SDS1000X-E Series

Super Phosphor Oscilloscope

DataSheet-2017.09

SIGLENT TECHNOLOGIES CO.,LTD

SDS1104X−E
SDS1204X−E
SDS1202X−E

Product overview

SIGLENT's new 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 a 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 is 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 point 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 includes even more functions, including: searching and navigating, on-screen Bode plot, 16 digital channels (Option), an external USB powered 25 MHz AWG module (Option), a USB WIFI adapter (Option), and an embedded application that allows remote control via web browser.

Key Features

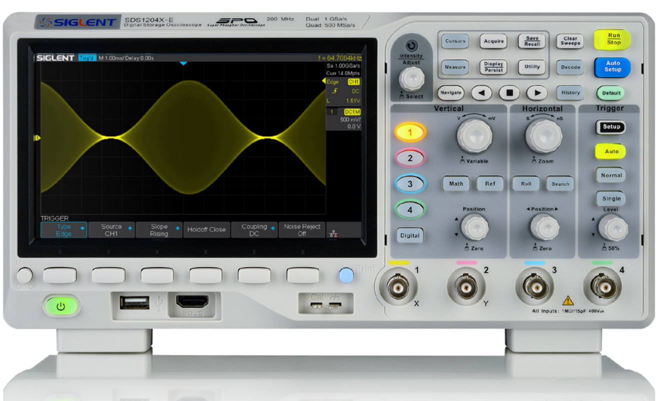
- 100 MHz, 200 MHz bandwidth models
- Two channel series have one 1 GSa/s ADC, four channel series have two 1 GSa/s ADCs. When all channels are enabled, each channel has a maximum sample rate of 500 MSa/s. When a single channel per ADC is active, it has sample rate of 1 GSa/s
- The newest generation of SPO technology
  - Waveform capture rate up to 100,000 wfm/s (normal mode), and 400,000 wfm/s (sequence mode)
  - Supports 256-level intensity grading and color 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, RS232, CAN, LIN
- Video trigger, supports HDTV
- Low background noisewith 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
- 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 (four channel series only)
- Search and navigate (four channel series only)
- USB AWG module (four channel series only, option)
- USB WIFI adapter (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
- Supports Multi-language display and embedded online help

Models and key Specification

Model	SDS1104X-E	SDS1204X -E SDS1202X-E
Bandwidth	100 MHz	200 MHz
SamplingRate (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 (Standard)	IIC, SPI, UART/RS232, 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	
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	
USB WIFI adapter (four channel series only, option)	802.11b/g/b, WPA-PSK, the adapter must be supplied by Siglent to ensure working	
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	

Function & Characteristics

7 inch TFT-LCD display and 10 one-button menus



Front panel of the four channel series

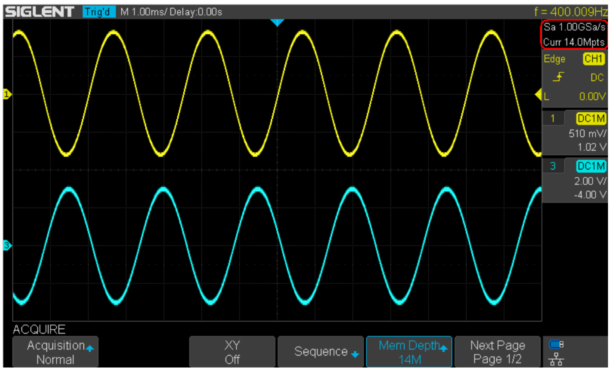
Front panel of the two channel series

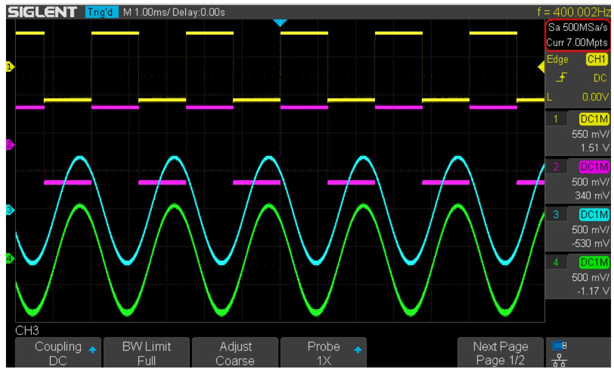
• 7 -inch TFT -LCD display with 800 * 480 resolution

• 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

Function & Characteristics

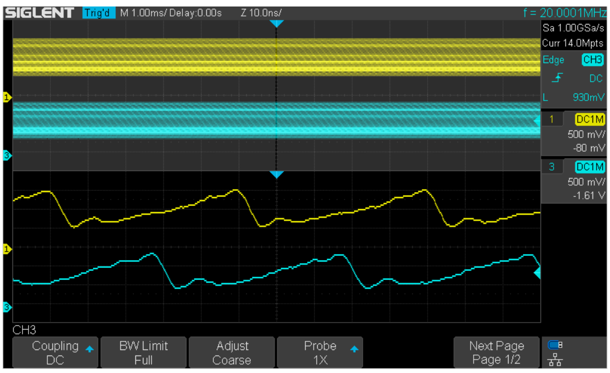
When all channels are enabled, each channel has a maximum sample rate of 500 MSa/s. When a single channel per pair is active, that channel has sample rate of 1 GSa/s





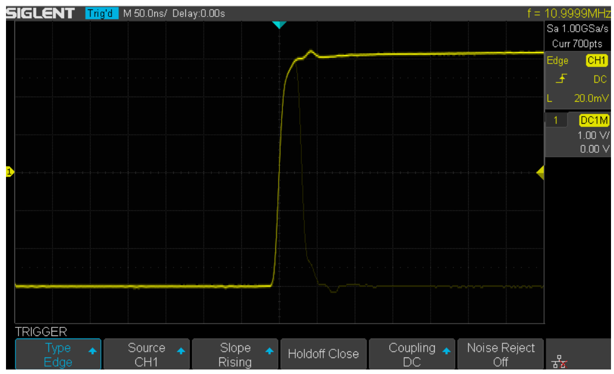
The four channel series has two 1 GSa/s ADC chips (channel 1 and 2 share one, channel 3 and 4 share another), so that each channel can achieve sample rates up to 500 MSa/and work on bandwidths of 200 MHz when all channels are enabled.

Record Length of Up to 14 Mpts (single channel/pair mode), 7 Mpts/CH (two channels/ pair mode)



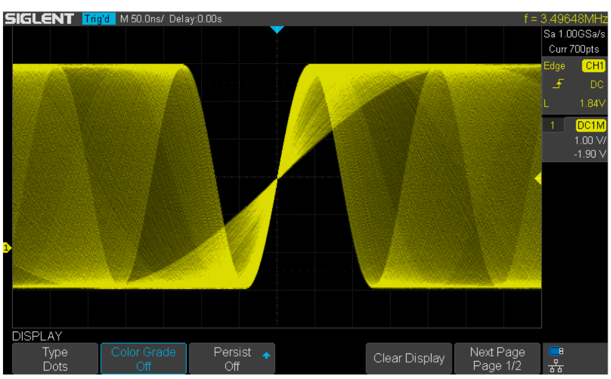
Using hardware-based Zoom technologies and max record length of up to 14 Mpts, users are able to oversample to capture for longer time periods at higher resolution and use the zoom feature to see more details within each signal.

Waveform Capture Rate Up to 400,000 wfm/s

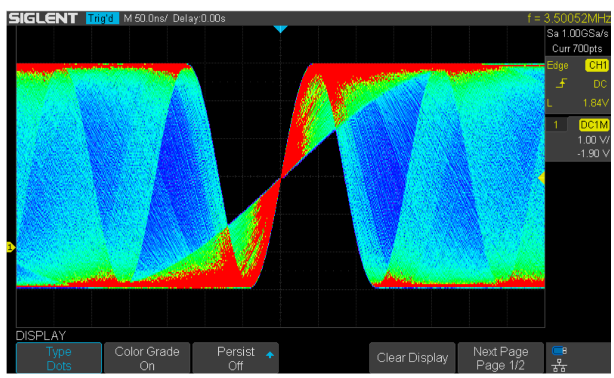


With a waveform capture rate of up to 400,000 wfm/s (sequence mode), the oscilloscope can easily capture the unusual or low-probability events.

256 -Level Intensity Grading and Color Temperature Display

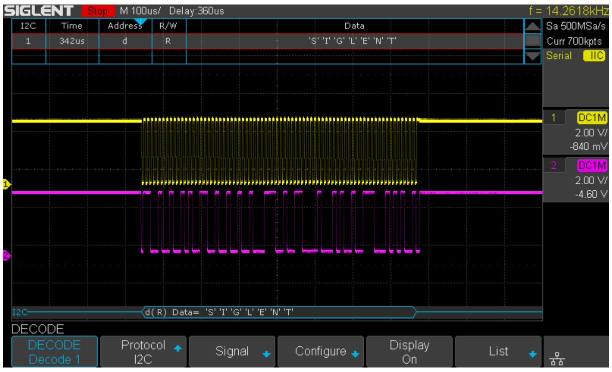


SPO display technology provides for fast refresh rates. The resulting intensity-graded trace is brighter for events that occur with more frequency and dims when the events occur with less frequency.



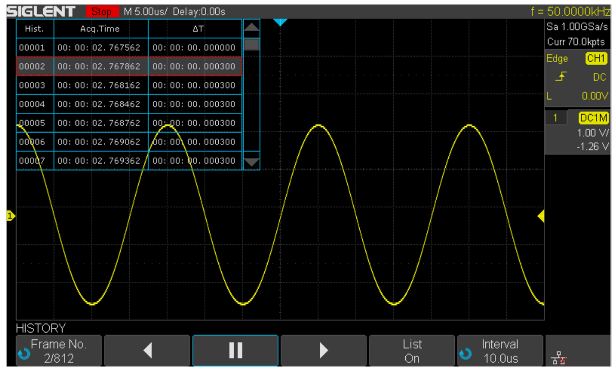
The color temperature display is similar to the intensity-graded trace function, but the trace occurrence is represented by different colors (color "temperature") as opposed to changes in the intensity of one color. Red colors represents the more frequent events, while blue is used to mark points that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

Serial Bus Decoding Function (Standard)



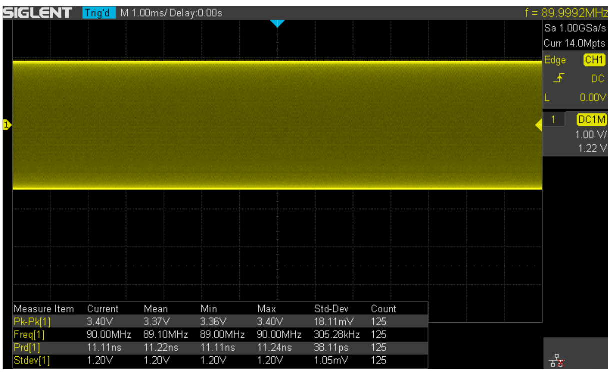
SDS1000X-E displays the decoding through the events list. Bus protocol information can be quickly and intuitively displayed in a tabular format.

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



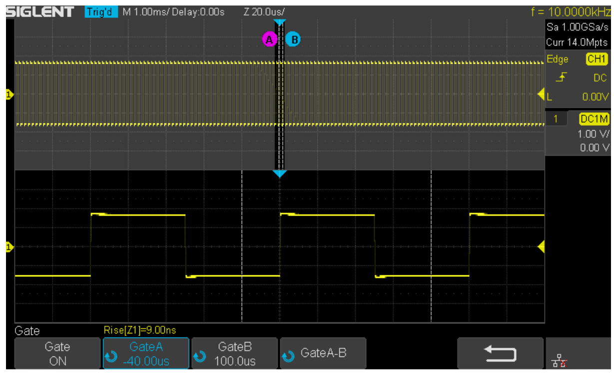
Playback the latest triggered events using the history function. Segmented memory collection will store trigger events into multiple (Up to 80,000) memory segments, each segment will store triggered waveforms and timestamp each frame.

True measurement to 14 M points



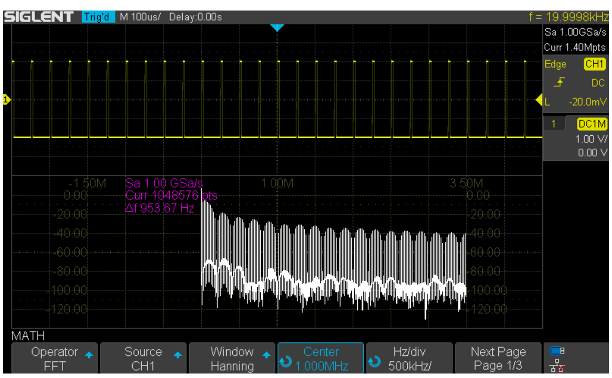
At any one timebase, SDS1000X-E can measure using all 14 M sample points. This ensures the accuracy of measurements while the math co-processor decreases measurement time and increases ease-of-use.

Gate and Zoom Measurement



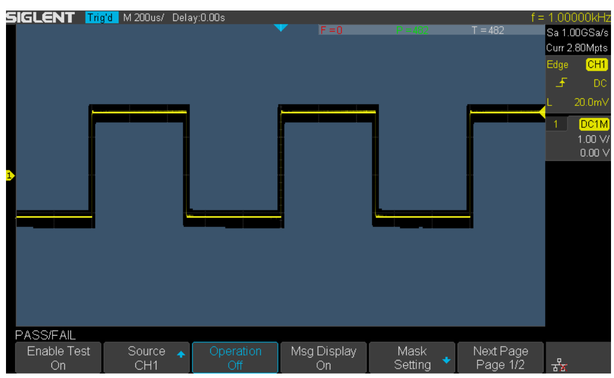
Through Gate and Zoom measurement, the user can specify an arbitrary interval of waveform data analysis and statistics. This helps avoid measurement errors that can be caused by invalid or extraneous data, greatly enhancing the measurements' validity and flexibility.

1 M points FFT



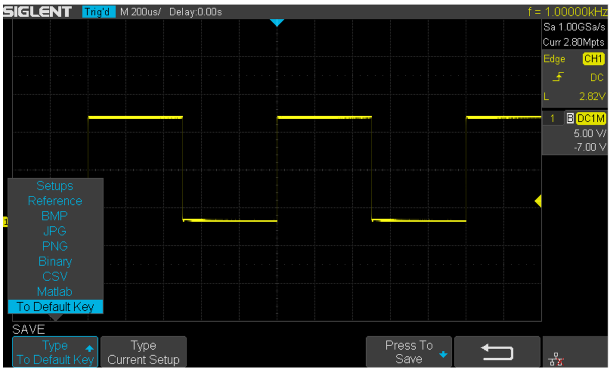
The new math co-processor enables FFT analysis of incoming signals using up to 1 M samples per waveform. This provides high frequency resolution with a fast refresh rate. The FFT function also supports a variety of window functions so that it can adapt to different spectrum measurement needs.

Hardware-Based High Speed Pass/ Fail function



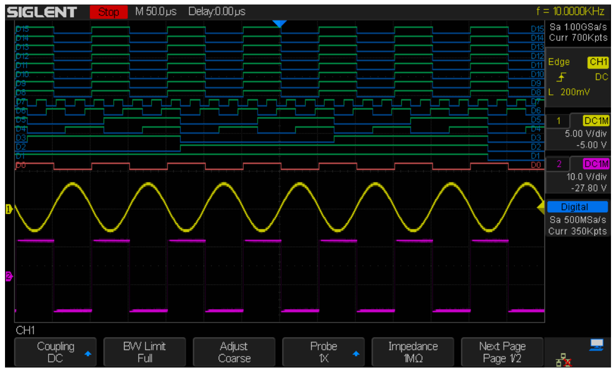
The SDS1000X-E utilizes a hardware-based Pass/Fail function, performing up to 40,000 Pass / Fail decisions each second. Easily generate user defined test templates provide trace mask comparison making it suitable for long-term signal monitoring or automated production line testing.

Customizable Default Key



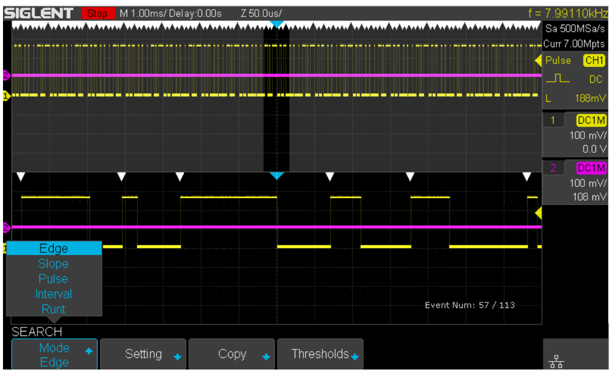
The current parameters of the oscilloscope can be preset to Default Key through the Save menu.

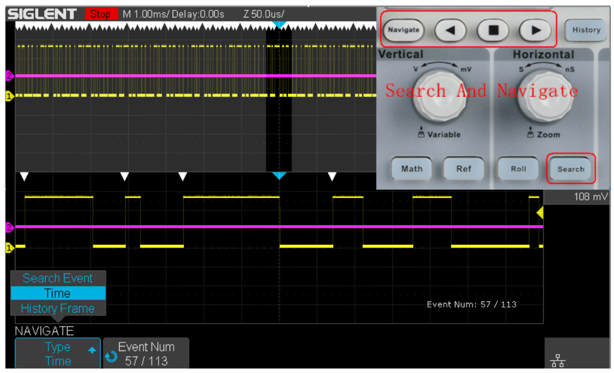
16 Digital Channels/MSO (four channel series only, option)



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

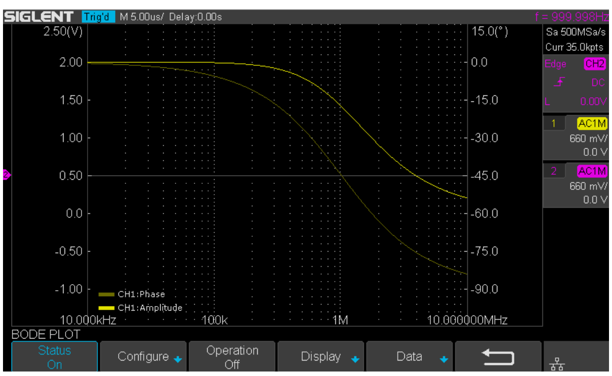
Search and Navigate (four channel series only)

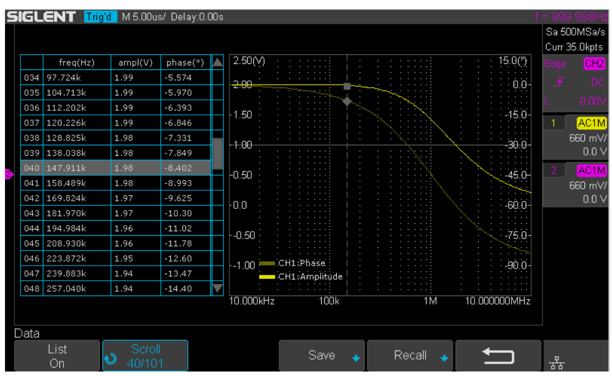




The SDS1000X-E can search events specified by the user in a frame. It can also navigate by time (delay position) and historical frames.

Bode Plot (four channel series only)





SDS1000X-E can control the USB AWG module, control an independent SIGLENT SDG instrument, scan an object's amplitude and phase frequency response, and display the data as a Bode Plot. It can also show the result lists, and export the data to a USB disk.

USB WIFI Adapter (four channel series only, option)

USB WIFI Adapter

WiFi control of instrumentation can provide a convenient and safe method of configuring and collecting data. This new feature works with a SIGLENT approved WiFi adapter to provide wireless control and communications with SIGLENT 4 channel scopes. The adapter must be supplied by Siglent to ensure working.

USB 25 MHz 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.

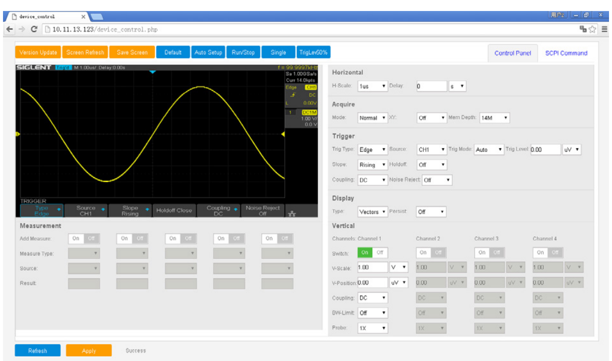
Complete Connectivity

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

Web control (four channel series only)



With the new embedded web server, users can control the 4 channel scopes from a simple web page. This provides wonderful remote troubleshooting and monitoring capabilities.

Specifications

Acquire System	
Sampling Rate	1 GSa/s (single channel/pair), 500 MSa/s (two channels/pair)
Memory Depth	Max 14 Mpts/Ch (single channel/pair), 7 Mpts/Ch (two channels/pair)
Peak Detect	2 nsec (Four channel series)
	4 nsec (Two channel series)
Average	Averages:4, 16, 32, 64, 128, 256, 512, 1024
Eres	Enhance bits:0.5, 1.5, 2, 2.5, 3; Selectable
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%) || (15 pF ±2 pF) (Four channel series) DC: (1 MΩ±2%) || (18 pF ±2 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

Vertical System	
Bandwidth (-3 dB)	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)
Offset Range (Probe 1X)	500 µV- 150 mV: ± 2 V
	152 mV- 1.5 V: ± 20 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 -3 dB)	≤10 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
Risetime	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 step)

Trigger System	
Trigger Mode	Auto, Normal, Single
Trigger 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)
Holdoff Range	80 ns- 1.5 s
Trigger 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 8 Hz
	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	DC: Passes all components of the signal
	LFRJ: Blocks the DC component and attenuates the low-frequency components below 10 KHz
	HFRJ: Attenuates the high-frequency components above 500 KHz
components below 10 KHz	Internal: ±0.2 div
	EXT (Two channel series): ±0.4 div
Trigger 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
Trigger Jitter	< 100 ps
Trigger 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
LimitRange	< , > , < > , > <
Source	All channels
TimeRange	2 ns- 4.2 s
Resolution	1 ns

Pulse Trigger	
Polarity	+wid , -wid
Limit Range	< , > , < > , > <
Source	All channels
Pulse Range	2 ns ~ 4.2 s
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	1 ns
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: 1 byte Addr & Data: 1 ~ 2 byte Data Length: 1 ~ 12 byte
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/ RS232 Trigger	
Condition	Start, Stop, Data, Parity Error
Source (RX/TX)	All channels
Data format	Hex
Limit Range	=, >, <
Data Length	1 byte
Data Width	5 bit, 6 bit, 7 bit, 8 bit
Parity Check	None, Odd, Even
Stop Bit	1 bit, 1.5 bit, 2 bit
Idle Level	High, Low
Baud (Selectable)	600/1200/2400/4800/960019200/38400/57600/115200 bit/s
(Custom)	300 bit/s ~ 334000 bit/s
CAN Trigger	
Condition	All, Remote, ID, ID + Data, Error
Source	All channels
ID	STD (11 bit), EXT (29 bit)
Data Format	Hex
Data Length	1~2 byte
Baud Rate (Selectable)	5 k/10 k/20 k/50 k/100 k/125 k/250 k/500 k/800 k/1 M bit/s
Baud Rate (Custom)	5 kbit/s~1 Mbit/s
LIN Trigger	
Condition	Break, Frame ID, ID+Data, Error
Source	All channels
ID	1 byte
Data Format	Hex
Data Length	1 ~ 2 byte
Baud Rate (Selectable)	600/1200/2400/4800/9600/19200 bit/s
Baud Rate (Custom)	300 bit/s ~ 20 kbit/s

Serial Decoder	
I2C Decoder	
Signal	SCL, SDA
Address	7 bits, 10 bits
Threshold	-4.5 ~ 4.5 div
List	1 ~ 7 lines
SPI Decoder	
Signal	SCL,MISO, MOSI, CS *NOTE 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/ RS232 Decoder	
Signal	RX, TX
Data Width	5 bit，6 bit，7 bit，8 bit
Parity Check	None, Odd, Even
Stop Bit	1 bit, 1.5 bit, 2 bit
Idle Level	Low, High
Threshold	-4.5 ~ 4.5 div
List	1 ~ 7 lines
CAN Decoder	
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 Decoder	
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 5 measurements at the same time	
Measurement Range	Screen region, Gate region	
Measurement Parameters (38 Types)		
Vertical (Voltage)	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 (Time)	Period	Period for every cycle in waveform at the 50% level, and positive slope
	Freq	Frequency for every cycle in waveform at the 50% level, and positive slope
	+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	Ratio of positive width to period
	-Dut	Ratio of negative width to period
	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 Current, Mean, Min, Max, Standard Deviation of time from the trigger to each rising edge at the 50% crossing in multiple frames (number = Count).
Delay	Phase	Calculate the phase difference between two edges
	FRR	Time between the first rising edges of the two channels
	FRF	Time from the first rising edge of channel A to the first falling edge of channel B
	FFR	Time from the first falling edge of channel A to the first rising edge of channel B
	FFF	Time from the first falling edge of channel A to the 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

Measurement	
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 bit counter (channels are selectable)

Math Function	
Operation	+ , - , * , / , FFT , d/dt , ∫dt , √
FFT window	Rectangular, Blackman, Hanning, Hamming, Flattop
FFT display	Full Screen, Split, Exclusive
Number of Decoders	2
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
AmplitudeRange	-1.5 ~ +1.5 V (50Ω)
	-3 ~ +3 V (High-Z)
Waveform Type	Sine, Square, Ramp, pulse, Noise, DC and 45 built-in waveforms
Output impedance	50 Ω±2%
Protection	Over-Voltage Protection, Current-Limiting Protection
Sine	
Frequency	1 μHz ~ 25 MHz
Offset Accuracy (10 kHz)	±(1%*Offset Setting Value +1 mVpp)
Amplitude flatness (10 kHz, 5 Vpp)	±0.3 dB
SFDR	DC ~ 1 MHz -60 dBc
	1 MHz ~ 5 MHz -55 dBc
	5 MHz ~ 25 MHz -50 dBc
HD	DC ~ 5 MHz -50 dBc
	5 MHz ~ 25 MHz -45 dBc
Square/Pulse	
Frequency	1 μHz ~ 10 MHz
Duty Cycle	1% ~ 99%
Rise/Fall time	< 24 ns (10% ~ 90%)
Overshoot (1 kHz,1 Vpp, Typical)	< 3% (typical 1 kHz, 1 Vpp)
Pulse Width	> 50 ns
Jitter	< 500 ps + 10 ppm
Ramp	
Frequency	1 μHz ~ 300 kHz
Linearity (Typical)	< 0.1% of Pk-Pk (Typical, 1 kHz, 1 Vpp, 100% Symmetry)
Symmetry	0% ~ 100% (Adjustable)

DC	
Offset range	±1.5 V (50 Ω)
	±3 V (High-Z)
Accuracy	±(|offset|*1%+3 mV)
Noise	
Bandwidth	>25 MHz (-3 dB)
Arbitrary Wave	
Frequency	1 μHz ~ 5 MHz
Wave Length	16 kpts
Sampling Rate	125 MSa/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	-3 V ~ 3 V
Logic Type	TTL, CMOS, LVCMOS3.3, LVCMOS2.5, custom
Skew[2]	D0~D15: ±1 sampling interval Digital to Analog: ± (1 sampling interval +1 ns)
I/O	
Standard	USB Host, USB Device, LAN, Pass/Fail, Trigger Out
Pass/Fail	3.3 V TTL Output
Display (Screen)	
Display Type	7-inch TFT LCD
Display Resolution	800×480
Display Color	24 bit
Contrast (Typical)	500:1
Backlight	300 nit
Range	8 x 14 divisions
Display (Waveform)	
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: 10℃ ~ +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: ≤15,266 m
Electromagnetic Compatibility	2004/108/EC)
	Execution Standard EN 61326-1:2006
	EN 61000-3-2:2006 + A2:2009, EN 61000-3-3:2008
Safety	2006/95/EC
Execution Standard EN 61010-1:2010/ EN 61010-2-030:2010	

Power Supply

Input Voltage	100 ~ 240 VAC, CAT II, Auto selection
Frequency	50/60/400 Hz
Power	25 W Max

Mechanical (Four channel series)

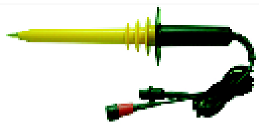
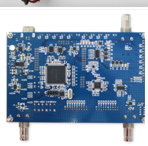
Dimensions	Length: 312 mm
	Width: 132.6 mm
	Height: 151 mm
Weight	N.W: 2.6 kg; G.W: 3.8 kg

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

Probes and Accessories

Probe	Picture	Model	Description
Passive	PB470		Bandwidth: 70 MHz, 1X/10X, 1M/10 Mohm, 300 V/600 V
	PP510		Bandwidth: 100 MHz, 1X/10X, 1M/10 Mohm,300 V/600 V
	PP215		Bandwidth: 200 MHz, 1X/10X, 1M/10 Mohm, 300 V/600 V
Current Probe	CP4020		Bandwidth: 100 KHz, Max. continuous current: 20 Arms, Peak current: 60 A Switch Ratio: 50 mV/A, 5 mV/A, Accuracy: 50 mV/A (0.4 A-10 Apk)±2%, 5 mV/A (1 A-60 Apk) ±2%, 9 V battery source
	CP4050		Bandwidth: 1 MHz, Max. continuous current: 50 Arms, Peak current: 140 A Switch Ratio: 500 mV/A, 50 mV/A Accuracy: 500 mV/A (20 mA-14 ApK)±3% ±20 mA , 50 mV/A (200 mA-100 ApK) ±4%±200 mA, 50 mV/A (100 A-140 ApK) ±15% max, 9V battery source
	CP4070		Bandwidth: 150 KHz, Max. continuous current: 70 Arms, Peak current: 200 A Switch Ratio: 50 mV/A, 5 mV/A, Accuracy: 50 mV/A (0.4 A-10 ApK)±2% , 5 mV/A (1 A-200 ApK) ±2%, 9V battery source
	CP4070A		Bandwidth: 300 KHz, Max. continuous current: 70 Arms, Peak current: 200 A Switch Ratio: 100 mV/A, 10 mV/A, Accuracy: 100 mV/A (50 m A-10 ApK)±3%±50 mA , 10 mV/A (500 mA-40 ApK)±4%±50 mA, 10 mV/A (40 A-200 ApK)±15% max, 9 V battery source
	CP5030		Bandwidth: 50 MHz, Max. continuous current: 30 Arms, Peak current: 50 A Switch Ratio: 100 mV/A, 1 V/A, Accuracy: 1 V/A (±1%±1 mA), 100 mV/A (±1%±10 mA), DC 12 V/ 1.2 A power adapter
	CP5030A		Bandwidth: 100 MHz, Max. continuous current: 30 Arms, Peak current: 50 A Switch Ratio: 100 mV/A, 1 V/A, Accuracy: 1 V/A (±1%±1 mA), 100 mV/A (±1%±10 mA), DC 12V/1.2A power adapter
	CP5150		Bandwidth: 12 MHz, Max. continuous current: 150 Arms, Peak current: 300 A Switch Ratio: 100 mV/A, 10 mV/A, Accuracy: 100 mV/A (±1%±10 mA), 10 mV/A (±1%±100 mA), DC 12 V/1.2 A power adapter
	CP5500		Bandwidth: 5 MHz, Max. continuous current: 500 Arms, Peak current: 750 A Switch Ratio: 100 mV/A, 10 mV/A, Accuracy: 100 mV/A (±1%±10 mA), 10 mV/A (±1%±100 mA), DC 12 V/1.2 A power adapter
Differential Probe	DPB4080		Bandwidth: 50 MHz, Differential Range: 800 V (DC + Peak AC), 100 X/200 X/500 X/1000 X, Accuracy: ±1%, DC 9 V/1 A power adapter

Probe	Picture	Model	Description
Differential Probe	DPB5150		Bandwidth: 70 MHz, Differential Range: 1500 V (DC + Peak AC),50 X/500 X Accuracy: ±2%, DC 5 V/1 A USB adapter
	DPB5150A		Bandwidth: 100 MHz, Differential Range: 1500 V (DC + Peak AC), 50X/500X , Accuracy: ±2% DC 5 V/1 A USB adapter
	DPB5700		Bandwidth: 70 MHz, Differential Range: 7000 V (DC + Peak AC), 100X/1000X , Accuracy: ±2%, DC 5 V/1 A USB adapter
	DPB5700A		Bandwidth: 100 MHz Differential Range: 7000 V (DC + Peak AC), 100X/1000X Accuracy: ±2% DC 5 V/1 A USB adapter
High Voltage	HPB4010		Bandwidth: 40 MHz Differential Range: DC 10 KV, AC (rms): 7 KV (sine), AC (Vpp): 20 KV (Pulse) 1000X Accuracy: ≤3%
Isolated front end	ISFE		The USB Device interface allows a connection into the GPIB interface. USB-GPIB adapter allows the oscilloscope to easily send and receive commands through the GPIB. USB follows the USB2.0 specification. GPIB follows the IEEE488.2 standard.
Demo Board	STB-3		Output signals include square waves, sine, AM, fast edge , pulse, PWM, I2C, CAN, LIN etc. Used in teaching and demonstrations.
USB AWG Module	SAG1021		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

Ordering information

Product Name	SDS1000X-E Series Digital Oscilloscope	
	SDS1104X-E 100 MHz Four Channels	
	SDS1204X-E 200 MHz Four Channels	
	SDS1202X-E 200 MHz Two Channels	
Standard Accessories	USB Cable -1	
	Quick Start -1	
	Passive Probe -4/2	
	Certification -1	
	Power Cord -1	
Optional Accessories	16 Channels MSO Software (four channel series only)	SDS1000X-E-16LA
	16 Channels Logic Analyzer (four channel series only)	SLA1016
	AWG Software (four channel series only)	SDS1000X-E-FG
	USB AWG Module Hardware (four channel series only)	SAG1021
	WIFI Software (four channel series only)	SDS1000X-E-WIFI
	USB WIFI Adapter (four channel series only)	TL_WN725N
	Isolated Front End	ISFE
	STB Demo Source	STB-3
	High Voltage Probe	HPB4010
	Current Probes	CP4020/CP4050/CP4070/CP4070A/CP5030/CP5030A/CP5150/CP5500
	Differential Probes	DPB4080/DPB5150/DPB5150A/DPB5700/DPB5700A

SDS1000X-E Series

Super Phosphor Oscilloscope

SIGLENT®

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, function/arbitrary waveform generators, digital multimeters, DC power supplies, spectrum analyzers, isolated handheld oscilloscopes and other general purpose test instrumentation. Since its first oscilloscope, the ADS7000 series, 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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