SDS1000X-E
Digital Oscilloscope

Data Sheet

Rev. 05A



SIGLENT TECHNOLOGIES CO.,LTD

SDS1104X-E
SDS1204X-E
SDS1202X-E

Product Overview

SIGLENT's SDS1000X-E Super Phosphor Oscilloscopes feature two channel and four channel models. The two channel model is available with a 200 MHz analog bandwidth, a single ADC with 1 GSa/s maximum sample rate, and a single memory module with 14 Mpts of sample memory. The four channel scope is available in 100 and 200 MHz models and incorporates two 1 GSa/s ADCs and two 14 Mpts memory modules. When all channels are enabled, each channel has sample rate of 500 MSa/s and a standard record length of 7 Mpts. When only a single channel per ADC is active, the maximum sample rate is 1 GSa/s and the maximum record length is 14 Mpts. For ease-of-use, the most commonly used functions can be accessed with its user-friendly front panel design.

The SDS1000X-E series employs a new generation of SPO (Super- Phosphor Oscilloscope) technology that provides excellent signal fidelity and performance. The system noise is also lower than similar products in the industry. It comes with a minimum vertical input range of 500 uV/div, an innovative digital trigger system with high sensitivity and low jitter, and a waveform capture rate of 400,000 frames/sec (sequence mode). The SDS1000X-E also employs a 256-level intensity grading display function and a color temperature display mode not found in other models in this class. SIGLENT's latest oscilloscope offering supports multiple powerful triggering modes including serial bus triggering. Serial bus decoding for IIC, SPI, UART, CAN, LIN bus types are included. The X-E models also include History waveform recording, and sequential triggering that enable extended waveform recording and analysis. Another powerful addition is the new 1 million points FFT math function that gives the SDS1000X-E very high frequency resolution when observing signal spectra. The new digital design also includes a hardware co-processor that delivers measurements quickly and accurately without slowing acquisition and front-panel response. The features and performance of SIGLENT's new SDS1000X-E cannot be matched anywhere else in this price class.

The four channel series support even more functions, including: searching and navigating, on-screen Bode plot, 16 digital channels (Option), an external USB powered 25 MHz AWG module (Option), and an embedded application that allows remote control via web browser.

Key Features

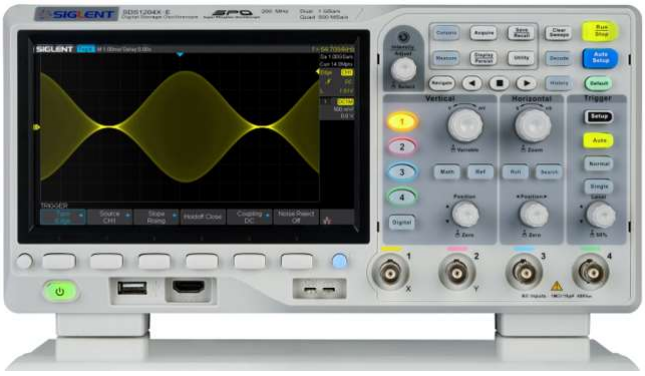
- 100 MHz, 200 MHz bandwidth models
- Two channel series have one 1 GSa/s ADC, four channel series have two 1 GSa/s ADCs. When all channels are enabled, each channel has a maximum sample rate of 500 MSa/s. When a single channel per ADC is active, it has sample rate of 1 GSa/s
- The Siglent SPO technology
  - Waveform capture rates up to 100,000 wfm/s (normal mode) and 400,000 wfm/s (sequence mode)
  - Supports 256-level intensity grading and color temperature display modes
  - Record length up to 14 Mpts
  - Digital trigger system
- Intelligent trigger: Edge, Slope, Pulse Width, Window, Runt, Interval, Time out (Dropout), Pattern
- Serial bus triggering and decoding (Standard), supports protocols IIC, SPI, UART, CAN, LIN
- Video trigger, supports HDTV
- Low background noise with voltage scales from 500 μV/div to 10 V/div
- 10 types of one-button shortcuts, supports Auto Setup, Default, Cursors, Measure, Roll, History, Display/Persist, Clear Sweep, Zoom and Print
- Segmented acquisition (Sequence) mode, divides the maximum record length into multiple segments (up to 80,000), according to trigger conditions set by the user, with a very small dead time segment to capture the qualifying event
- History waveform record (History) function (maximum recorded waveform length is 80,000 frames)
- Automatic measurement function for 38 parameters as well as Measurement Statistics, Zoom, Gating, Math, History and Reference functions
- 1 Mpts FFT. Four channel series support Peaks and Markers
- Math and measurement functions use all sampled data points (up to 14 Mpts)
- Math functions (FFT, addition, subtraction, multiplication, division, integration, differential, square root)
- Preset key can be customized for user settings or factory "defaults"
- Security Erase mode
- High Speed hardware-based Pass/ Fail function
- MSO, 16 digital channels (four channel series only, option)
- Bode plot, Measuring Power Supply Control Loop Response (four-channel series only)
- Search and navigate (four-channel series only)
- USB AWG module (four channel series only, option)
- Web Browser based control (four channel series only)
- Large 7-inch TFT-LCD display with 800 * 480 resolution
- Multiple interface types: USB Host, USB Device (USB -TMC), LAN, Pass / Fail, Trigger Out
- Supports SCPI remote control commands
- VXI-11+SCPI, Telnet (Port 5024) +SCPI and Socket (Port 5025) +SCPI programming over LAN
- Supports Multi-language display and embedded online help
- Supports Label(four channel series only)
- Supports counter(four channel series only)
- Supports data logger including Sample Logger and Measurement Logger(four channel series only)
- Supports NTP(Network Time Protocol) (four channel series only)

Models and Key Specifications

Model	SDS1104X-E	SDS1204X-E SDS1202X-E
Bandwidth	100 MHz	200 MHz
Sample rate (Max.)	Two channel series have a single 1 GSa/s ADC, four channel series have two 1 GSa/s ADCs. When all channels are enabled, each channel has a maximum sample rate of 500 MSa/s. When a single channel per pair is active, that channel has sample rate of 1 GSa/s	
Channels	4 (four channel series) 2+EXT (two channel series)	
Memory depth (Max.)	7 Mpts/CH (not interleave mode); 14 Mpts/CH (interleave mode)	
Waveform capture rate (Max.)	100,000 wfm/s (normal mode), 400,000 wfm/s (sequence mode)	
Trigger type	Edge, Slope, Pulse Width, Window, Runt, Interval, Dropout, Pattern, Video	
Serial Trigger and decoder (Std)	IIC, SPI, UART, CAN, LIN	
16 Digital Channels (four channel series only, option)	Maximum waveform capture rate up to 1 GSa/s, Record length up to 14 Mpts/CH	
USB AWG module (four channel series only, option)	One channel, 25 MHz, sample rate of 125 MHz, wave length of 16 kpts, isolated output (SAG1021I only)	
Bode plot (four channel series only)	Minimum start frequency of 10 Hz, minimum scan bandwith of 500 Hz, maximum scan bandwidth of 120 MHz (dependent on Oscilloscope and AWG bandwidth), 500 maximum scan frequency points	
Data Logger(four channel series only)	Sample Logger. The Max sample rate is 25kSa/s, the Min sample rate is 1Sa/s.	
	Measure Logger. The Max interval is 10 minutes, the Min interval is 0.1s. The Max number of measurements that can be logged is 4.	
I/O	USB Host, USB Device, LAN, Pass/Fail, Trigger Out, Sbus (Siglent MSO)	
Probe (Std)	4 pcs passive probe PP510	4/2 pcs passive probe PP215
Display	7-inch TFT-LCD (800x480)	
Weight	Four channel series: Without package 2.6 kg; With package 3.8 kg Two channel series: Without package 2.5 kg; With package 3.5 kg	

Functions & Characteristics

7 Inch TFT-LCD Display and 10 One-button Menus



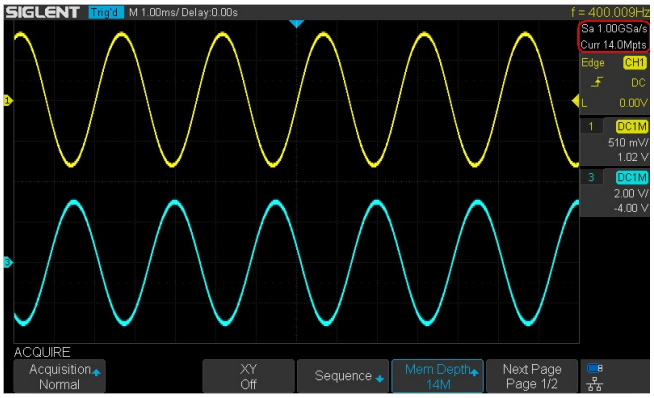
Front panel of the four channel series

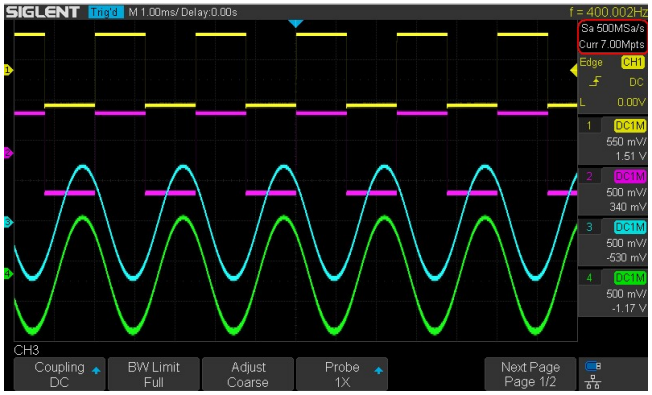


Front panel of the two channel series

7-inch TFT -LCD display with 800 * 480 resolution. Most commonly used functions are accessible using 10 different one-button operation keys: Auto Setup, Default, Cursor, Measure, Roll, History, Persist, Clear Sweep, Zoom, Print.

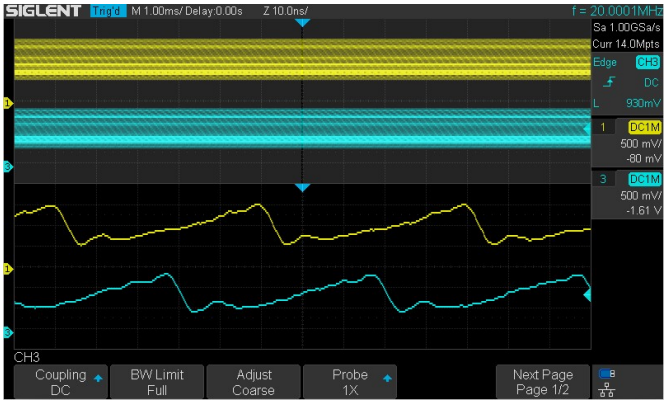
When all channels are enabled, each channel has a maximum sample rate of 500 MSa/s. When a single channel per pair is active, that channel has sample rate of 1 GSa/s





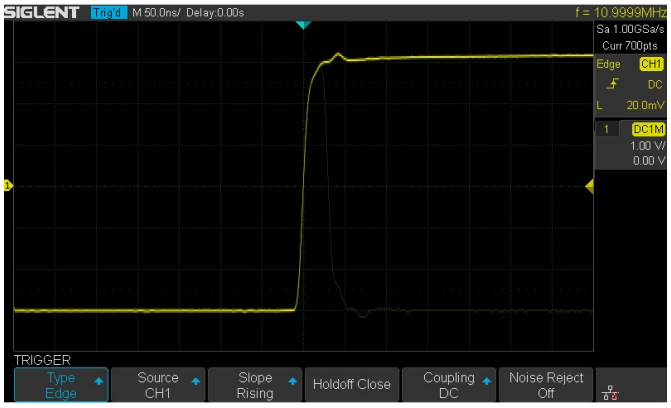
The four channel series has two 1GSa/s ADC chips (channel 1 and 2 share one, channel 3 and 4 share another), so that each channel can achieve sample rates up to 500 MSa/s and work on bandwidths of 200 MHz when all channels are enabled.

Record Length of up to 14 Mpts



Using hardware-based Zoom technologies and max record length of up to 14 Mpts, users are able to oversample to capture for longer time periods at higher resolution and use the zoom feature to see more

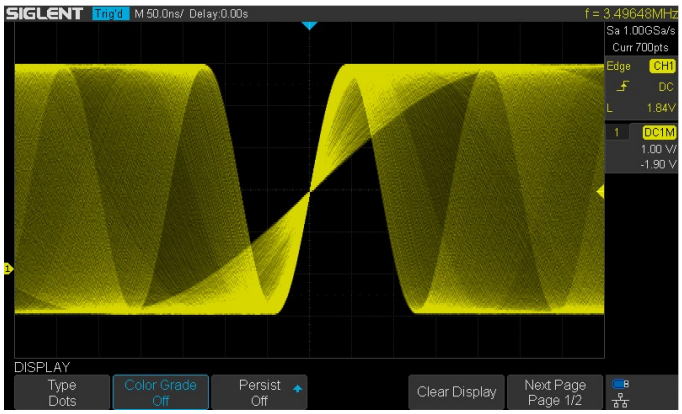
Waveform Capture Rate up to 400,000 wfm/s



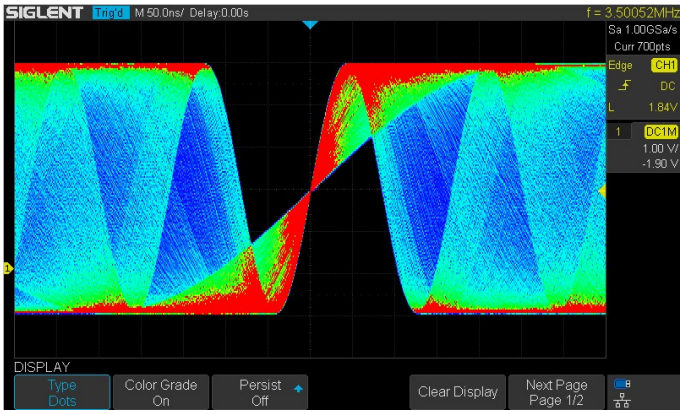
With a waveform capture rate of up to 400,000 wfm/s (sequence mode), the oscilloscope can easily capture the unusual or low-probability events.

details within each signal.

256-Level Intensity Grading and Color Temperature Display

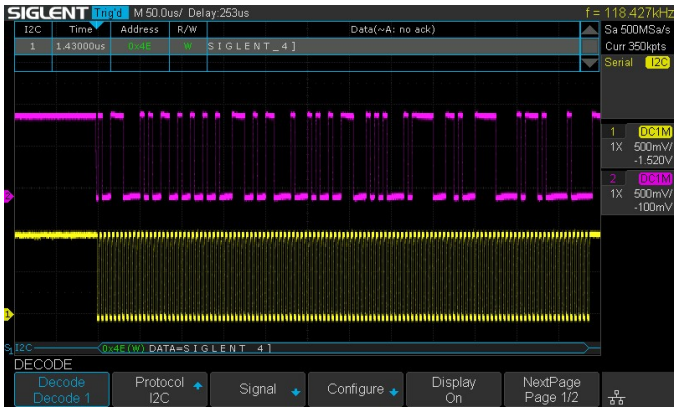


SPO display technology provides fast refresh rates. The resulting intensity-graded trace is brighter for events that occur with more frequency and dims when the events occur with less frequency.



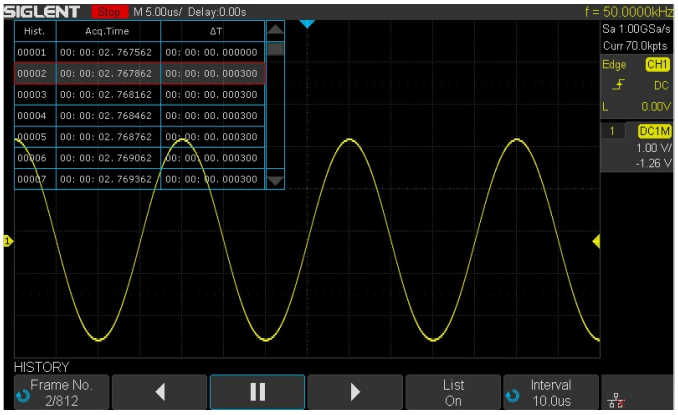
The color temperature display is similar to the intensity-graded trace function, but the trace occurrence is represented by different colors (color "temperature") as opposed to changes in the intensity of one color. Red colors represent events that occur more frequently, while blue is used to mark points that occur less frequently.

Serial Bus Decoding Function (Standard)



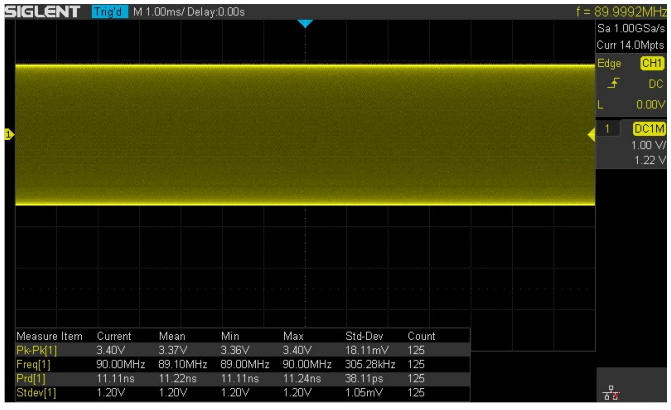
SDS1000X-E displays the decoding through the events list. Bus protocol information can be quickly and intuitively displayed in a tabular format.

History Waveforms (History) Mode and Segmented Acquisition (Sequence)



Playback the latest triggered events using the history function. Segmented memory collection will store trigger events into multiple (Up to 80,000) memory segments, each segment will store triggered waveforms and timestamp of each frame.

True measurement to 14 M points



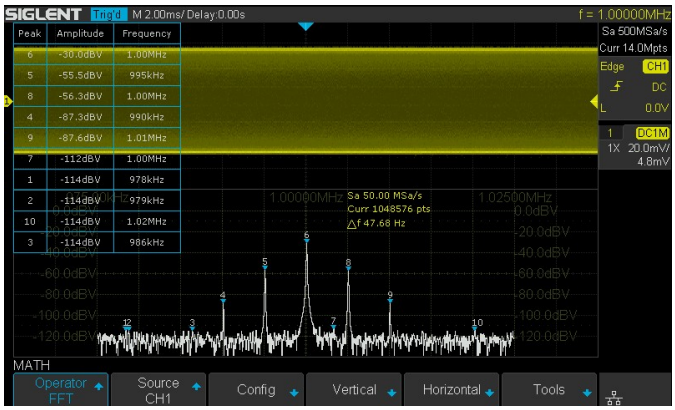
Gate and Zoom Measurement



SDS1000X-E can measure all sampled data points up to 14 Mpts. This ensures the accuracy of measurements while the math co-processor decreases measurement time and increases ease-of-use.

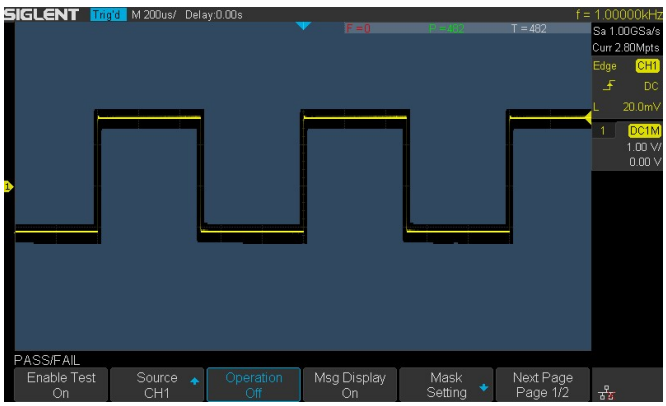
Through Gate and Zoom measurement, the user can specify an arbitrary interval of waveform data analysis and statistics. This helps avoid measurement errors that can be caused by invalid or extraneous data, greatly enhancing the measurements' validity and flexibility.

1M points used to calculate the FFT



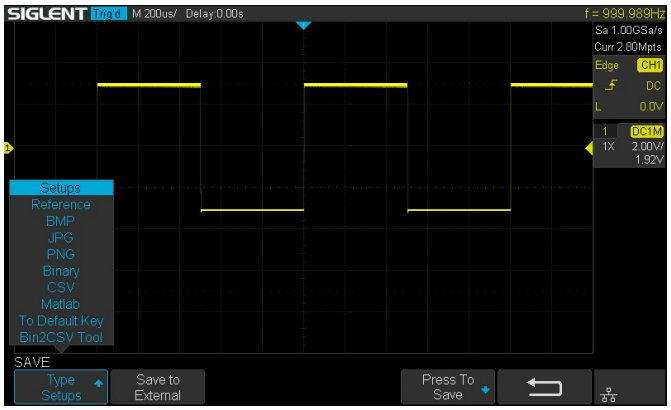
The new math co-processor enables FFT analysis of incoming signals using up to 1 M samples per waveform. This provides high frequency resolution with a fast refresh rate. The FFT function also supports a variety of window functions so that it can adapt to different spectrum measurement needs. Four-channel series support Peaks, Markers, a variety of numbers.

Hardware-Based High-Speed Pass/Fail



The SDS1000X-E utilizes a hardware-based Pass/Fail function, performing up to 40,000 Pass / Fail decisions each second. Easily generate user defined test templates provide trace mask comparison making it suitable for long-term signal monitoring or automated production line testing.

Customizable Default Key



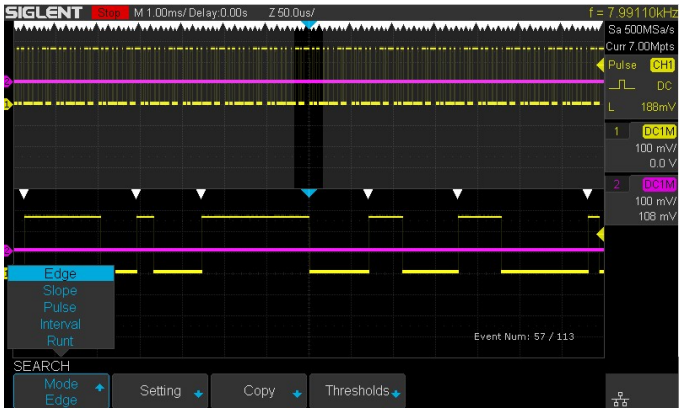
The current parameters of the oscilloscope can be preset to Default Key through the Save menu.

16 Digital Channels/MSO (four-channel series only, option)



16 digital channels enables users to acquire and trigger on the waveforms then analyze the pattern, simultaneously with one instrument.

Search and Navigate (four-channel series only)



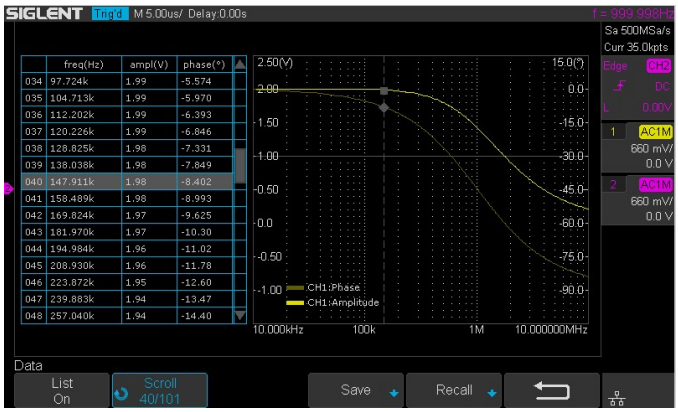
The SDS1000X-E can search events specified by the user in a frame. It can also navigate by time (delay position) and historical frames.

USB 25MHz AWG Module (four-channel series only, option)



The four channel series supports a USB 25 MHz function/arbitrary waveform generator that is operated from the USB host connection. Functions include Sine, Square, Ramp, Pulse, Noise, DC and 45 built-in waveforms. The arbitrary waveforms can be accessed and edited by the SIGLENT EasyWave PC software.

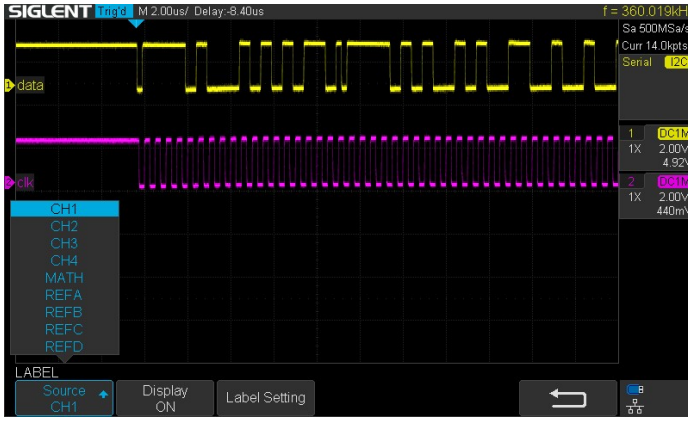
Bode Plot (four-channel series only)





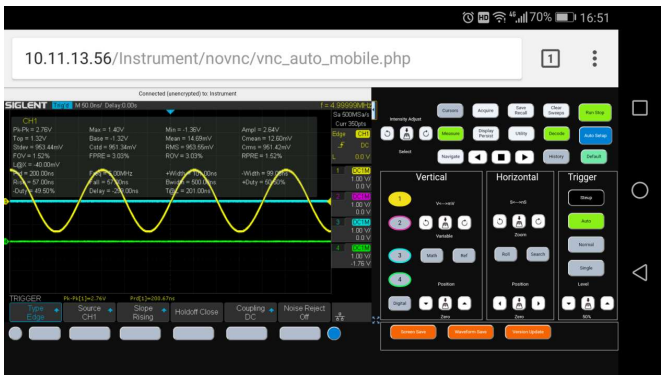
SDS1000X-E can control the USB AWG module or control an independent SIGLENT SDG instrument, scan a devices amplitude and phase frequency response, and display the data as a Bode Plot. There is also a Vari-level Mode for accurately measuring Power Supply Control Loop Response (PSRR). It can also show the result lists, and export the data to a USB disk.

Label(four-channel series only)



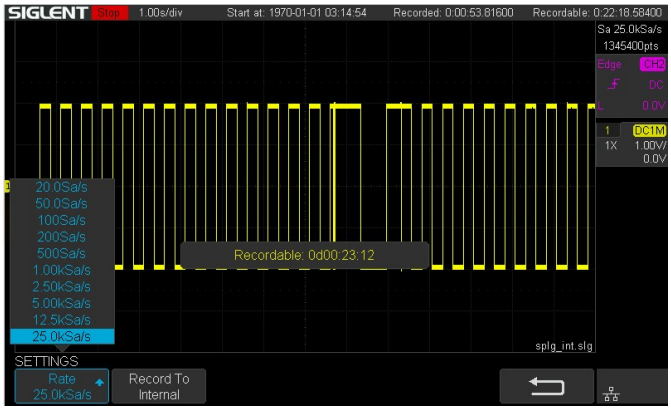
When multi-channel measurement is used, corresponding labels are set for different sources to facilitate observation and reading.

Web control (four-channel series only)



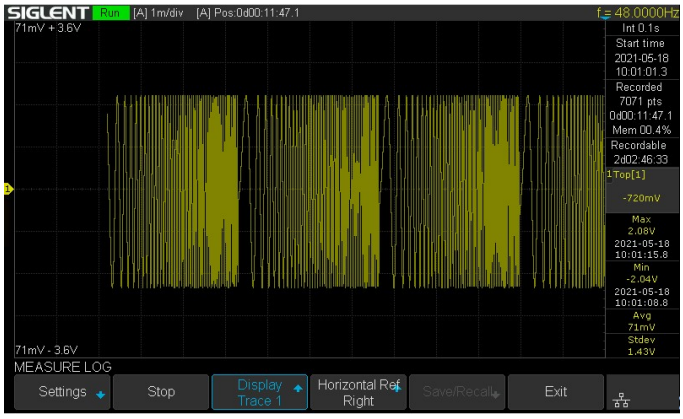
With the new embedded web server, users can control the SDS1xx4X-E from a simple web page. This provides wonderful remote troubleshooting and monitoring capabilities. The web page has PC and mobile styles that include an embedded virtual control panel.

Sample Logger(four-channel series only)



The Sample Logger is the mode of logging the sampling points over long time durations. . Data is logged into the internal flash or external U disk in real time. After logging is complete, the user can recall the sampling points on the oscilloscope, or analyze the saved data on the computer.

Measurement Logger (four-channel series only)



The measurement Logger is designed to collect measurement values for a long time. The data is logged in memory. After logging is complete, the data can be saved into the internal flash or external U disk.

Complete Connectivity



Back panel of the four-channel series



Back panel of the two-channel series

SDS1000X-E supports USB Host, USB Device (USB -TMC), LAN (VXI -11), Pass/Fail and Trigger Out.

Specifications

Acquisition System	
Sampling Rate (Max.)	1 GSa/s (single channel/pair), 500 MSa/s (two channels/pair)
Memory Depth (Max.)	Max 14 Mpts/Ch (single channel/pair), 7 Mpts/Ch (two channels/pair)
Peak Detect	2 ns (Four-channel series) 4 ns (Two-channel series)
Average	Averages:4,16, 32,64,128,256,512,1024
ERES	Enhance bits:0.5, 1.5, 2, 2.5, 3
Waveform interpolation	Sin(x)/x, Linear

Input	
Channels	4 (Four-channel series) 2+EXT (Two-channel series)

Coupling	DC, AC, GND
Impedance	DC: (1 MΩ±2%) ‖ (17 pF ±3 pF) (Four-channel series) DC: (1 MΩ±2%) ‖ (16 pF ±3 pF) (Two-channel series)
Max. Input voltage	1 MΩ: ≤400 Vpk (DC + Peak AC <=10 kHz)
CH to CH Isolation	DC-Max BW :>40 dB
Probe attenuation	0.1X,0.2X,0.5X,1X,2X,5X,10X.....1000X,2000X,5000X,10000X,Custom

Vertical System	
Bandwidth (-3dB)	200 MHz (SDS1204X-E/SDS1202X-E) 100 MHz (SDS1104X-E)
Vertical Resolution	8-bit
Vertical Scale (Probe 1X)	500 μV/div-10 V/div (1-2-5 sequence) 500 μV- 118 mV: ± 2 V
Offset Range (Probe 1X)	120 mV- 1.18 V: ± 20 V 1.2 V- 10 V: ± 200 V
Bandwidth limit	20 MHz ± 40%
Bandwidth Flatness	DC- 10% (BW): ± 1 dB 10%- 50% (BW): ± 2 dB 50%- 100% (BW): + 2 dB/-3 dB
Low frequency response (AC coupling -3 dB)	≤2 Hz (at input BNC)
Noise	ST-DEV ≤0.5 division (<1 mV/div) ST-DEV ≤0.2 division (<2 mV/div) ST-DEV ≤0.1 division(≥ 2 mV/div)
SFDR including harmonics	≥ 35 dB
DC Gain Accuracy	≤±3.0%: 5 mV/div-10 V/div ≤±4.0%: ≤2 mV/div
Offset Accuracy	±(1%* Offset+1.5%*8*div+2 mV): ≥2 mV/div ±(1%* Offset+1.5%*8*div+500 uV): ≤1 mv/div
Rise time	Typical 1.8 ns (SDS1204X-E/SDS1202X-E) Typical 3.5 ns (SDS1104X-E)
Overshoot (500 ps Pulse)	< 10%

Horizontal System	
Timebase Scale	1.0 ns/div-100 s/div
Channel Skew	<100 ps
Waveform Capture Rate	Up to 100,000 wfm/s (normal mode), 400,000 wfm/s (sequence mode)
Intensity grading	256 Levels
Display Format	Y -T, X -Y, Roll
Timebase Accuracy	±25 ppm
Roll Mode	50 ms/div-100 s/div (1-2-5 sequence)

Trigger System	
Mode	Auto, Normal, Single
Level	Internal: ±4.5 div from the center of the screen EXT: ±0.6 V (Two channel series) EXT/5: ±3 V(Two channel series)
Hold off range	80 ns- 1.5 s
Coupling	AC DC LFRJ HFRJ

	Noise RJ
Coupling Frequency Response	DC: Passes all components of the signal AC: Blocks DC components and attenuates signals below 8Hz LFRJ: Blocks the DC component and attenuates the low-frequency components below 2 MHz HFRJ: Attenuates the high-frequency components above 1.2 MHz
Coupling Frequency Response (EXT, Two channel series)	DC: Passes all components of the signal AC: Blocks DC components and attenuates signals below 20 Hz LFRJ: Blocks the DC component and attenuates the low-frequency components below 7 kHz HFRJ: Attenuates the high-frequency components above 160 kHz
Accuracy (typical)	Internal: ±0.2 div EXT(Two channel series): ±0.4 div
Sensitivity	DC - Max BW 0.6 div EXT(Two channel series): 200 mVpp DC- 10 MHz 300 mVpp 10 MHz - BW frequency EXT/5 (Two-channel series): 1 Vpp DC – 10 MHz; 1.5 Vpp 10 MHz -BW frequency
Jitter	<100 ps
Displacement	Pre-Trigger: 0 - 100% Memory Delay Trigger: 0 to 10,000 div
Edge Trigger	
Slope	Rising, Falling, Rising & Falling
Source	All channels/EXT/(EXT/5)/AC Line(Two-channel series) All channels/ AC Line(Four-channel series)
Slope Trigger	
Slope	Rising, Falling
Limit Range	<, >, < >, > <
Source	All channels
Time Range	2ns- 4.2s
Resolution	1ns
Pulse Width Trigger	
Polarity	+wid , -wid
Limit Range	<, >, < >, > <
Source	All channels
Pulse Range	2 ns - 4.2s
Resolution	1 ns
Video Trigger	
Signal Standard	NTSC, PAL,720p/50,720p/60,1080p/50,1080p/60,1080i/50,1080i/60,Custom
Source	All channels
Sync	Any, Select
Trigger condition	Line, Field
Window Trigger	
Window Type	Absolute, Relative
Source	All channels
Interval Trigger	
Slope	Rising, Falling
Limit Range	<, >, < >, > <
Source	All channels
Time Range	2 ns - 4.2 s
Resolution	1 ns

Dropout Trigger	
Timeout Type	Edge, State
Source	All channels
Slope	Rising, Falling
Time Range	2 ns - 4.2 s
Resolution	1ns
Runt Trigger	
Polarity	+wid , -wid
Limit Range	< , > , < > , > <
Source	All channels
Time Range	2 ns - 4.2 s
Resolution	1 ns
Pattern Trigger	
Pattern Setting	Invalid, Low, High
Logic	AND, OR, NAND, NOR
Source	All channels
Limit Range	< , > , < > , > <
Time Range	2 ns - 4.2 s
Resolution	1 ns
Serial Trigger	
I2C Trigger	
Condition	Start, Stop, Restart, No Ack, EEPROM, 7-bits Address & Data, 10-bits Address & Data, Data Length
Source(SDA/SCL)	All channels
Data format	Hex
Limit Range	EEPROM: =, >, <
Data Length	EEPROM: 1byte
	Addr & Data: 1-2byte
	Data Length: 1-12byte
R/W bit	Addr & Data: Read, Write, Do not care
SPI Trigger	
Condition	Data
Source(CS/CL/Data)	All channels
Data format	Binary
Data Length	4-96-bit
Bit Value	0, 1, X
Bit Order	LSB, MSB
UART Trigger	
Condition	Start, Stop, Data, Parity Error
Source(RX/TX)	All channels
Data format	Hex
Limit Range	=, >, <
Data Length	1 byte
Data Width	5, 6, 7, 8-bits
Parity Check	None, Odd, Even, Space, Mark
Stop Bit	1, 1.5, 2-bits
Idle Level	High, Low
Baud Rate(Selectable)	600/1200/2400/4800/960019200/38400/57600/115200/Custom bit/s
Baud Rate (Custom)	300-5000000 bit/s
CAN Trigger	
Condition	Start, Remote, ID, ID + Data, Error

Source	All channels
ID	STD (11-bits), EXT (29-bit)
Data Format	Hex
Data Length	1 -2 byte
Baud Rate	5k/10k/20k/50k/100k/125k/250k/500k/800k/1M/Custom bit/s
LIN Trigger	
Condition	Break, Frame ID, ID+Data, Error
Source	All channels
ID	1byte
Data Format	Hex
Data Length	1-2byte
Baud Rate (Selectable)	600/1200/2400/4800/9600/19200/Custom bit/s
Baud Rate (Custom)	300 bit/s -20 kbit/s

Search	
Event	Edge, Slope, Pulse, Interval, Runt
Event Number	Y-T: 700 ROLL: No limitation Stop After ROLL: 700

Serial Decoder	
Decoders	2
I^2C	
Signal	SCL, SDA
Address	7, 10 bits
Threshold	-4.5 - 4.5 div
List	1- 7 lines
SPI	
Signal	SCL,MISO, MOSI, CS (2 channel scopes can only use 2 signal) identifiers
Edge Select	Rising, Falling
Idle Level	Low, High
Bit Order	MSB, LSB
Threshold	-4.5 - 4.5 div
List	1- 7 lines
UART	
Signal	RX, TX
Data Width	5，6，7，8 bits
Parity Check	None, Odd, Even, Space, Mark
Stop Bit	1, 1.5, 2 bits
Idle Level	Low, High
Threshold	-4.5 - 4.5 div
List	1- 7 lines
CAN	
Signal	CAN_H, CAN_L
Source	CAN_H, CAN_L, CAN_H-CAN_L
Threshold	-4.5 - 4.5 div
List	1- 7 lines
LIN	

LIN Specification Package Revision	Ver1.3, Ver2.0
Threshold	-4.5 - 4.5 div
List	1- 7 lines

Measurement		
Source	All channels, All channels in Zoom, Math, All References, History	
Number of Measurements	Display 4 measurements at the same time. 5 measurements displayed in statistics table.	
Measurement Range	Screen or Gate region	
Measurement Parameters	38 Types	
Vertical	Max	Highest value in input waveform
	Min	Lowest value in input waveform
	Pk-Pk	Difference between maximum and minimum data values
	Ampl	Difference between top and base in a bimodal signal, or between max and min in an unimodal signal
	Top	Value of most probable higher state in a bimodal waveform
	Base	Value of most probable lower state in a bimodal waveform
	Mean	Average of all data values
	Cmean	Average of data values in the first cycle
	Stdev	Standard deviation of all data values
	Cstd	Standard deviation of all data values in the first cycle
	VRMS	Root mean square of all data values
	Crms	Root mean square of all data values in the first cycle
	FOV	Overshoot after a falling edge;(base -min)/Amplitude
	FPRE	Overshoot before a falling edge;(max -top)/Amplitude
	ROV	Overshoot after a rising edge;(max -top)/Amplitude
	RPRE	Overshoot before a rising edge;(base -min)/Amplitude
	Level@X	the voltage value of the trigger point
Horizontal	Period	Time between the middle threshold points of two consecutive, like-polarity edges
	Freq	Reciprocal of period
	+Wid	Width measured at 50% level and positive slope
	-Wid	Width measured at 50% level and negative slope
	Rise Time	Duration of rising edge from 10 -90%
	Fall Time	Duration of falling edge from 90 -10%
	Bwid	Time from the first rising edge to the last falling edge, or the first falling edge to the last rising edge at the 50% crossing
	+Dut	Time difference between the 50% threshold of a rising edge to the 50% threshold of the next falling edge of the pulse
	-Dut	Time difference between the 50% threshold of a falling edge to the 50% threshold of the next rising edge of the pulse
	Delay	Time from the trigger to the first transition at the 50% crossing
	Time@Level	Time from the trigger to each rising edge at the 50% crossing. When Statistics is Off, it shows the time from the trigger to the last rising edge at the 50% crossing. When Statistics is On, it shows the Mean, Min, Max, Standard Deviation of time from the trigger to each rising edge at the 50% crossing in multiple frames (number = Count). The Current shows the time of current frame from the trigger to the last rising edge at the 50% crossing.
Delay	Phase	Phase difference between two edges
	FRR	Time from the first rising edge of channel A to the following first rising edge of channel B

	FRF	Time from the first rising edge of channel A to the following first falling edge of channel B
	FFR	Time from the first falling edge of channel A to the following first rising edge of channel B
	FFF	Time from the first falling edge of channel A to the following first falling edge of channel B
	LRR	Time from the first rising edge of channel A to the last rising edge of channel B
	LRF	Time from the first rising edge of channel A to the last falling edge of channel B
	LFR	Time from the first falling edge of channel A to the last rising edge of channel B
	LFF	Time from the first falling edge of channel A to the last falling edge of channel B
	Skew	Time of source A edge minus time of nearest source B edge
Cursors	Manual : Time X1, X2, (X1 -X2), (1/ΔT) Voltage Y1, Y2, (Y1 -Y2) Track: Time X1, X2, (X1 -X2)	
Statistics	Current, Mean, Min, Max, Stdev, Count	
Counter	Hardware 6-digit counter（channels are selectable）	

Math	
Operation	+ , - , * , / , FFT , d/dt , ∫dt , √
FFT window	Rectangular, Blackman, Hanning, Hamming, Flattop
FFT display	Full Screen, Split, Exclusive

USB AWG Module (four channel series only, option)	
Channel	1
Max. Output Frequency	25 MHz
Sampling Rate	125 MSa/s
Frequency Resolution	1 μHz
Frequency Accuracy	±50 ppm
Vertical Resolution	14-bits
Amplitude Range	-1.5 ~ +1.5 V (50Ω load)
	-3 ~ +3 V (High-Z load)
Waveform Type	Sine, Square, Ramp, Pulse, Noise, DC and 45 built-in waveforms
Output impedance	50Ω ± 2%
Protection	Over-Voltage Protection, Current-Limiting Protection
Insulation Voltage	±42 Vpk (for SAG2021I only)
Sine	
Frequency	1 μHz ~ 25 MHz
Offset Accuracy(10 kHz)	±(1%*Offset Setting Value +3 mVpp)
Amplitude flatness (10 kHz, 5Vpp)	±0.3 dB
SFDR	DC ~ 1 MHz -60dBc
	1 MHz ~ 5 MHz -55dBc
	5 MHz ~ 25 MHz -50dBc
HD	DC ~ 5 MHz -50dBc
	5 MHz ~ 25 MHz -45dBc
Square/Pulse	
Frequency	1 μHz ~ 1 0MHz
Duty Cycle	1% ~99%
Rise/Fall time	< 24 ns (10% ~ 90%)
Overshoot(1kHz,1Vpp,	< 3% (typical 1kHz, 1 Vpp)

Typical)	
Pulse Width	> 50 ns
Jitter	< 500 ps + 10 ppm
Ram	
Frequency	1 μHz ~ 300 kHz
Linearity(Typical)	< 0.1% of Pk-Pk (Typical, 1 kHz, 1 Vpp, 50% Symmetry)
Symmetry	0% ~ 100%
DC	
Offset range	±1.5 V (50Ω load)
	±3 V (High-Z load)
Accuracy	±(|offset|*1%+3 mV)
Noise	
Bandwidth	>25 MHz (-3dB)
Arbitrary Wave	
Frequency	1 μHz ~ 5 MHz
Wave Length	16 kpts
Sampling Rate	125MSa/s
Lead in	EasyWave and U-Disk

Digital Channels (four channel series only, option)	
No. of Channels	16
Max. Sampling Rate	1 GSa/s
Memory Depth	14 Mpts/CH
Min. Detectable Pulse Width	4 ns
Level Group	D0~D7, D8~D15
Level Range	-8 V ~ 8 V
Logic Type	TTL, CMOS, LVCMOS3.3, LVCMOS2.5, Custom
Skew	D0~D15: ±1 sampling interval Digital to Analog: ± (1 sampling interval +1ns)

I/O	
Standard	USB Host (1 for two channel series, and 2 for four channel series), USB Device, LAN, Pass/Fail, Trigger Out
Pass/Fail	3.3V TTL Output

Display(Screen)	
Display Type	7-inch TFT LCD
Display Resolution	800×480 pixels
Display Color	24-bit
Contrast(Typical)	500:1
Backlight	300 nits

Display(Waveform)	
Range	8 x 14 divisions
Display Mode	Dot, Vector
Persist Time	Off, 1 Sec, 5 Sec, 10 Sec, 30 Sec, Infinite
Color Display	Normal, Color
Screen Saver	1 min, 5 min, 10 min, 30 min, 1 hour, Off

Language	Simplified Chinese, Traditional Chinese, English, French, Japanese, Korean, German, Russian, Italian, Portuguese

Environments	
Temperature	Operating: 0℃ - +40℃ Non-operating: -20℃ - + 60℃
Humidity	Operating: 85% RH, 40 ℃, 24 hours Non-operating: 85% RH, 65 ℃, 24 hours
Height	Operating: ≤ 3000 m Non-operating: ≤ 15,000 m

Standards			
Electromagnetic compatibility	Meets EMC directive (2014/30/EU), meets or exceeds IEC 61326-1:2012/EN61326-1:2013 (Basic)		
	Conducted disturbance	CISPR 11/EN 55011	CLASS A group 1，150kHz-30MHz
	Radiated disturbance	CISPR 11/EN 55011	CLASS A group 1， 30MHz-1GHz
	Electrostatic discharge (ESD)	IEC 61000-4-2/EN 61000-4-2	4.0 kV（Contact），8.0 kV（Air）
	Radio-frequency electromagnetic field Immunity	IEC 61000-4-3/EN 61000-4-3	10 V/m（80 MHz to 1 GHz）； 3 V/m（1.4 GHz to 2 GHz）； 1 V/m（2.0 GHz to 2.7GHz）
	Electrical fast transients (EFT)	IEC 61000-4-4/EN 61000-4-4	2kV （Input AC Power Ports）
	Surges	IEC 61000-4-5/EN 61000-4-5	1kV （Line to line） 2kV （Line to ground）
	Radio-frequency continuous conducted Immunity	IEC 61000-4-6/EN 61000-4-6	3 V, 0.15-80MHz
	Voltage dips and interruptions	IEC 61000-4-11/EN 61000-4-11	Voltage Dips： 0% UT during 1 cycle; 40% UT during 10/12 cycles; 70% UT during 25/30 cycles Voltage interruptions：0% UT during 250/300 cycles
Safety	UL 61010-1:2012/R: 2018-11; CAN/CSA-C22.2 No. 61010-1:2012/A1:2018-11. UL 61010-2-030:2018; CAN/CSA-C22.2 No. 61010-2-030:2018.		

Power Supply	
Input Voltage	100 ~ 240 Vrms 50/60Hz 100 ~ 120 Vrms 400Hz
Power	50 W Max (Four-channel series) 25 W Max (Two-channel series)

Mechanical (Four-channel series)	
Dimensions	Length: 312 mm Width: 132.6 mm Height: 151 mm
Weight	N.W: 2.6 kg; G.W: 3.8 kg

Mechanical (Two-channel series)	
Dimensions	Length: 312 mm

	Width: 134 mm Height:150 mm
Weight	N.W:2.5 kg; G.W: 3.5 kg

Accessories

Probe	Picture	Model	Specifications &Description
Demo Board		STB-3 Test Board	Output signals including square, sine, AM, fast edge, pulse, PWM, I2C, CAN, LIN etc. Used in teaching and demonstrations.
USB Isolated AWG Module		SAG1021I	Output Sine, Square, Ramp, pulse, Noise, DC and 45 built-in waveforms. The arbitrary waveforms can be accessed and edited by the EasyWave PC software.
Rack Mount		SDS1X-E-RMK	The height is 4U.

Ordering Information

Ordering information		
Product Name	SDS1104X-E 100MHz Four Channels	
	SDS1204X-E 200MHz Four Channels	
	SDS1202X-E 200MHz Two Channels	
Standard Accessories	USB Cable -1	
	Quick Start -1	
	Passive Probe -4/2	
	Certification -1	
	Power Cord -1	
Optional Accessories	16 Channels Logic Analyzer (four-channel series only)	SLA1016
	USB Isolated AWG Module Hardware (four channel series only)	SAG1021I
	STB Demo Source	STB-3
	High Voltage Probe	HPB4010
	Current Probes	CP4020/CP4050/CP4070/ CP4070A/SCP5030/SCP5030A/ SCP5150/SCP5500
	Differential Probes	DPB4080/DPB5150/DPB5150A /DPB5700/DPB5700A
	Rack Mount	SDS1X-E-RMK

About SIGLENT

SIGLENT is an international high-tech company, concentrating on R&D, sales, production and services of electronic test & measurement instruments.

SIGLENT first began developing digital oscilloscopes independently in 2002. After more than a decade of continuous development, SIGLENT has extended its product line to include digital oscilloscopes, isolated handheld oscilloscopes, function/arbitrary waveform generators, RF/MW signal generators, spectrum analyzers, vector network analyzers, digital multimeters, DC power supplies, electronic loads and other general purpose test instrumentation. Since its first oscilloscope was launched in 2005, SIGLENT has become the fastest growing manufacturer of digital oscilloscopes. We firmly believe that today SIGLENT is the best value in electronic test & measurement.

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