SDS6000A Series

Digital Storage Oscilloscope

Data Sheet

EN01E

SIGLENT TECHNOLOGIES CO.,LTD

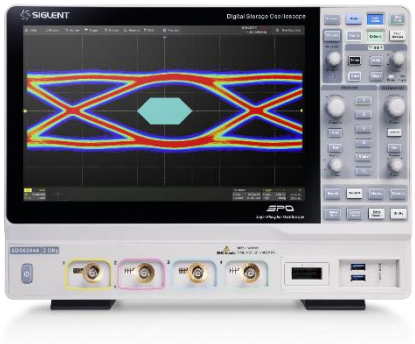
SDS6204A
SDS6104A
SDS6054A

Product Overview

SIGLENT's SDS6000A series Digital Storage Oscilloscopes are available in bandwidths of 2 GHz, 1 GHz and 500 MHz, have sample rate of 5 GSa/s (10 GSa/s ESR) at each channel, maximum record length of 500 Mpts/ch, and display up to 4 analog channels + 16 digital channels mixed signal analysis ability.

The SDS6000A series employs Siglent's SPO technology with a maximum waveform capture rate of up to 170,000 wfm/ s (normal mode, up to 750,000 wfm/s in Sequence mode), 256-level intensity grading display function plus a color temperature display mode. It also employs an innovative digital trigger system with high sensitivity and low jitter. The trigger system supports multiple powerful triggering modes including serial bus triggering. Tools such as History waveform recording, Search and Navigate functions, Mask Test, Bode Plot, Power Analysis and Eye/Jitter Analysis allow for extended waveform records to be captured, stored, and analyzed. An impressive array of measurement and math capabilities, options for a 25 MHz arbitrary waveform generator, as well as serial decoding are also features of the SDS6000A.

The large 12.1" display capacitive touch screen supports multi-touch gestures, with the addition of user-friendly UI design, can greatly improve the operation efficiency. It also supports mouse control, and remote web control over LAN.



Key Features

- 4 analog channels, up to 2 GHz bandwidth with 5 GSa/s (10 GSa/s ESR) sample rate at each channel
- Low background noise, supports 0.5 mV/div to 10 V/div vertical scales
- SPO technology
  - Waveform capture rates up to 170,000 wfm/s (normal mode), and 750,000 wfm/s (sequence mode)
  - Supports 256-level intensity grading and color temperature display modes
  - 500 Mpts Record length in total for all 4 channels
  - Digital trigger system
- Intelligent trigger: Edge, Slope, Pulse, Window, Runt, Interval, Dropout, Pattern, Qualified, Nth edge, Setup/hold, Delay and Video (HDTV supported). Zone Trigger simplifies advanced triggering
- Serial bus triggering and decoder, supports protocols I^2C, SPI, UART, CAN, LIN, CAN FD, FlexRay, I^2S, MIL-STD-1553B, SENT, Manchester and ARINC429
- Segmented acquisition (Sequence) mode, dividing 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 between segments to capture the qualifying event
- History waveform record (History) function, the maximum recorded waveform length is 80,000 frames
- Automatic measurements on 50+ parameters, supports statistics with histogram, track, trend, Gating measurement, and measurements on Math, History and Ref
- 4 Math traces (8 Mpts FFT, Filter, addition, subtraction, multiplication, division, integration, differential, square root, etc.), supports formula editor
- Abundant data analysis functions such as Search, Navigate, Digital Voltmeter, Counter, Waveform Histogram, Bode plot, Power Analysis, SignalScan and Eye/Jitter Analysis
- High Speed hardware-based Average, Hi-Res; High Speed hardware-based Mask Test function, with Mask Editor tool for creating user-defined masks
- 16 digital channels
- 25 MHz function / arbitrary waveform generator, built-in multiple predefined waveforms
- Large 12.1" TFT-LCD display with 1280 * 800 resolution; Capacitive touch screen supports multi-touch gestures
- Interfaces include: USB Hosts, USB Device (USBTMC), LAN（VXI-11/Telnet/Socket）, micro SD card, Pass/Fail, Trigger Out, HDMI
- Built-in web server supports remote control over the LAN port using a web browser. Supports SCPI remote control commands. Supports external mouse and keyboard

Models and Key Specifications

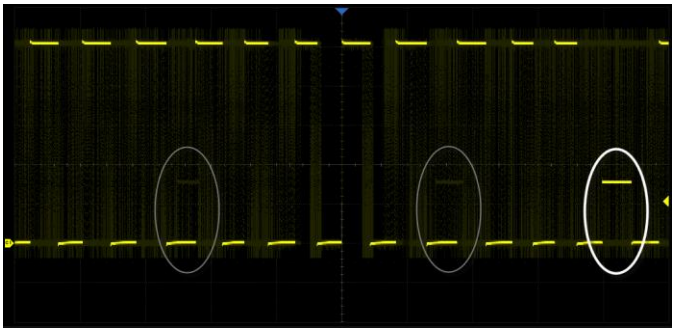
Model	SDS6204A	SDS6104A	SDS6054A
Analog channels	4 + EXT		
Bandwidth	2 GHz	1 GHz	500 MHz
Sample rate (Max.)	5 GSa/s (10 GSa/s ESR) @ each channel		
Memory depth (Max.)	500 Mpts/ch（single-channel） 250 Mpts/ch (dual-channel) 125 Mpts/ch (3 or 4 channels)		
Waveform capture rate (Max.)	Normal mode：170,000 wfm/s; Sequence mode：750,000 wfm/s		
Vertical resolution	8-bit, up to 16-bit in Hi-Res mode		
Trigger type	Edge, Slope, Pulse width, Window, Runt, Interval, Dropout, Pattern, Video, Qualified, Nth edge, Setup/hold, Delay, Serial		
Serial trigger and decode	Standard: I^2C, SPI, UART, CAN, LIN Optional: CAN FD, FlexRay, I^2S, MIL-STD-1553B, SENT, Manchester (decode only), ARINC429 (decode only)		
Measurement	50+ parameters，statistics, histogram, trend, and track supported		
Math	4 traces 8 Mpts FFT, +, -, x, ÷, ∫dt, d/dt, √, Identity, Negation, Absolute, Sign, e^x, 10^x, ln, lg, Interpolation, MaxHold, MinHold, ERES, Average, Filter. Supports formula editor		
Data analysis	Search, Navigate, History, Mask Test, Digital Voltmeter, Counter, Waveform Histogram, Bode plot and Power Analysis, Eye/Jitter Analysis, SignalScan		
Digital channel	16-channel; maximum sample rate up to 1 GSa/s; record length up to 50 Mpts		
Waveform generator	Single-channel external USB isolated waveform generator, frequency up to 25 MHz, 125 MSa/s sample rate, 16 kpts waveform memory		
I/O	USB 3.0 Host x2，USB 2.0 Host x2，USB 2.0 Device，LAN，micro SD card, HDMI, External trigger， Auxiliary output（TRIG OUT，PASS/FAIL）		
Probe (Standard)	SP3150A, 500 MHz, 1 probe supplied for each channel		
Display	12.1 TFT-LCD with capacitive touch screen (1280*800)		

Functions & Characteristics

Excellent User Interface and User Experience

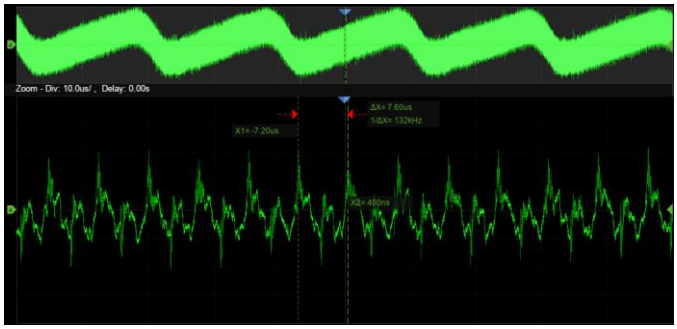
- 12.1” display with 1280*800 resolution
- Capacitive touch screen, supporting multi-touch gestures, can move or scale the waveform traces quickly by finger-touch movements, which greatly improves the operation efficiency
- Built-in WebServer supports remote control on a web page over LAN
- Supports external mouse and keyboard

High Waveform Update Rate



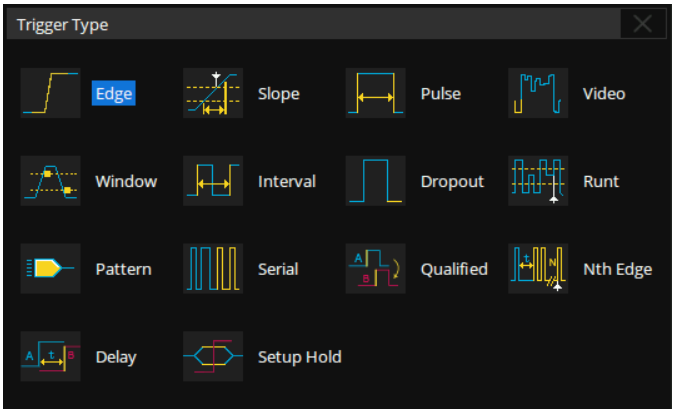
With a waveform update rate of up to 170,000 wfm/s, the oscilloscope can easily capture unusual or low-probability events. In Sequence mode, the waveform capture rate can reach 750,000 wfm/s

Deep Record Length



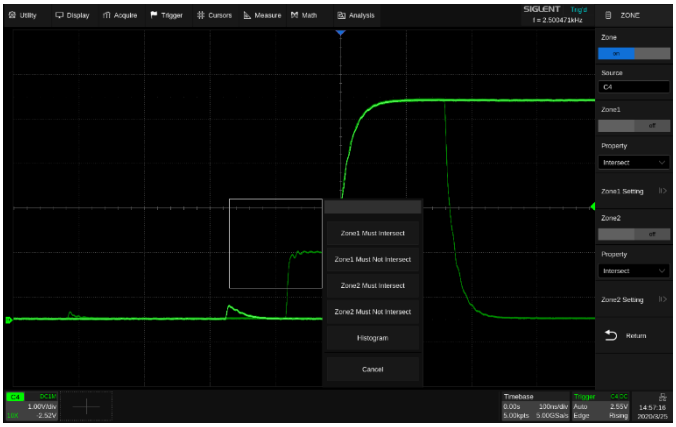
Using hardware-based Zoom technique and record length of up to 500 Mpts, users can select a slower timebase without compromising the sample rate, and then quickly zoom in to focus on the area of interest

Multiple Trigger Functions



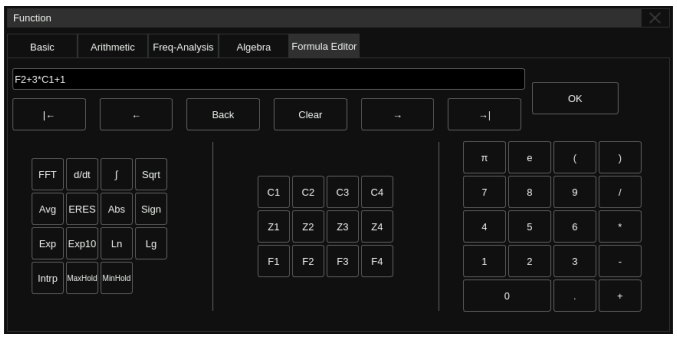
Edge, Slope, Pulse, Video, Windows, Runt, Interval, Dropout, Pattern, Qualified, Nth edge, Setup/hold, Delay and serial trigger

Trigger Zone

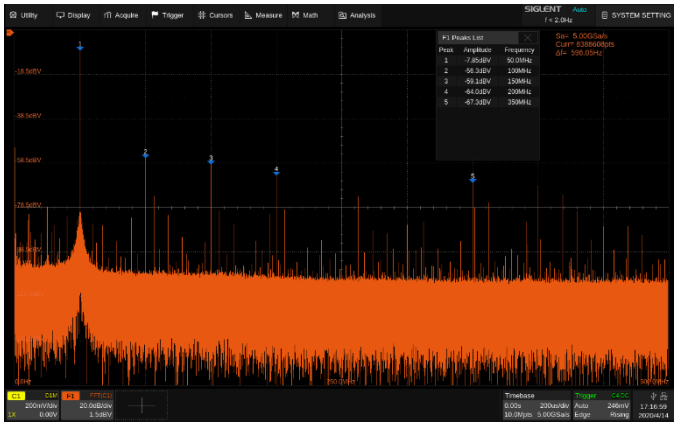


Trigger Zone is available for advanced triggering

Advanced Math Function

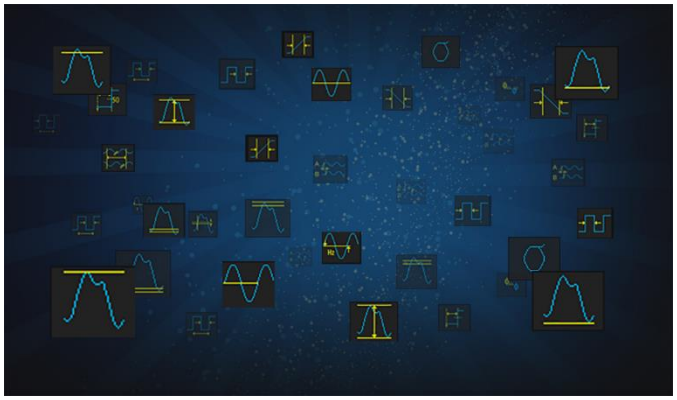


In addition to the traditional (+, -, X, /) operations, FFT, Filter, integration, differential, square root, and more are supported. Formula Editor is available for more complex operations. 4 math traces are available.



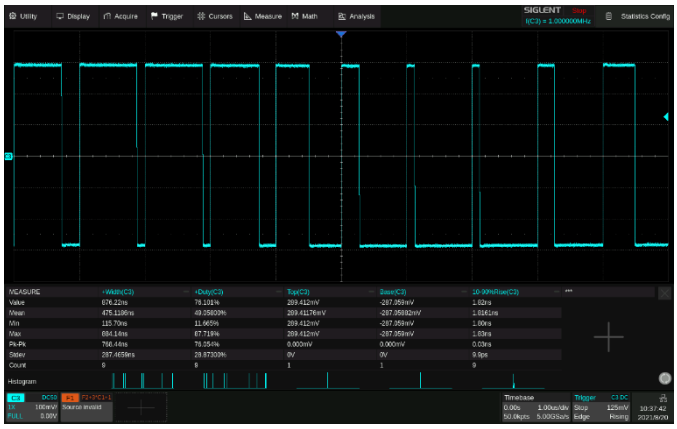
Hardware-accelerated FFT supports up to 8 Mpts operation. This provides high-frequency resolution with a fast refresh rate. The FFT function also supports a variety of window functions so that it can adapt to different spectrum measurement needs. Three modes (Normal, Average, and Max hold) can satisfy different requirements for observing the power spectrum. Auto peak detection and markers are supported.

Measurements of a Variety of Parameters



Parameter measurements include 4 categories: horizontal, vertical, miscellaneous, and CH delay providing a total of 50+ different types of measurements. Measurements can be performed within a specified gate period. Measurements on Math, Reference, and History frames are supported

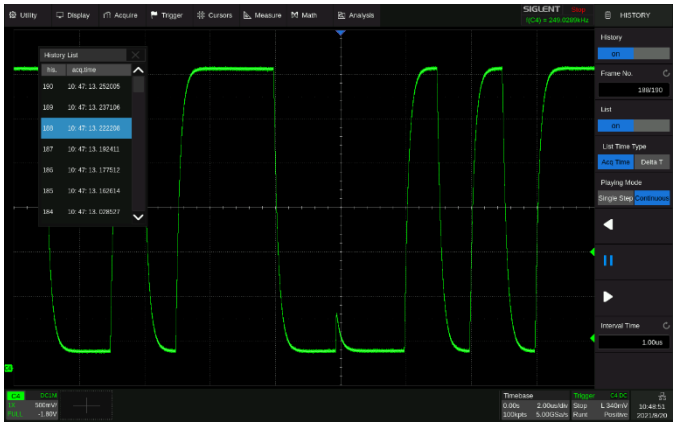
Parameter Statistics Function



Statistics show the current value, maximum value, minimum value, standard deviation, and mean value of up to 12 parameters simultaneously. A histogram is available to show the probability distribution of a parameter. Trend and Track are available to show the parameter value vs. time.

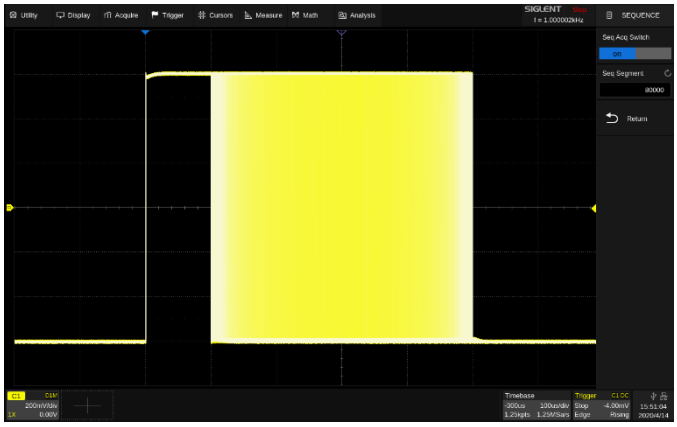
For horizontal parameters such as period, all results are extracted from a frame, instead of just calculating the first one. This accelerates statistics on horizontal measurements much more and enables distribution observation in a frame using Histogram and Track

History Mode



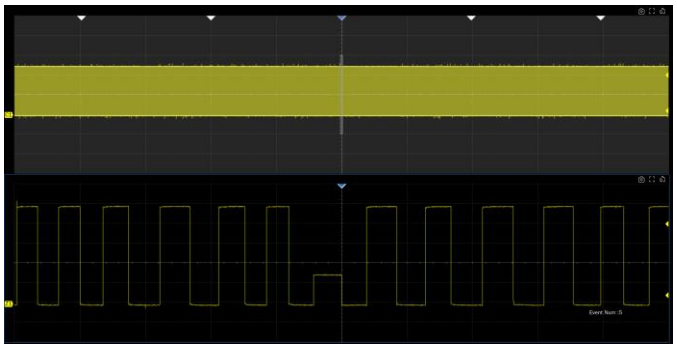
History function can record up to 80,000 frames of waveforms. The recording is executed automatically so that the customer can playback the history waveforms at any time to observe unusual events and quickly locate the area of interest using the cursors or measurements. The failed frames of the Mask Test can be stored as history

Sequence Mode



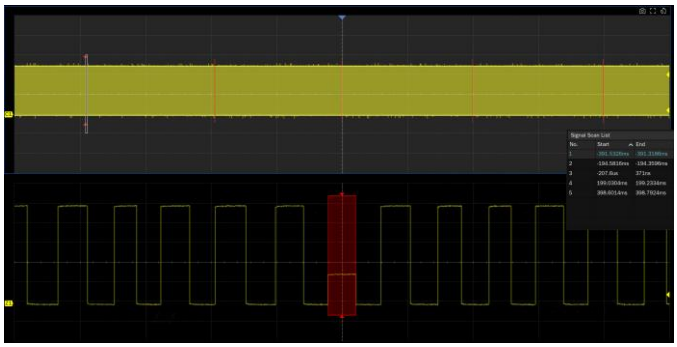
Segmented memory collection will store the waveform into multiple memory segments (up to 80,000) and each segment will store a triggered waveform as well the dead time information. The interval between segments can be as small as 1.3 μs. All of the segments can be played back using the History function

Search and Navigate



The oscilloscope can search events specified by the user in a frame based on hardware. Events flagged by the Search can be recalled automatically using Navigate. It can also navigate by time (delay position) and history frames

SignalScan

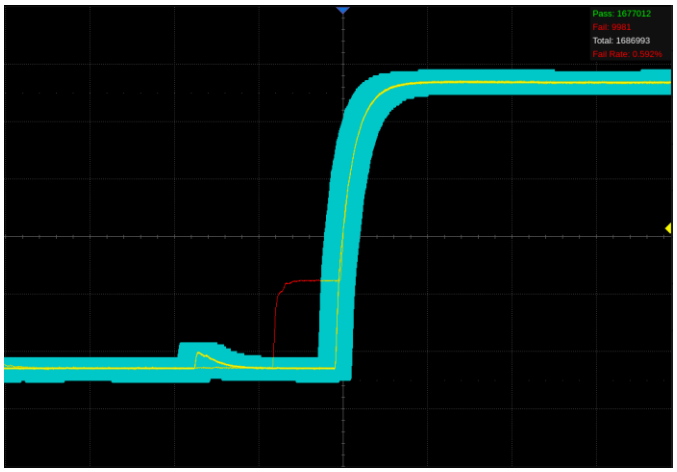


SignalScan automatically searches events by software according to the search conditions set by users, and marks them. Different from hardware search, in SignalScan the supported search conditions are richer, while the scan speed is relatively slower

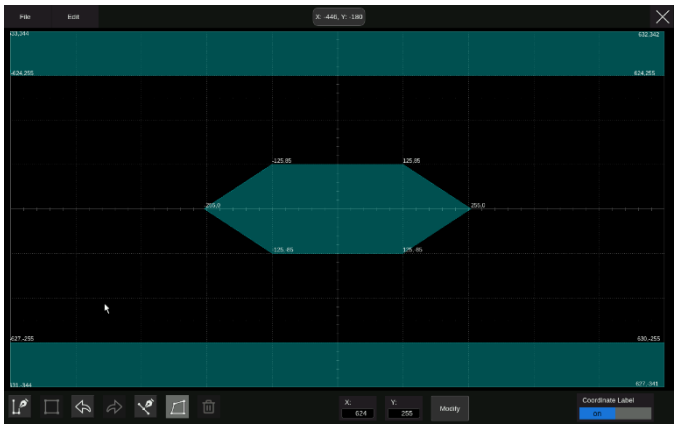
Serial Bus Decode

Display the decoded characters through the events list. Bus protocol information can be quickly and intuitively displayed in tabular form. I2C, SPI, UART, CAN, LIN, CAN FD, FlexRay, I2S, MIL-STD-1553B, SENT, Manchester and ARINC429 are supported

Hardware-based High Speed Mask Test Function



The oscilloscope utilizes a hardware-based Mask Test function, performing up to 18,000 Pass / Fail decisions each second. It is easy to generate user-defined test templates to provide trace mask comparisons, making it suitable for long-term signal monitoring or automated production line testing

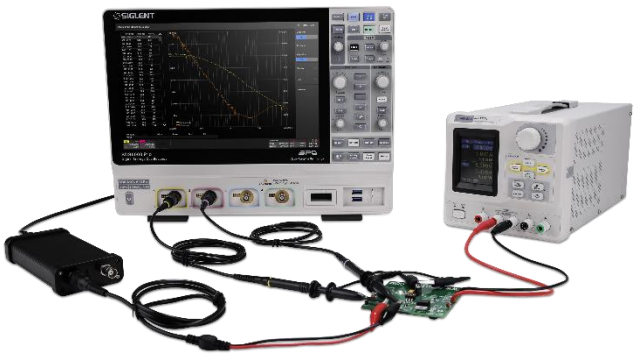


Built-in Mask Editor application helps to create custom masks

Eye/Jitter Analysis

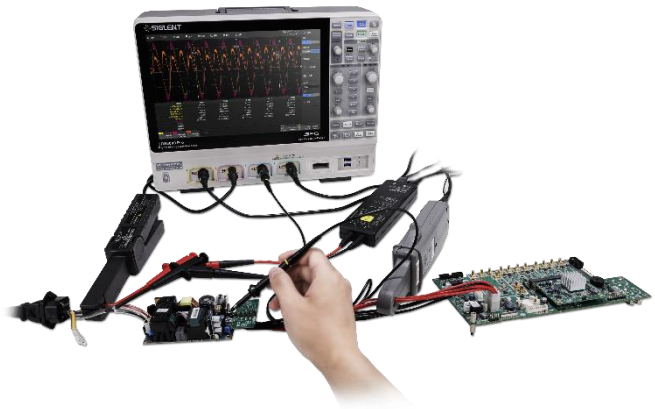
Supports eye diagram and jitter analysis/measurement. It can automatically extract the embedded reference clock from serial data and create the eye diagram. Measurement on multiple eye/jitter parameters is provided. Mask test on eye diagrams is supported

Bode Plot



The oscilloscope can control the isolated USB AWG module or a stand-alone SIGLENT SDG generator, to scan the amplitude and phase-frequency response of the DUT, and display the data as a Bode Plot. This makes it possible to replace expensive network analyzers in some applications

Power Analysis (Optional)



The Power Analysis option provides a full suite of power measurements and analysis, which greatly improve the measurement efficiency in switching power supplies and power devices design

Digital Channels / MSO

Four analog channels plus 16 digital channels enable users to acquire and trigger the waveforms then analyze the pattern, simultaneously with one instrument

25 MHz Function/Arbitrary Waveform Generator

The oscilloscope can control the SAG1021I isolated USB Function/Arbitrary waveform generator to output waveform with up to 25 MHz frequency and ±3 V amplitude. Six basic waveforms plus multiple types of arbitrary waveforms are built-in

Complete Connectivity

USB Host 3.0 x2, USB Host 2.0 x2, USB Device 2.0 (USBTMC) x1, LAN（VXI-11/Telnet/Socket）x1, micro SD card x1, Auxiliary output（Pass/Fail, Trigger Out）x1 and HDMI x1

Specifications

All specifications are not guaranteed unless the following conditions are met:
• The oscilloscope calibration period is current
• The oscilloscope has been working continuously for at least 30 minutes at the specified temperature (18℃ ~ 28℃)

Acquire (analog)	
Sample rate	5 GSa/s (10 GSa/s (ESR*1) @ each channel
Memory depth *2	500 Mpts/ch（single-channel） 250 Mpts/ch (dual-channel) 125 Mpts/ch (3 or 4 channels)
Waveform update rate	Normal mode：up to 170,000 wfm/s Sequence mode：up to 750,000 wfm/s
Intensity grading	256-level
Peak detect	200 ps
Average	4, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, 8192
Hi-Res	Enhanced bit: 1, 2, 3, 4, 5, 6, 7, 8 bit
Sequence	Up to 80,000 segments, interval between triggers = 1.3 μs min.
History	Up to 80,000 frames
Interpolation	sinx/x, x

* 1：ESR： Enhanced Sample Rate，gets better measure accuracy by 2x interpolation

* 2：In Average and Hi-Res modes，the memory depth is 25 Mpts/ch

Vertical (analog)	SDS6204A	SDS6104A	SDS6054A
Channel	4 + EXT		
Bandwidth (-3dB) @ 50Ω	2 GHz *1	1 GHz	500 MHz
Rise time@50Ω (typical)	230 ps	350 ps	550 ps
Bandwidth (-3dB) @ 1 MΩ, with probe	500 MHz	500 MHz	500 MHz
Bandwidth (-3dB) @ 1 MΩ, with external 50Ω	300 MHz	300 MHz	300 MHz
Resolution	8-bit, up to 16-bit in Hi-Res mode		
Bandwidth in Hi-Res mode (typical)	9-bit: 0.25*Sample rate, up to the analog bandwidth 10-bit: 0.115*Sample rate, up to 1.15 GHz, limited by the analog bandwidth 11-bit: 0.055*Sample rate, up to 550 MHz, limited by the analog bandwidth 12-bit: 0.028*Sample rate, up to 280 MHz 13-bit: 0.014*Sample rate, up to 140 MHz 14-bit: 0.007*Sample rate, up to 70 MHz 15-bit: 0.0035*Sample rate, up to 35 MHz 16-bit: 0.0017*Sample rate, up to 17 MHz		
Range	8 divisions		
Vertical scale (probe 1X)	1 MΩ: 0.5 mV/div – 10 V/div 50 Ω: 0.5 mV/div – 1 V/div		
DC gain accuracy	±1.5%		
Offset accuracy	± (1% of the offset setting + 0.5% of full scale + 0.02% of max offset + 1mV)		
Offset range (probe 1X)	1 MΩ: 0.5 mV/div ~ 5 mV/div: ± 1.6 V; 5.1 mV/div ~ 10 mV/div: ± 4 V; 10.2 mV/div ~ 20 mV/div : ± 8 V; 20.5 mV/div ~ 100 mV/div: ± 16 V； 102 mV/div ~ 200 mV/div: ± 80V; 205 mV/div ~ 1 V/div: ± 160 V;1.02 V/div ~ 10 V/div: ± 400 V 50 Ω: 0.5 mV/div ~ 5 mV/div: ± 1.6 V; 5.1 mV/div ~ 10 mV/div: ± 4 V; 10.2 mV/div ~ 20 mV/div: ± 8 V; 20.5 mV/div ~ 1 V/div: ± 10 V		
Bandwidth limit	Hardware Bandwidth limit: 20MHz, 200MHz		
Low frequency response (AC coupling -3 dB)	6 Hz (typical)		
Overshoot (100 mV/div, 150 ps	15%	10%	5%

edge @50 Ω, typical)			
Coupling	DC, AC, GND		
Impedance	(1 MΩ ± 2%) || (20 pF ± 3 pF) 50 Ω: 50 Ω ± 2%		
Max. Input voltage	1 MΩ ≤ 400 Vpk(DC + AC), DC ~ 10 kHz 50 Ω ≤ 5 Vrms, ± 10V Peak		
SFDR	≥ 45dBc		
CH to CH Isolation (@50Ω)	70 dB up to 200 MHz 60 dB up to 500 MHz 50 dB up to 1 GHz 40 dB up to 2 GHz		
Probe Attenuation	1X, 10X, 100X, custom		

* 1：The bandwidth is 1 GHz below 2.3 mV/div

Horizontal	SDS6204A	SDS6104A	SDS6054A
Time scale	0.1 ns/div – 1000 s/div	0.2 ns/div – 1000 s/div	0.5 ns/div – 1000 s/div
Range	10 divisions		
Display mode	Y-T, X-Y, Roll		
Roll mode	≥ 50 ms/div		
Skew (C1~C4)	< 100 ps		
Time base Accuracy	±2 ppm initial (0~50℃); ±0.5 ppm 1st year aging; ±3 ppm 20-year aging		

Trigger				
Mode	Auto, Normal, Single			
Level	Internal: ±4.5 div from the center of the screen EXT: ± 0.61 V EXT/5: ± 3.05 V			
Ext Trigger Channel input voltage	1 MΩ ≤ 42 Vpk 50 Ω ≤ 5 Vrms			
Hold off range	By time: 8 ns ~ 30 s (8 ns step) By event: 1 ~ 10^8			
Coupling	C1~C4 DC: Passes all components of the signal AC: Blocks DC components and attenuates signals below 15 Hz LFRJ: Attenuates the frequency components below 2.4 MHz HFRJ: Attenuates the frequency components above 1.3 MHz Noise RJ: Increases the trigger hysteresis EXT DC: Passes all components of the signal AC: Blocks DC components and attenuates signals below 15 Hz LFRJ: Attenuates the frequency components below 2.5 MHz HFRJ: Attenuates the frequency components above 1.3 MHz			
Accuracy (typical)	C1 ~ C4: ±0.2 div EXT: ±0.3 div			
Sensitivity	C1 ~ C4:		Noise RJ = OFF	Noise RJ = ON
		>10 mV/div:	0.52 div	0.66 div
		5 mV/div~10 mV/div:	0.52 div	0.66 div
		≤ 2 mV/div:	1 div	1 div
	EXT:	200 mVpp, DC ~ 10 MHz 300 mVpp, 10 MHz ~ bandwidth（300 MHz）		
	EXT/5:	1 Vpp, DC ~ 10 MHz 1.5 Vpp, 10 MHz ~ bandwidth（300 MHz）		
Jitter	C1 ~ C4: < 9 ps RMS (typical) for ≥ 300 MHz sine and ≥ 6 divisions peak to peak amplitude for vertical gain settings from 2.5 mV/div to 10 V/div < 5 ps RMS (typical) for ≥ 500 MHz sine and ≥ 6 divisions peak to peak amplitude for vertical gain settings from 2.5 mV/div to 10 V/div EXT: < 200 ps rms			

Displacement	Pre-Trigger: 0 ~ 100% memory Delay-Trigger: 0 ~ 10,000 div
Zone	Up to 2 zones Source: C1~C4 Property: Intersect, Not Intersect
Edge Trigger	
Source	C1~C4/EXT/(EXT/5)/AC Line/D0~D15
Slope	Rising, Falling, Rising & Falling
Slope Trigger	
Source	C1~C4
Slope	Rising, Falling
Limit range	<, >, in range, out of range
Time range	2 ns ~ 20 s, Resolution = 1 ns
Pulse Width Trigger	
Source	C1~C4/D0~D15
Polarity	+wid, -wid
Limit range	<, >, in range, out of range
Time range	2 ns ~ 20 s, Resolution = 1 ns
Video Trigger	
Source	C1~C4
Standard	NTSC, PAL, 720p/50, 720p/60, 1080p/50, 1080p/60, 1080i/50, 1080i/60, Custom
Synchronization	Any, Select
Trigger Condition	Line, Field
Window Trigger	
Source	C1~C4
Window type	Absolute, Relative
Interval Trigger	
Source	C1~C4/D0~D15
Slope	Rising, Falling
Limit range	<, >, in range, out of range
Time range	2 ns ~ 20 s, Resolution = 1 ns
Dropout Trigger	
Source	C1~C4/D0~D15
Timeout type	Edge, State
Slope	Rising, Falling
Time range	2 ns ~ 20 s, Resolution = 1 ns
Runt Trigger	
Source	C1~C4
Polarity	Positive, Negative
Limit range	<, >, in range, out of range
Time range	2 ns ~ 20 s, Resolution = 1 ns
Pattern Trigger	
Source	C1~C4/D0~D15
Pattern Setting	Don't Care, Low, High
Logic	AND, OR, NAND, NOR
Limit range	<, >, in range, out of range
Time range	2 ns ~ 20 s, Resolution = 1 ns
Qualified Trigger	
Type	State, State with Delay, Edge, Edge with Delay
Qualified Source	C1~C4/D0~D15
Edge Trigger Source	C1~C4/D0~D15
Nth Edge Trigger	
Source	C1~C4/D0~D15
Slope	Rising, Falling
Idle time	8 ns ~ 20 s, Resolution = 1 ns
Edge Number	1 ~ 65535
Delay Trigger	
Source A	C1~C4/D0~D15
Source B	C1~C4/D0~D15

Slope	Rising, Falling
Limit range	<, >, in range, out of range
Time range	2 ns ~ 20 s, Resolution = 1 ns
Serial Trigger	
Source	C1~C4/D0~D15
Protocol	Standard: I²C, SPI, UART, CAN, LIN Optional: CAN FD, FlexRay, I²S, MIL-STD-1553B, SENT
I²C	Type: Start, Stop, Restart, No Ack, EEPROM, Address & Data, Data Length
SPI	Type: Data
UART	Type: Start, Stop, Data, Parity Error
CAN	Type: All, Remote, ID, ID+Data, Error
LIN	Type: Break, Frame ID, ID+Data, Error
CAN FD（Optional）	Type: Start, Remote, ID, ID+Data, Error
FlexRay（Optional）	Type: TSS, Frame, Symbol, Errors
I²S（Optional）	Type: Data, Mute, Clip, Glitch, Rising Edge, Falling Edge
MIL-STD-1553B（Optional）	Type：Transfer, Word, Error, Timing
SENT（Optional）	Type: Start, Slow channel, Fast channel, Error

Serial Decoder	
Decoders	2
Threshold	-4.1 ~ 4.1 div
List	1 ~ 7 lines
Decoder type	Full duplex
I²C	
Source	C1~C4/D0~D15/F1~F4/M1~M4
Signal	SCL, SDA
Address	7-bit, 10-bit
SPI	
Source	C1~C4/D0~D15/F1~F4/M1~M4
Signal	CLK, MISO, MOSI, CS
Edge Select	Rising, Falling
Chip select	Active high, Active low, Clock timeout
Bit Order	LSB, MSB
UART	
Source	C1~C4/D0~D15/F1~F4/M1~M4
Signal	RX, TX
Data Width	5-bit, 6-bit, 7-bit, 8-bit
Parity Check	None, Odd, Even, Mark, Space
Stop Bit	1-bit, 1.5-bit, 2-bit
Idle Level	Low, High
Bit Order	LSB, MSB
CAN	
Source	C1~C4/D0~D15/F1~F4/M1~M4
LIN	
LIN Version	Ver 1.3, Ver 2.0
Source	C1~C4/D0~D15/F1~F4/M1~M4
Baud Rate	600 bps, 1200 bps, 2400 bps, 4800 bps, 9600 bps, 19200 bps, Custom
CAN FD（Optional）	
Source	C1~C4/D0~D15/F1~F4/M1~M4
Nominal Baud Rate	10 kbps, 25 kbps, 50 kbps, 100 kbps, 250 kbps, 1 Mbps, Custom
Data Baud Rate	500 kbps, 1 Mbps, 2 Mbps, 5 Mbps, 8 Mbps, 10 Mbps, Custom
FlexRay（Optional）	
Source	C1~C4/D0~D15/F1~F4/M1~M4
Baud Rate	2.5 Mbps, 5 Mbps, 10 Mbps, Custom
I²S（Optional）	
Source	C1~C4/D0~D15/F1~F4/M1~M4
Signal	BCLK, WS, DATA
Audio Variant	Audio-I2S, Audio-LJ, Audio-RJ

Start Bits	0~31
Data Bits	1~32
MIL-STD-1553B（Optional）	
Source	C1~C4/F1~F4/M1~M4
SENT（Optional）	
Source	C1~C4/D0~D15/F1~F4/M1~M4
Manchester（Optional）	
Source	C1~C4/F1~F4/M1~M4
Baud Rate	500 bps~5 Mbps
ARINC429（Optional）	
Source	C1~C4/F1~F4/M1~M4
Baud Rate	12.5 kbps~100 kbps, tolerance 1%~20%
Word format	L/SDI/D/SSM，L/D/SSM，L/D

Measurement	
Automatic Measurement	
Source	C1~C4, D0~D15, Math, Ref, History, Zoom
Mode	Simple, Advanced
Range	Screen Gated: inside screen, definable with separate Gate cursors
Custom Threshold	Upper, Middle, Lower
No. of Measurements	Display 12 measurements at the same time (Display mode = M2)
Vertical Parameters	Max, Min, Pk-Pk, Top, Base, Amplitude, Mean, Cycle Mean, Stdev, Cycle Stdev, RMS, Cycle RMS, Median, Cycle Median, FOV, FPRE, ROV, RPRE, Level@Trigger, UpperLower
Horizontal Parameters	Period, Frequency, Time@max, Time@min, +Width, -Width, 10-90%Rise time, 90-10%Fall time, Rise time, Fall time, +Burst Width, -Burst Width, +Duty Cycle, -Duty Cycle, Delay, Time@Middle, Cycle-Cycle jitter
Miscellaneous Parameters	+Area@DC, -Area@DC, Area@DC, Absolute Area@DC, +Area@AC, -Area@AC, Area@AC, Absolute Area@AC, Cycles, Rising Edges, Falling Edges, Edges, Positive pulses, Negative pulses, Positive Slope, Negative Slope
Delay Parameters	Phase, FRFR, FRFF, FFFR, FFFF, FRLR, FRLF, FFLR, FFLF, Skew, △time1~4
Statistics	Current, Mean, Min, Max, Sdev, Count, Histogram, Trend, Track
Statistics Count	Unlimited, 1~1024
Statistics Count in one frame	Up to 65,000
Cursors	
Source	C1~C4、D0~D15、Math、Ref、Histogram
Type	Manual : Time X1, X2, (X1-X2), (1/ΔT); Vertical Y1, Y2, (Y1-Y2) Track: Time X1, X2, (X1-X2) Measure: indicates the measurement on specific parameter

Math	
Trace	F1, F2, F3, F4
Source	C1~C4, Zoom, F1~F4
Operation	FFT, +, -, x, ÷, ∫dt, d/dt, √, Identity, Negation, |x|, Sign, e^x, 10^x, ln, lg, Interpolation, Max hold, Min hold, ERES, Average, Filter, Formula Editor
FFT	Length: 8 Mpts, 4 Mpts, 2 Mpts, 1 Mpts, 512 kpts, 256 kpts, 128 kpts, 64 kpts, 32 kpts, 16 kpts, 8 kpts, 4 kpts, 2 kpts Window: Rectangular, Blackman, Hanning, Hamming, Flattop, Blackma_Harris, Gaussian Display: Full Screen, Split, Exclusive Mode: Normal, Max hold, Average Tools: Peaks, Markers

Analysis	
Search	
Source	C1~C4, History
Mode	Edge, Slope, Pulse, Interval, Runt
Copy setting	Copy from trigger, Copy to trigger
Navigate	
Type	Search event, Time, History frame
Mask Test	
Source	C1~C4, Z1~Z4, F1~F4, M1~M4

Mask creating	Auto (Create mask), Customized (Mask Editor)
Mask test speed	Up to 18,000 frames/s
DVM	
Source	C1~C4
Mode	DC mean, DC RMS, AC RMS, Peak-peak, Amplitude
Plot	Bar, Histogram, Trend
Gate	20 ms
Bode Plot	
Source	C1~C4
Supported signal sources	SAG1021I (Connection: USB), SDG series waveform generators (Connection: USB, LAN)
Sweep type	Simple, Vari-level
Frequency	Mode: Linear, Logarithmic Range: 10 Hz ~ 120 MHz
Measure	Upper cutoff frequency, Lower cutoff frequency, Bandwidth, Gain margin, Phase margin
Power Analysis (optional)	
Measure	Power quality, Current Harmonics, Inrush current, Switching loss, Slew rate, Modulation, Output ripple, Turn on/turn off, Transient response, PSRR, Efficiency, SOA
Histogram	
Source	C1~C4
Type	Horizontal, Vertical, Both
Counter	
Source	C1~C4
Frequency resolution	7 digits
Totalizer	Counter on edges, supports Gate and Trigger
Eye Diagram (optional)	
Source	C1~C4
Clock recovery	Constant frequency, PLL
Measure	Eye height, “1”level, “0”level, Eye amplitude, Eye width, Eye crossing, Average power, Q factor, TIE
Mask Test	Supported
Jitter Analysis (optional)	
Source	C1~C4
Clock recovery	Constant frequency, PLL
Measure	Period, Frequency, +Width, -Width, +Duty cycle, -Duty cycle, Cycle-cycle jitter, Cycle-cycle +width, Cycle-cycle -Width, Cycle-cycle +Duty cycle, Cycle-cycle -Duty cycle, Bit Rate, Unit interval
Jitter decomposition	TIE, RJ, DJ, DCD, DDJ, PJ, TJ@BER Statistics: Histogram, Track, Spectrum
SignalScan	
Source	C1~C4, F1~F4, M1~M4, D0~D15
Mode	Edge, Non-monotonic, Runt, Measure, Serial pattern, Bus pattern, Protocol Decode

Digital Channels	
Max. Sampling Rate	1 GSa/s
Memory Depth	50 Mpts/ch
Min. Detectable Pulse Width	3.3 ns
Level Group	D0~D7, D8~D15
Level Range	-10 V~10 V
Logic Type	TTL, CMOS, LVCMOS3.3, LVCMOS2.5, Custom
Skew	D0~D15: ±1 sampling interval Digital to Analog: ± (1 sampling interval +1 ns)

SAG1021I Waveform Generator (optional)	
Channels	1
Max. Output Frequency	25 MHz
Sampling Rate	125 MSa/s
Frequency Resolution	1 μHz
Frequency Accuracy	±50 ppm
Vertical Resolution	14 bit
Amplitude Range	-1.5 V ~ +1.5 V (into 50 Ω) -3 V ~ +3 V (into High-Z)
Waveforms	Sine, Square, Ramp, Pulse, DC, Noise, 45 Arbitrary
Output Impedance	50 Ω ± 2%
Protection	Over voltage protection, Current limit
Insulation Voltage	±42 Vpk

Sine	
Frequency	1 μHz ~ 25 MHz
Offset accuracy (10 kHz)	±(1%*offset setting value +3 mVpp)
Amplitude flatness	±0.3 dB, compare to 10 kHz, 2.5 Vpp into 50 Ω
SFDR	DC ~ 1 MHz -60 dBc 1 MHz ~ 5 MHz -55 dBc 5 MHz ~ 25 MHz -50 dBc
Harmonic distortion	DC ~ 5 MHz -50 dBc 5 MHz ~ 25 MHz -45 dBc
Square/Pulse	
Frequency	1 μHz ~ 10 MHz
Duty cycle	1% ~ 99%
Edge	< 24 ns (10% ~ 90%)
Overshoot	< 3% (typical，1 kHz, 1 Vpp)
Pulse width	> 50 ns
Jitter (cycle-cycle)	< 500 ps + 10 ppm
Ramp	
Frequency	1 μHz ~ 300 kHz
Linearity	< 0.1% of Pk-Pk (typical, 1 kHz, 1 Vpp, 50% symmetry)
Channels	0% ~ 100%
DC	
Offset range	±1.5 V (into 50 Ω) ±3 V (into Hi-Z)
Accuracy	±(|setting value|*1% + 3 mV)
Noise	
Bandwidth (-3 dB)	>25 MHz
Arb	
Frequency	1 μHz ~ 5 MHz
Waveform memory	16 kpts
Sample rate	125 MSa/s
Wave import	From EasyWaveX, from U-disk, directly from waveform data of analog channels

I/O	
Front	USB 3.0 Host x2， Calibration Signal: 1 kHz,3 V Square
Rear	USB 2.0 Host x2, USB 2.0 Device, LAN: 10/100MbaseT (RJ45), Micro SD Card, External Trigger，EXT: ≤1.5 Vrms，EXT/5: ≤ 7.5Vrms, Auxiliary Output: TRIG OUT(3.3 V LVCMOS), PASS/FAIL OUT(3.3 V TTL), HDMI

Display	
Display Type	12.1 TFT LCD with capacitive touch screen
Resolution	1280×800
Contrast (typical)	1000:1
Backlight (typical)	450 nit
View angles (typical)	Top：85°, Bottom：85°, Left：85°, Right：85°

Display Setting	
Range	8 x 10 grid
Display Type	Dot, Vector
Persistence Time	OFF, 0.1 s, 0.2 s, 0.5 s, 1 s, 5 s, 10 s, 30 s, infinite
Color Display	Normal, Color; Supports customer trace color
Language	Simplified Chinese, Traditional Chinese, English, French, Japanese, German, Spanish, Russian, Italian, Portuguese
Built-in Help System	Simplified Chinese, English

Environmental			
Temperature	Operating: 0 °C ~ 50 °C Non-operating: -30 °C ~ 70 °C		
Humidity	Operating: 5% ~ 90%RH, 30℃, degraded to 50%RH at 40 ℃ Non-operating: 5% ~ 95%		
Altitude	Operating: ≤ 3,048 m, 25 ℃ Non-operating: ≤12,192 m		
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 1 150 kHz-30 MHz
	Radiated disturbance	CISPR 11/EN 55011	CLASS A group 1 30 MHz-1 GHz
	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.		
RoHS	EU 2015/863		

Power Supply	
Input Voltage & Frequency	100 ~ 240 Vrms 50/60Hz 100 ~ 120 Vrms 400 Hz
Power consumption	193 W max., 123 W typical, 4 W typical in standby mode

Mechanical	
Dimensions	Length × Height × Width = 379mm × 288mm × 159mm
Weight	Net Weight 5.5 kg, Gross Weight 7.1 kg

Ordering Information

Model	Description
SDS6204A	2 GHz, 5 GSa/s, 4-CH, 500 Mpts/ch memory depth, 12.1” capacitive touch screen
SDS6104A	1 GHz, 5 GSa/s, 4-CH, 500 Mpts/ch memory depth, 12.1” capacitive touch screen
SDS6054A	500 MHz, 5 GSa/s, 4-CH, 500 Mpts/ch memory depth, 12.1” capacitive touch screen

Standard Accessories	Quantity
USB cable	1
Quick start	1
Passive probe (SP3150A)	1/channel
Certificate of calibration	1
Wireless mouse	1
Power cord	1
Protective Cover	1
Optional Accessories	**Description**
SP6150A	High-speed passive probe: 1.5 GHz, 10X, Input impedance 1.8 pF || 500 Ω
SAP1000	High-speed active probe: 1 GHz, 10X, Input impedance 1.2 pF || 1 MΩ, Input dynamic range ±8 V, Offset range ±12 V，SAPBus interface
SAP2500	High-speed active probe: 2.5 GHz, 10X, Input impedance 1.1 pF || 1 MΩ, Input dynamic range ±8 V, Offset range ±12 V，SAPBus interface
SAP2500D	High-speed differential probe: 2.5 GHz, 10X, Input impedance (differential) 1 pF || 200 kΩ, Input dynamic range ±4 V, Offset range ±8 V，SAPBus interface
HPB4010	High voltage passive probe: DC-40MHz, 1000X, Input impedance 3.0 pF || 100 MΩ, Max. measurement voltage DC: 0~10 kVDC, AC: ≤ 7 kVrms (Sinewave), 20 kVp-p (Pulse)
DPB1300	High voltage differential probe: 50 MHz, 50X/500X, Max differential test voltage (DC + Peak AC) ± 1300 V, Max input common mode voltage CATIII 600 V / CATII 1000 V, 12 V adapter power supply
DPB5150	High voltage differential probe: 70 MHz, 50X/500X, Max differential test voltage (DC + Peak AC) ± 1500 V, Max input common mode voltage CATIII 600 V / CATII 1000 V, USB 5V adapter power supply
DPB5150A	High voltage differential probe: 100 MHz, 50X/500X, Max differential test voltage (DC + Peak AC) ±1500 V, Max input common mode voltage CATIII 600 V / CATII 1000 V, USB 5V adapter power supply
DPB5700	High voltage differential probe: 70 MHz, 100X/1000X, Max differential test voltage (DC + Peak AC) ±7000 V, Max input common mode voltage CATIII 1000 V, USB 5V adapter power supply
DPB5700A	High voltage differential probe: 100 MHz, 100X/1000X, Max differential test voltage (DC + Peak AC) ±7000 V, Max input common mode voltage CATIII 1000 V, USB 5V adapter power supply
SCP5030	Current probe: DC-50 MHz, Conversion factor 1 V/A, 0.1 V/A, Max current 30 Arms/50 Apk, 300V, SAPBus interface
SCP5030A	Current probe: DC-100 MHz, Conversion factor 1 V/A, 0.1 V/A, Max current 30 Arms/50 Apk, 300V, SAPBus interface
SCP5150	Current probe: DC-12 MHz, Conversion factor 0.1 V/A, 0.01 V/A, Max current 150 Arms/300 Apk, CAT III 300 V/CAT II 600 V, SAPBus interface
SCP5500	Current probe: DC-2 MHz, Conversion factor 0.1 V/A, 0.01 V/A, Max current 500 Arms/750 Apk, CAT III 300 V/CAT II 600 V, SAPBus interface
CPL5100	Current probe: DC-600 kHz, Conversion factor 0.1 V/A, 0.01 V/A, Current range 50 mA -100 Apk, 12 V adapter power supply
CP4020	Current probe: DC-200 kHz, Conversion factor 5 mV/A, 50 mV/A, Max current 20 Arms/60 Ap-p, CAT III 600 V/CAT II 600 V, 9 V adapter power supply
CP4050	Current probe: DC-1 MHz, Conversion factor 50 mV/A, 500 mV/A, Max current 50 Arms/140 Ap-p, CAT III 300 V/CAT II 600 V, 9 V adapter power supply
CP4070	Current probe: DC-300 kHz, Conversion factor 5 mV/A, 50 mV/A, Max current 70 Arms/200 Ap-p, CAT III 300 V/CAT II 600 V, 9 V adapter power supply
CP4070A	Current probe: DC-300 kHz, Conversion factor 10 mV/A, 100 mV/A, Max current 70 Arms/200 Ap-p, CAT III 600 V/CAT II 600 V, 9 V adapter power supply
CP6030	Current probe: DC-50 MHz, Conversion factor 1 V/A, 0.1 V/A, Max current 30 Arms/50 Apk, 300V, 12 V adapter power supply

CP6030A	Current probe: DC-100 MHz, Conversion factor 1 V/A, 0.1 V/A, Max current 30 Arms/50 Apk, 300V, 12 V adapter power supply
CP6150	Current probe: DC-12 MHz, Conversion factor 0.1 V/A, 0.01 V/A, Max current 150 Arms/300 Apk, CAT III 300 V/CAT II 600 V, 12 V adapter power supply
CP6500	Current probe: DC-5 MHz, Conversion factor 0.1 V/A, 0.01 V/A, Max current 500 Arms/750 Apk, CAT III 300 V/CAT II 600 V, 12 V adapter power supply
SAP4000P	Power rail probe: DC - 4 GHz, 1.1X, Input impedance: 50 kΩ @ low frequency, 50 Ω @ high frequency, Input dynamic range ± 600 mV, Offset range ± 24 V, SAPBus interface
SPL2016	16-channel logic probe: Input impedance 100 kΩ || 18 pF, Input dynamic range ±20 V, Min. input swing 800 mVpp, Max. data rate 300 Mbps (without lead), 100 Mbps (with lead)
SAG1021I	50 MHz isolated USB function/arbitrary waveform generator
DF2001A	Power Analysis deskew fixture
STB3	STB3 demo signal source
USB-GPIB	USB-GPIB adapter
SDS6000-RMK	Rack Mount Kit
BAG-S2	Bag
Options	**Description**
SDS6000Pro-PA	Power Analysis (software)
SDS6000Pro-EJ	Eye Diagram/Jitter Analysis (software)
SDS6000Pro-I2S	I^2S trigger & decode (software)
SDS6000Pro-1553B	MIL-STD-1553B trigger & decode (software)
SDS6000Pro-FlexRay	FlexRay trigger & decode (software)
SDS6000Pro-CANFD	CAN FD trigger & decode (software)
SDS6000Pro-SENT	SENT trigger & decode (software)
SDS6000Pro-Manch	Manchester decode (software)
SDS6000Pro-ARINC	ARINC429 decode (software)
SDS6000-4BW10	500 MHz to 1 GHz bandwidth upgrade (software)
SDS6000-4BW20	1 GHz to 2 GHz bandwidth upgrade (software)

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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