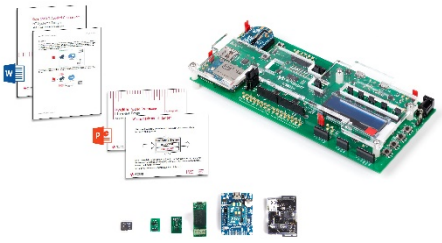
The Oscilloscope App within BenchVue enables control of oscilloscopes to quickly capture and annotate screen images, record trace data and data log measurements (included in model BV0000A) Build automated test sequences just as easy as using your front panel. Save time with the ability to export measurement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

Oscilloscope basic courseware

The Educator's Oscilloscope Training Kit 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.

IoT systems design courseware

The 1000 X-Series oscilloscope can be used with the U3800A Internet of Things (IoT) Systems Design Applied Courseware, which is designed to give students the opportunity to work with industry-grade test and measurement instruments The IoT Systems Design Applied Courseware is a ready-to-teach package that equips students with the knowledge on how to design and develop an embedded system with IoT capabilities. Designed as a resource for educators, the courseware consists of teaching slides and a training kit and integrates hands-on industry-relevant experiences and real-world applications in IoT systems design and testing.



A real oscilloscope

Measurements

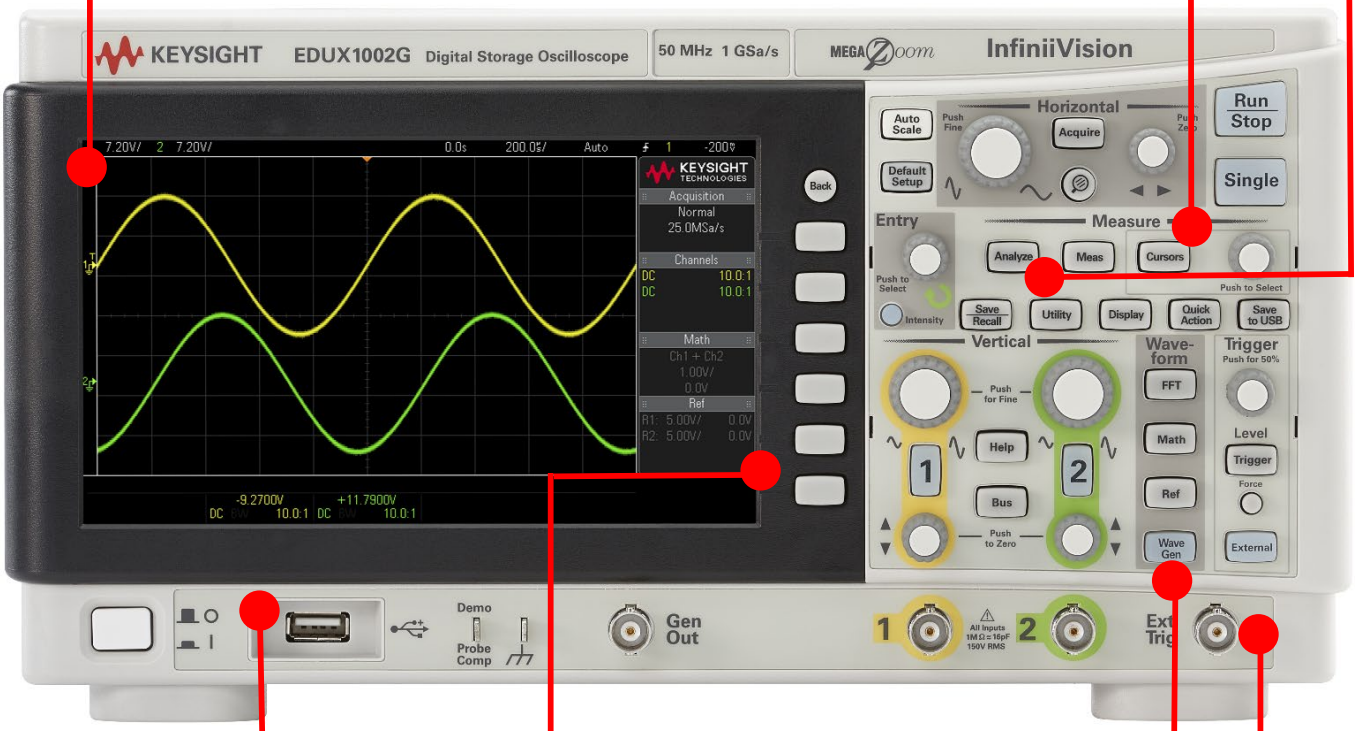
Press the measure key to access 24 built-in automatic measurements

Built-in localized-help

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

Cursors

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



USB save

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

Waveform Tools

Quick access to waveform math (+ − × ÷) and FFT. Reference Waveforms allow quick comparison of stored waveforms

Industry leading user Interface

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

External Trigger

It can be used for triggering or displayed as a 3rd channel for a digital signal. It can also be used to create a 3-channal bus-type display

Fast Waveform Update Rate

Fast 50,000 waveforms/sec update rate helps you quickly see random and infrequent signal glitches and errors

Analyze Features

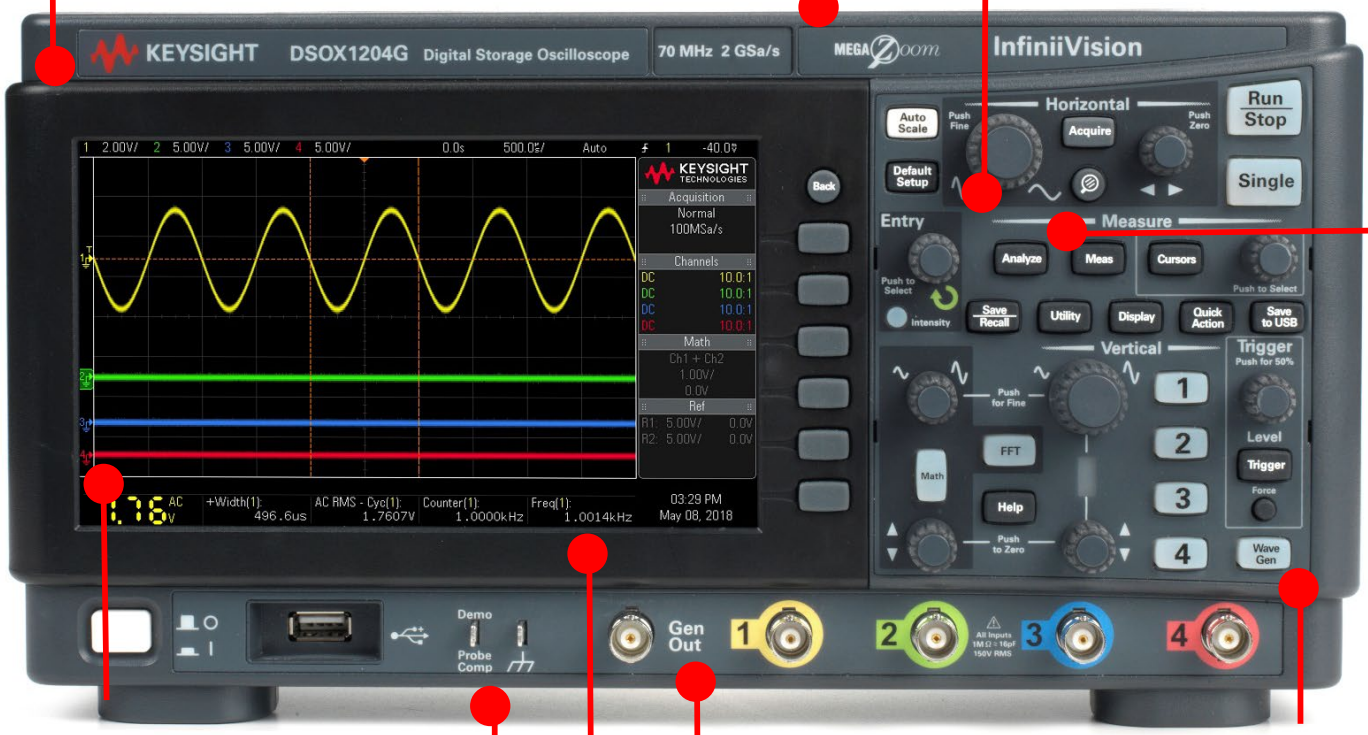
Mask Limit Testing DVM
Frequency Response Analysis
Serial Bus Decode

Compact Size with Big Screen

314 mm × 165 mm × 130 mm
(12.4” × 6.5” × 5.1”) 7” WVGA

Remote Control

USB
LAN (DSOX1204 model only)



Includes four 1:1/10:1 switchable probes

Digital Voltmeter

Integrated 3-digit voltmeter
5-digit frequency counter

Function Generator

Built-in generator enables you to generate the signals you need to quickly simulate your design.

Training Signals

Standard in all models so you can quickly learn how to troubleshoot many common signal problems

Frequency Response Analysis

Built-in generators are easily synchronized for measuring stimulus/response testing including Bode Plot for Gain & Phase

Configuring Your InfiniiVision 1000X-Series Oscilloscope

Step 1 Choose your oscilloscope

EDUX1002A	50 MHz, 2 channel
EDUX1002G	50 MHz, 2 channel with function generator
DSOX1102A	70/100 MHz, 2 channel
DSOX1102G	70/100 MHz, 2 channel with function generator
DSOX1204A	70/100/200 MHz, 4 channel
DSOX1204G	70/100/200 MHz, 4 channel with function generator

Step 2 Select bandwidth upgrades

Model: DSOX1102A/G

DSOX1B7T102	Upgrade bandwidth from 70 to 100MHz	Compatible with DSOX1102A or DSOX1102G

Model: DSOX1204A/G

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

Step 3 Add desired decodes

Model: EDUX1002A/G

EDUX1EMBD	Decodes and analysis for I^2C, UART(RS-232) protocols	Compatible with EDUX1002A or EDUX1002G

Model: DSOX1102A/G

DSOX1EMBD	Decodes and analysis for I^2C, SPI, UART(RS-232) protocols	Compatible with DSOX1102A or DSOX1102G
DSOX1AUTO	Decodes and analysis for CAN, LIN protocols	Compatible with DSOX1102A or DSOX1102G

Model: DSOX1204A/G

D1200EMBA	Decodes and analysis for I^2C, SPI, UART(RS-232) protocols	Compatible with DSOX1204A or DSOX1204G
D1200AUTA	Decodes and analysis for CAN, LIN protocols	Compatible with DSOX1204A or DSOX1204G

Configuring Your InfiniiVision 1000X-Series Oscilloscope (continued)

Step 4 Choose probes, accessories, and additional software options

Passive Probes

N2142A	1:1, 10:1 switchable 75 MHz passive probe	2 probes included standard with EDUX1002A/G
N2140A	1:1, 10:1 switchable 200 MHz passive probe	2 probes included standard with DSOX1102A/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

Software Application

N5467B/C	User-defined Application (UDA) software	Option
BV0004B	BenchVue oscilloscope application	Option
N8900A	Infiniium Offline Oscilloscope Analysis Software	Option

Other Accessories

N2137A	User's Guide for InfiniiVision DSOX1204A/G model	Option, Compatible with DSOX1204A/G
N2132A	User's Guide for InfiniiVision EDUX1002A/G model and DSOX1102A/G model	Option, Compatible with EDUX1002A/G, DSOX1102A/G
N2738A	Soft carrying case for 1000 X-Series oscilloscopes	Option
N2133A	Rackmount kit for 1000 X-Series oscilloscopes (white)	Option
N2138A	Rackmount kit for 1000 X-Series oscilloscopes (black)	Option

Configuring Your InfiniiVision 1000X-Series Oscilloscope (continued)

Step 5 Select language options (hard copy of user guide is not included unless ordered)

Model: EDUX1002A/G and DSOX1102A/G

	Front panel overlay	User's guide
English	Standard	N2132A-ABA
Chinese (Simplified)	DSOX1000-AB2	N2132A-AB2
Chinese (Traditional)	DSOX1000-AB0	N2132A-AB0
Czech	DSOX1000-AKB	Not available
French	DSOX1000-ABF	N2132A-ABF
German	DSOX1000-ABD	N2132A-ABD
Italian	DSOX1000-ABZ	N2132A-ABZ
Japanese	DSOX1000-ABJ	N2132A-ABJ
Korean	DSOX1000-AB1	N2132A-AB1
Polish	DSOX1000-AKD	Not available
Portuguese	DSOX1000-AB9	N2132A-AB9
Russian	DSOX1000-AKT	N2132A-AKT
Spanish	DSOX1000-ABE	N2132A-ABE
Thai	DSOX1000-AB3	Not available
Turkish	DSOX1000-AB8	Not available

Model: DSOX1204A/G

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

Included standard

Standard passive probes (Two N2142A for EDUX1002A/G; Two N2140A for DSOX1102A/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
Certificate of calibration

Performance Characteristics

Oscilloscopes overview

	EDUX1002A/EDUX1002G	DSOX1102A/DSOX1102G	DSOX1204A/DSOX1204G
Bandwidth (–3 dB) [1, 2]	50 MHz	70 MHz	70 MHz
		100 MHz (option DSOX1B7T102)	100 MHz (option D1200BW1A)
			200 MHz (option D1200BW2A)
Calculated rise time (10 to 90%)	≤ 7 ns	≤ 5 ns (70 MHz model)	≤ 5 ns (70 MHz model)
		≤ 3.5 ns (100 MHz model)	≤ 3.5 ns (100 MHz model)
			≤ 1.7 ns (200 MHz model)
Input channels	2	2	4
Maximum sample rate	1 GSa/s	2 GSa/s	2 GSa/s half-channel interleaved 1 GSa/s per channel
Maximum memory depth	100 kpts	1 Mpts	1 Mpts
Waveform update rate	≥ 50,000 waveforms/sec	≥ 50,000 waveforms/sec	≥ 50,000 waveforms/sec

Vertical system analog channels

	EDUX1002A/EDUX1002G/DSOX1102A/DSOX1102G/DSOX1204A/DSOX1204G
Input coupling	DC, AC (10 Hz cutoff frequency)
Input impedance/capacitance	1 MΩ ± 2%/16 pF ±3 pF
Input sensitivity range [3]	500 µV/div to 10 V/div
Standard probes	N2142A 1/10 switchable 75 MHz (2 included in EDUX1002A/EDUX1002G) N2140A 1/10 switchable 200 MHz (2 included in DSOX1002A/DSOX1002G) N2140A 1/10 switchable 200 MHz (4 included in DSOX1204A/DSOX1204G)
Probe attenuation factor	0.1X to 1000X 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. For 1 mV/div to 10 V/div settings, bandwidth is 20 MHz at the 500 µV/div setting.
3. 500 µV/div is a magnification of 1 mV/div setting.

Performance Characteristics (continued)

Horizontal system analog channels

	All Models
Time base range	5 ns/div to 50 s/div
Horizontal resolution	2.5 ps
Time base accuracy [4]	50 ppm ± 5 ppm per year (aging)
Time base 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

		EDUX1002A/EDUX1002G	DSOX1102A/DSOX1102G DSOX1204A/DSOX1204G
Maximum sample rate Maximum analog channels record length		1 GSa/s 100 kpts	2 GSa/s 1 Mpts
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 10 ns at all time base settings
			Capture glitches as narrow as 5 ns at all time base settings (100 MHz model) 2.5 ns at all time base setting (200 MHz model)
	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 segments = 50. Re-arm time = 19µs (minimum time between trigger events)
Time mode	Normal	Default mode	Default mode
	Roll	Displays the waveform moving across the screen from right to left. Available at the time base 50 ms/div or slower	Displays the waveform moving across the screen from right to left. Available at the time base 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 active channels and external trigger. Sets edge trigger mode on external trigger first then highest numbered active channel. Sets vertical sensitivity. Sets time base to display ~ 1.8 periods. Requires minimum voltage of 10 mVpp (channel)	Finds and displays all active channels and external trigger. Sets edge trigger mode on external trigger first then highest numbered active channel. Sets vertical sensitivity. Sets time base to display ~ 1.8 periods. Requires minimum voltage of 10 mVpp (channel)

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

Performance Characteristics (continued)

Trigger system

	All Models
Trigger sources	Analog channels, line [5], external, WaveGen, WaveGen modulation FM/FSK
Trigger modes	Normal (triggered): Requires trigger event for oscilloscope to trigger
	Auto: Triggers automatically in absence of a trigger event
	Single: Triggers only once on a trigger event
	Force: Front panel button that forces a trigger
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 sensitivity 2x
Trigger holdoff range	60 ns to 10 s

Trigger sensitivity

	EDUX1002A/EDUX1002G	DSOX1102A/DSOX1102G	DSOX1204A/DSOX1204G
Internal [6]	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 100 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: 50 mVpp (1.6 V range) 250 mVpp (8 V range)	≤ 10 MHz: 20 mVpp (1.6 V range) 100 mVpp (8 V range)
	10 to 50 MHz: 500 mVpp	10 to 100 MHz: 100 mVpp (1.6 V range) 500 mVpp (8 V range)	10 to 200 MHz: 100 mVpp (1.6 V range) 500 mVpp (8 V range)

Trigger level range

	EDUX1002A/EDUX1002G	DSOX1102A/DSOX1102G DSOX1204A/DSOX1204G
Internal	± 6 div from center screen	± 6 div from center screen
External [7]	± 8 V	± 1.6 V or ± 8 V selectable

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

Performance Characteristics (continued)

Trigger type selections

	EDUX1002A/EDUX1002G	DSOX1102A/DSOX1102G DSOX1204A/DSOX1204G
Trigger types	Edge, pulse width, video, pattern/state	Edge, pulse width, video, rise/fall time, setup and hold, pattern/state
Edge	Trigger on a rising, falling, alternating or either edge of any source	
Pattern/state	Trigger when a specified pattern/state on any combination inputs is entered[8]	
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
		Select from (< or >) and time settings range between Minimum: 5 ns Maximum: 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 – EDUX1EMBD option – DSOX1EMBD option – D1200EMBA option	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 – EDUX1EMBD option – DSOX1EMBD option – D1200EMBA option	Trigger on Rx or Tx start bit, stop bit, data content or parity error	
SPI – DSOX1EMBD option – D1200EMBA option	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 – DSOX1AUTO option – D1200AUTA option	Not available	Trigger on CAN (controller area network) version 2.0A and 2.0B signals. Trigger on the start of frame (SOF) bit, remote frame ID (RTR), data frame ID (~RTR), remote or data frame ID, data frame ID and data, error frame, all errors, acknowledge error, and overload frame.
LIN – DSOX1AUTO option – D1200AUTA option	Not available	Trigger on LIN (Local Interconnect Network) sync break, sync frame ID or frame ID and data, parity error, checksum error and frame

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

Performance Characteristics (continued)

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	Measurements continuously updated with statistics.
	Cursors track last selected measurement. Select up to four measurements from the list below:
	Snapshot: Measure all single waveform measurements (24)
	Voltage:
	Peak-to-peak, maximum, minimum, amplitude, top, base, overshoot, pre-shoot, average- N cycles,
	average-full screen, DC RMS-N cycles, DC RMS-full screen, AC RMS-N cycles, AC RMS-full screen (standard deviation)
	Time:
	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
	Automatic measurement logging:
	Available via BenchVue BV0004B

Waveform math

	All Models
Arithmetic	Add, subtract, multiply, divide, FFT (magnitude), FFT (phase), low-pass filter
FFT	Record Size: Up to 64 kpts resolution
	Window types: Hanning, Flat top, Rectangular, Blackman-Harris

Performance Characteristics (continued)

WaveGen – Built-in function generator (specifications are typical)

Note: Only available on WaveGen models EDUX1002G, DSOX1102G, and DSOX1204G. WaveGen is not upgradeable.

	EDUX1002G/ DSOX1102G/ 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

Performance Characteristics (continued)

WaveGen – Built-in function generator (specifications are typical) (continued)

Note: Only available on WaveGen models EDUX1002G, DSOX1102G, and DSOX1204G. WaveGen is not upgradeable.

	EDUX1002G/ DSOX1102G/ 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 250 uV 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

Performance Characteristics (continued)

Digital voltmeter (specifications are typical)

	All Models
Functions	ACrms, DC, DCrms
Resolution	ACV/DCV: 3 digits
Measuring rate	100 times/second
Autoranging	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 (specifications are typical)

	All Models
Functions	Frequency
Resolution	5 digits
Measuring rate	100 times/second
Autoranging	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) (specifications are typical)

	EDUX1002G/ DSOX1102G/ DSOX1204G
Dynamic range	> 80 dB (typical)
Input and output sources	Output: WaveGen out
	Input 1 and 2 can be assigned to any channel
Frequency range	10 Hz to 20 MHz
Number of test points	Up to 1,000 total points
Test amplitude	10 mVpp to 9 Vpp into 50-Ω
	Fixed amplitude across the entire sweep
Test results	Logarithmic overlaid gain and phase plot
Manual measurements	A single pair of tracking gain and phase markers
Plot scaling	Auto-scaled during test and manual

Environmental

Connectivity

	EDUX1002A/EDUX1002G/DSOX1102A/DSOX1102G
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, printers, and keyboards

	DSOX1204A/DSOX1204G
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 1 Gb/s networking: RJ-45

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 [9]
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

Nonvolatile storage

	All Models
Reference waveform display	Two internal waveforms or USB thumb drive
Waveform storage	Set up, .bmp, .png, .csv, ASCII XY, reference waveforms, .bin, mask, HDF5
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 (DSOX1204A/G only)

9. From 40 °C to 50 °C, the maximum % Relative Humidity follows the line of constant dew point.

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