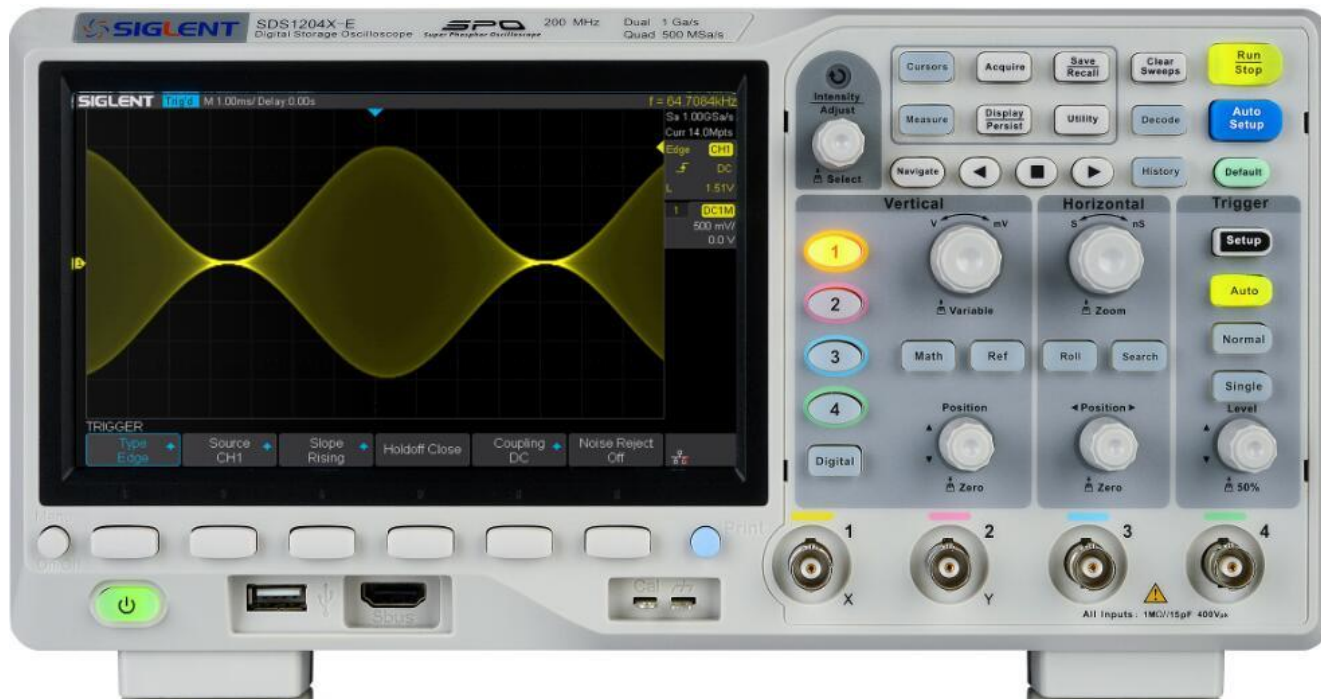# SIGLENT

The Best Value in Electronic Test & Measurement

SIGLENT TECHNOLOGIES CO.,LTD

SDS1000X-E Series Product Introduction

November 2017

What kind of oscilloscope do you need?

- Excellent background noise & Low channel crosstalk
- Large and powerful storage function
- Ultra-high waveform capture rate (for analysis of occasional, abnormal signals)
- Segmented storage (to improve storage depth utilization)
- Very high spectral resolution (FFT)
- History waveform record
- High resolution mode
- Serial data protocol analysis
- AWG (Option)
- MSO (Option)
- Bode chart
- WIFI (Option)
- Browser-based remote control
- …

The SDS1000X-E provides you with the most economical solution

- 2/4 Channels
- Excellent analog front-end design
- New SPO Technology
    - Waveform capture rate up to 400,000 wfm/s
    - Supports 256-level intensity grading and color display modes
    - Record length up to 14 Mpts
    - Digital trigger system
- Intelligent triggers
- Automatic measurement functions for 38 parameters
- Ultra-high spectral resolution
- Advanced Debugging Kit
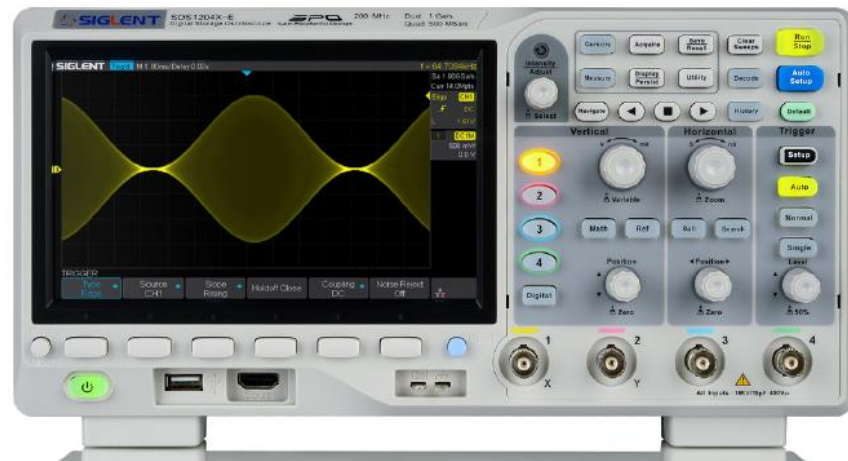
SDS1000X-E Provides You With the Most Economical Solution

- Serial bus triggering and decoding (Standard)
- Search and Navigation
- AWG
- MSO
- Bode chart
- WIFI
- ….
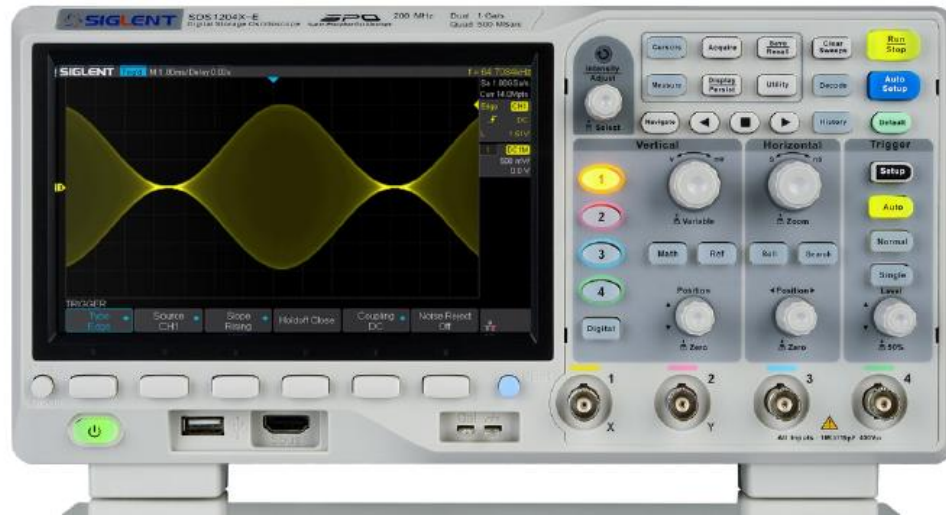
SDS1000X-E Models and Key Indicators

Model	SDS1104X-E	SDS1202 X-E
		SDS1204 X-E
Bandwidth	100MHz	200MHz
Channels	2/4 CH	
Sampling Rate (Max)	1 GSa/s	
Memory Depth (Max)	14 Mpts	
Data Processing	14 M measurement and operation of full sampling points	
Vertical Resolution	8 bit (Eres mode, Up to 3 bit ENOB equivalent)	
Waveform Capture Rate	400,000 wfm/s (Sequence mode)	
Vertical Sensitivity	500 uV/div - 10 V/div	
Trigger Type	Edge, Slope, Pulse Width, Window, Runt, Interval, Dropout, Pattern, Video	
Serial Trigger and Decode	IIC, SPI, UART/RS232, CAN, LIN	
History	80,000 frames	
FFT Data Processing Capacity	1 Mpts	
Automatic measurement	38 types, supports Statistics, Zoom, Gating, Math, History and Ref measurement	

SDS1000X-E Models and Key Indicators

Model	SDS1104X-E	SDS1202 X-E
		SDS1204 X-E
AWG	Supports USB arbitrary waveform generator (only four-channel model supported)	
MSO	Supports (only four-channel model supported)	
Bode Chart	Supports (only four-channel model supported)	
WIFI	Supports (only four-channel model supported)	
Interface	USB Host, USB Device (USBTMC), LAN (VXI-11), Pass/Fail, Trigger Out	
Display	7.0 inch TFT LCD (800*480), 8*14 grid	

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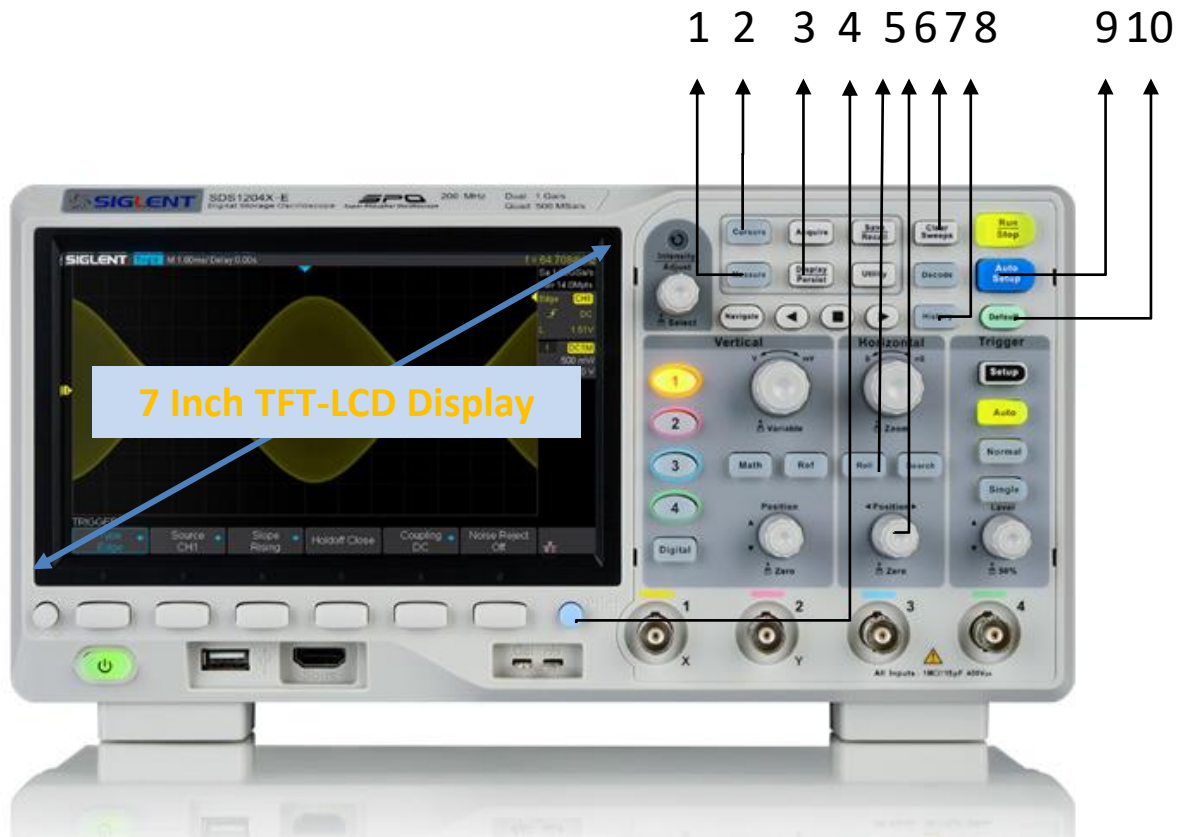
- Large 7 inch TFT-LCD display with 800 * 480 resolution
- Most commonly used functions are accessible using 10 different one-button operation keys: Auto Setup, Default, Cursor, Measure, Roll, History, Persist, Clear Sweep, Zoom, Print

Measure	Zoom
Cursors	Clear
Persist	History
Print	Auto
Roll	Default

Excellent Analog Front End Design

- Minimum vertical 500 μ V / div
  - Full bandwidth
  - True 500 μV / div sensitivity not software enhanced
- High channel isolation
  - Full bandwidth, channel isolation greater than 35 dB
  - Low channel crosstalk
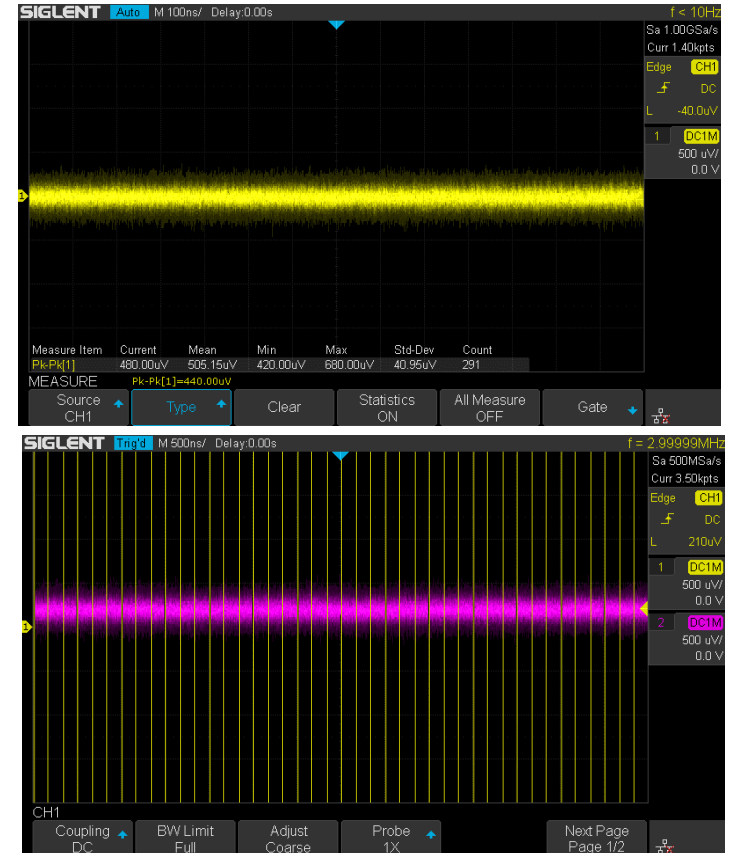
New SPO Technology

Waveform capture rate up to 400,000 wfm/s

Supports 256-level intensity grading and color display modes

Record length up to 14 Mpts

Digital trigger system

New SPO Technology

- Waveform capture rate up to 400,000 wfm/s

  - The dead time is as small as 2.5 μs
  - Easily capture of low probability events
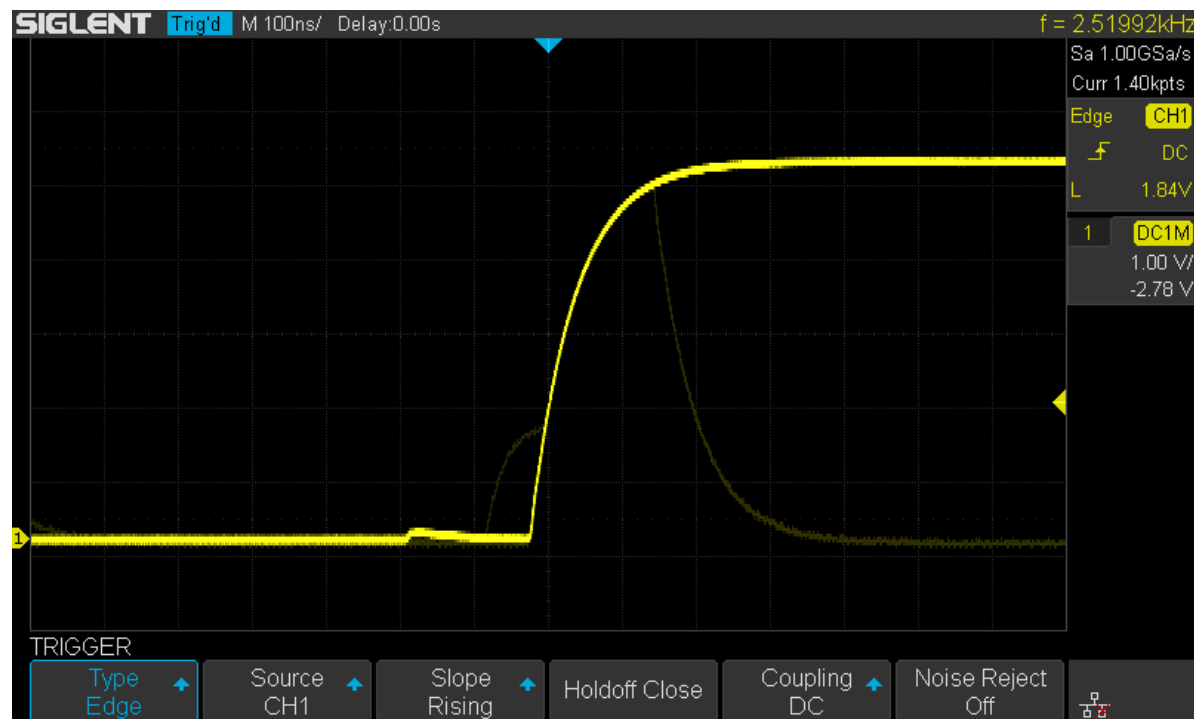
New SPO Technology

- Waveform capture can be as low as 400,000 wfm/s
  - Measured Trigger Out, the minimum trigger interval is 2 μs
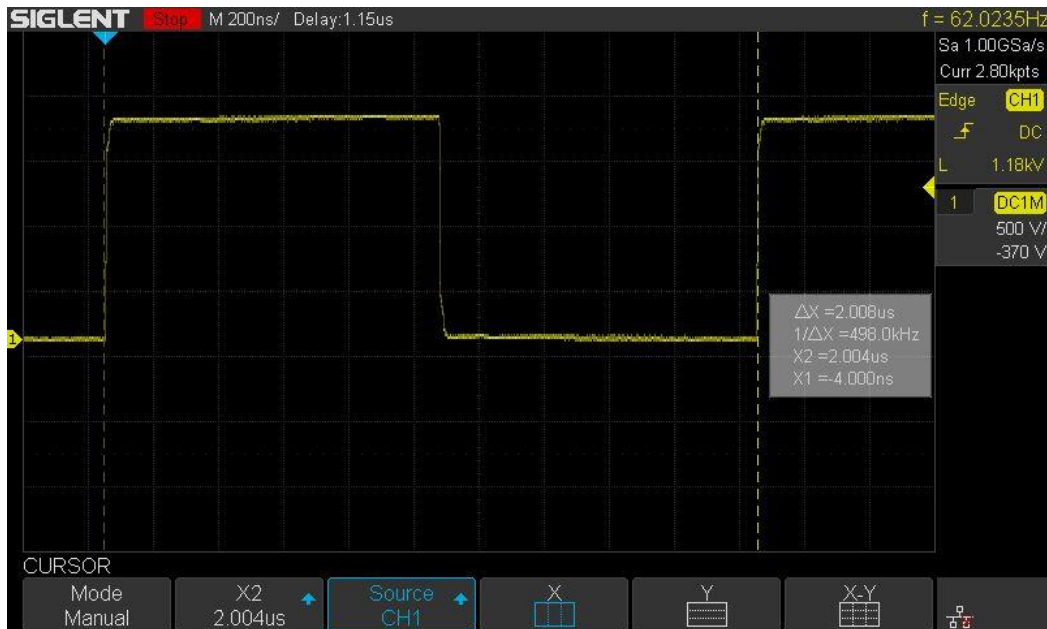
New SPO Technology

- 256-Level Intensity Grading and Color Temperature Display
  - The resulting intensity graded traces are brighter where events occur more frequently and less bright where they occur less often
  - The trace occurrence is represented by different colors (color "temperature") as opposed to changes in the intensity of one color. Red represents the most common occurrences or probabilities, while blue is used to mark points that occur least frequently.
  - Through the brightness and color temperature display, you can quickly find abnormal or occasional signals

Brightness Level Display
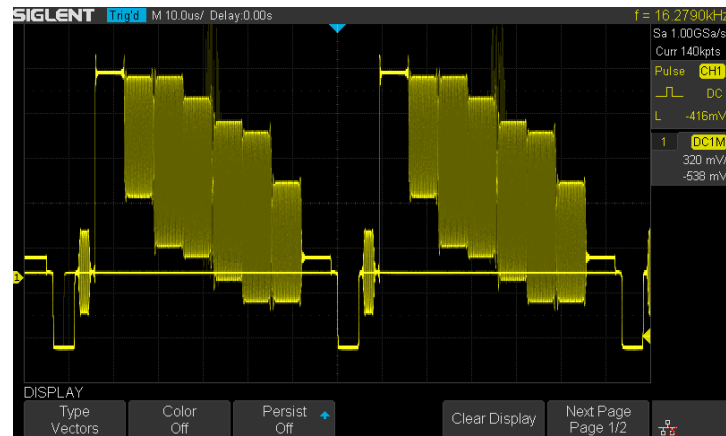
Color Temperature Display
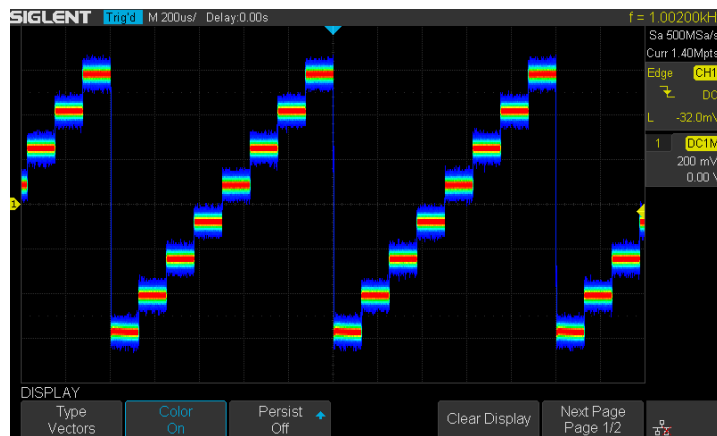
New SPO Technology

- Record length up to 14 Mpts
- Improve the measurement accuracy when using a slow time base setting
- 1 ms/div time base setting, the sampling rate can still reach 1 GSa / s
- Both the overall trace and the details of the signal can be seen with the zoom
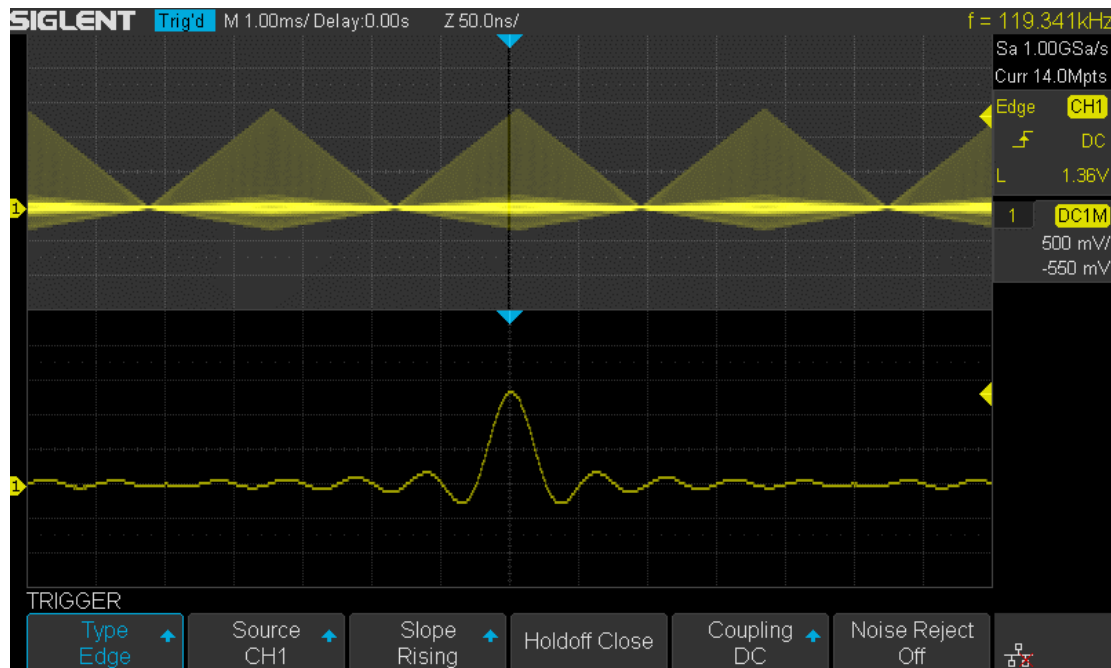
# New SPO Technology

◯ Digital trigger system

DSO (Analog trigger)

Jitter is less than 100ps
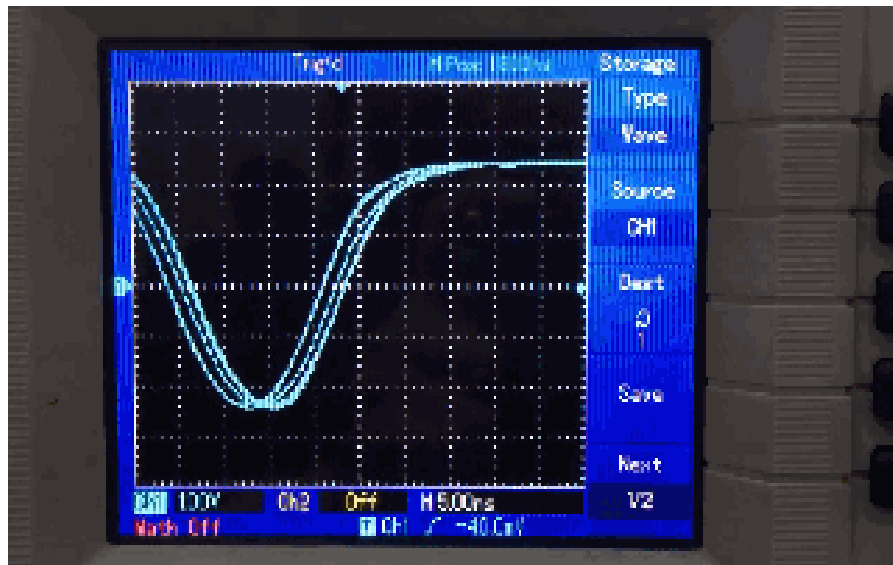
◯ The SDS1000X-E incorporates an innovative digital trigger system with higher trigger sensitivity and trigger jitter of less than 100 ps

14 M Full Sampling Data Processing

- Higher measurement accuracy
- The data sampled under the Nyquist theorem can be accurately measured to avoid the inaccuracies of the compression algorithm
- Allows the oscilloscope to achieve a high sampling rate, deep storage, and precision measurements, all at the same time
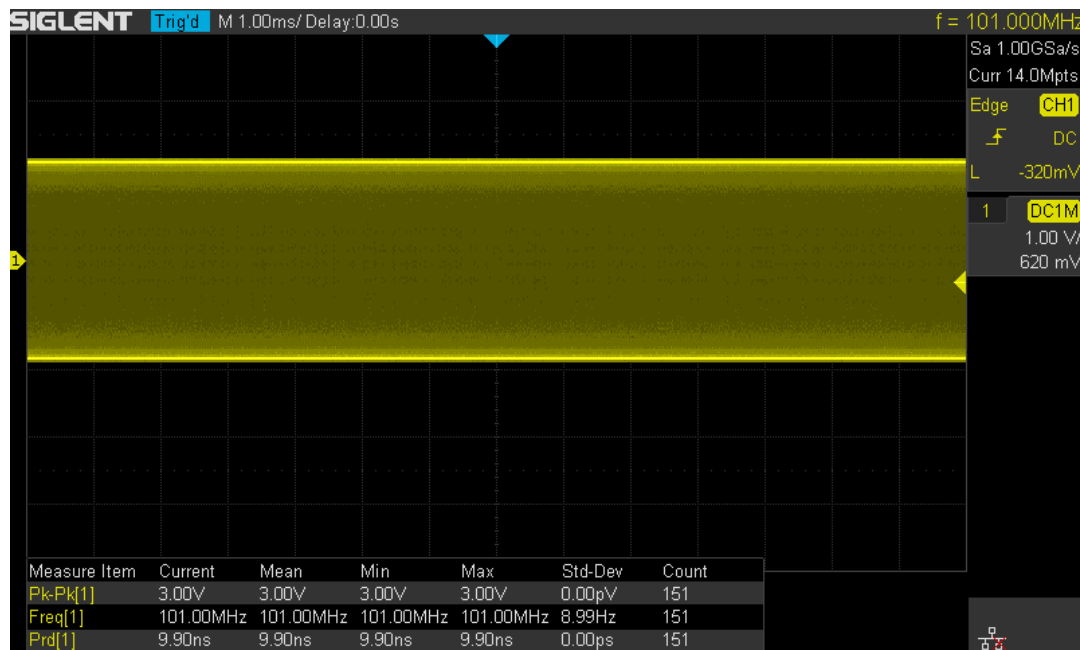
1 Mpts FFT Data Processing

Extrememly high spectral resolution while maintaining its very fast operating speed
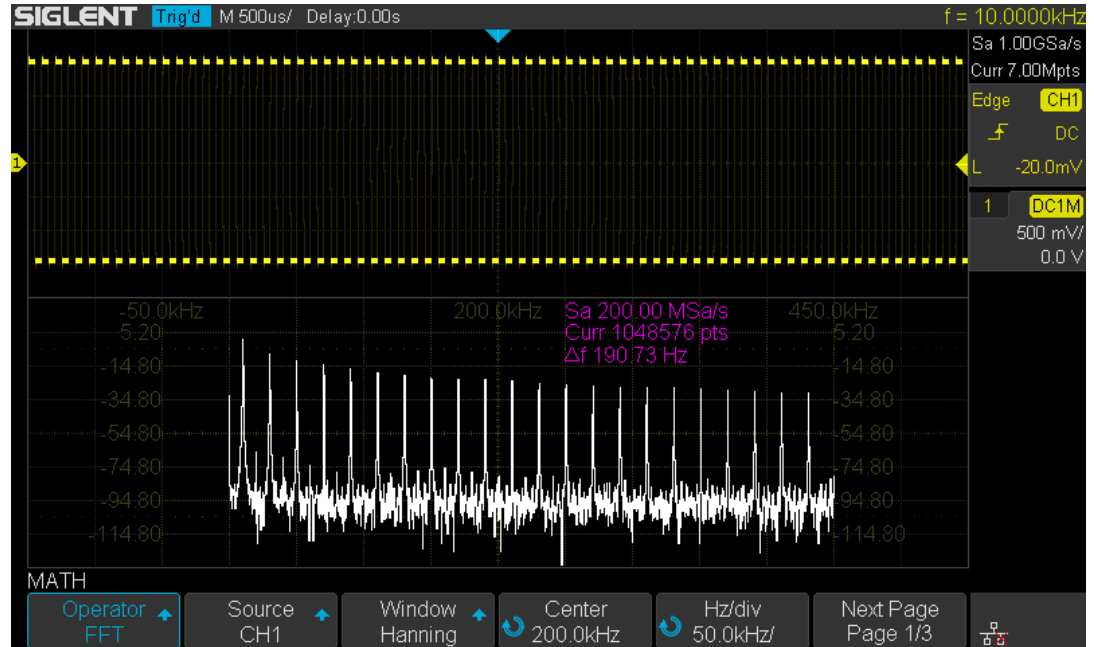
Intelligent Triggers

- Trigger Types
    - Edge
    - Slope
    - Pulse Width,
    - Video (supports HDTV)
    - Window
    - Runt
    - Time out
    - Pattern
    - Interval
- Interactive interface design, each trigger is accompanied by defining instructions
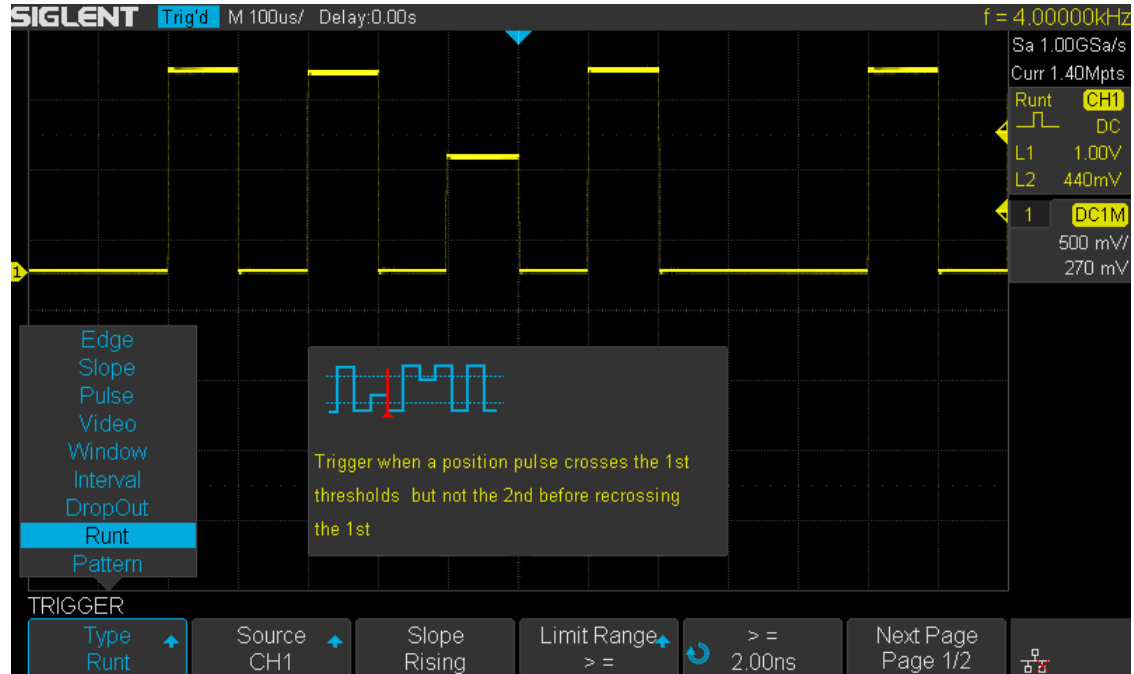
Serial Bus Triggering and Decoding (Standard)

- Supports serial bus protocols
  - IIC
  - SPI
  - UART/RS232
  - LIN
  - CAN
- Supports event list display
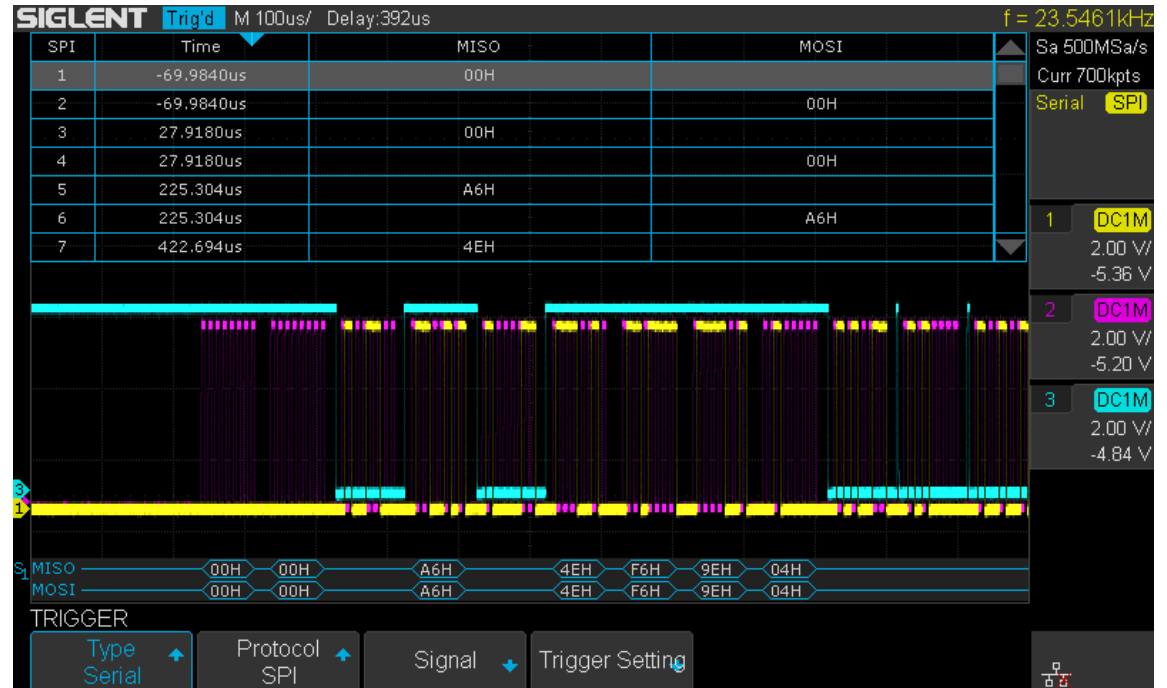
Comprehensive Measurement of Statistical Functions

- Supports 38 different types of automatic measurement parameters
- Simultaneous display of 5 measurements
- Supports Gating, Math, History and REF measurements
- Supports statistical measurements, giving current values, mean, minimum, maximum, standard variance and statistical samples
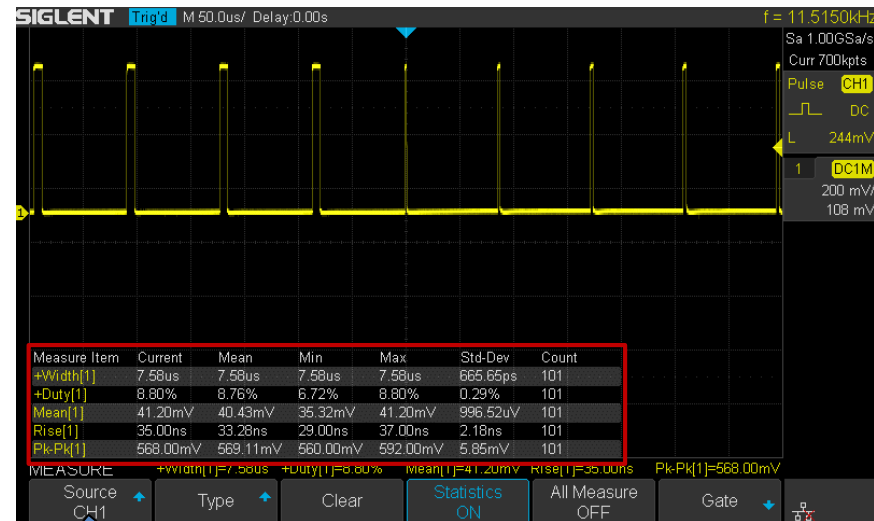
Measure Item	Current	Mean	Min	Max	Std-Dev	Count
+Width[1]	7.58us	7.58us	7.58us	7.58us	665.65ps	101
+Duty[1]	8.80%	8.76%	6.72%	8.80%	0.29%	101
Mean[1]	41.20mV	40.43mV	35.32mV	41.20mV	996.52uV	101
Rise[1]	35.00ns	33.28ns	29.00ns	37.00ns	2.18ns	101
Pk-Pk[1]	568.00mV	569.11mV	560.00mV	592.00mV	5.85mV	101

Advanced Math Functions

- In addition to the traditional +, -, *, / operations. The SDS1000X-E also supports FFT, differential, integral and square root operations
- Supports Gating Integral
  - Use the cursor to set the time period for the integration
  - Easy to calculate the area, energy and other important parameters
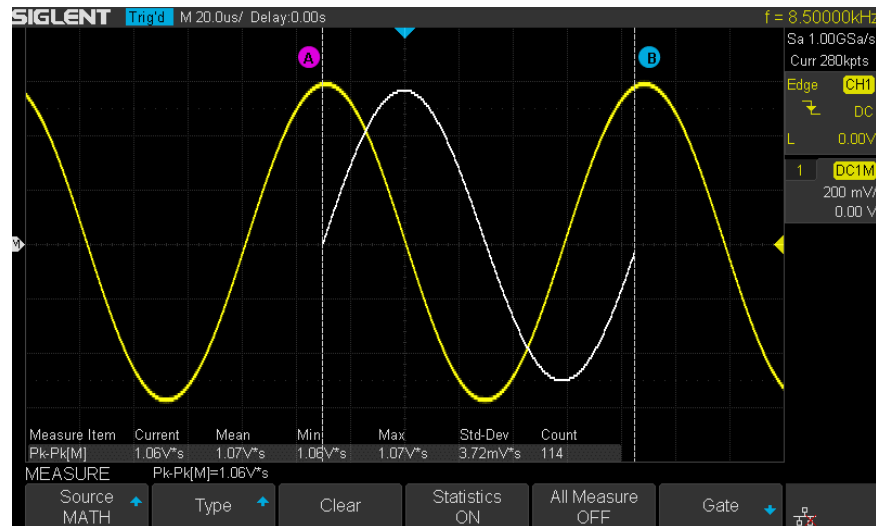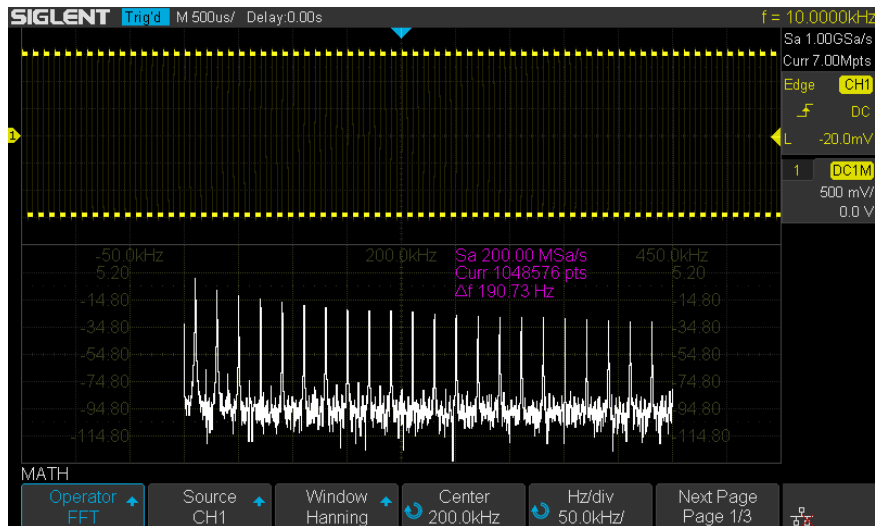
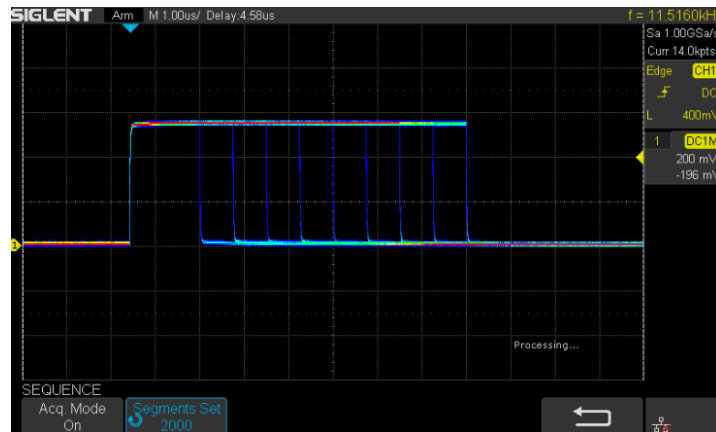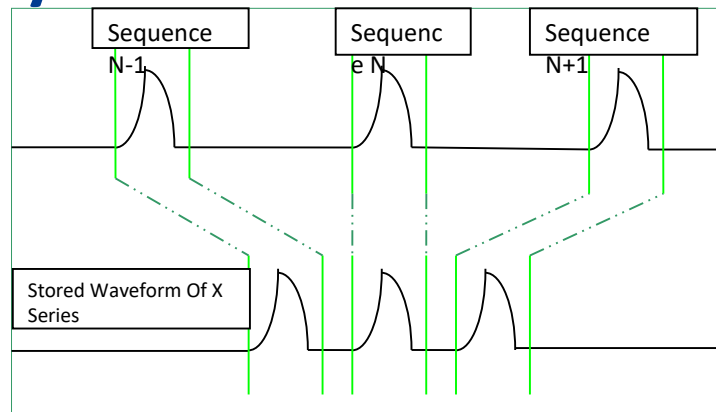# Advanced Debugging and Analysis Toolkit

- History Mode
  - Resident in the background, one-button to start quickly
  - Record up to 80,000 historical frames
  - Equipped with a dedicated waveform navigation bar- can be analyzed frame by frame
  - The trigger time for each frame is given in a timing list
  - With the Sequence pattern, the user can quickly locate and analyze the abnormalities in the waveform
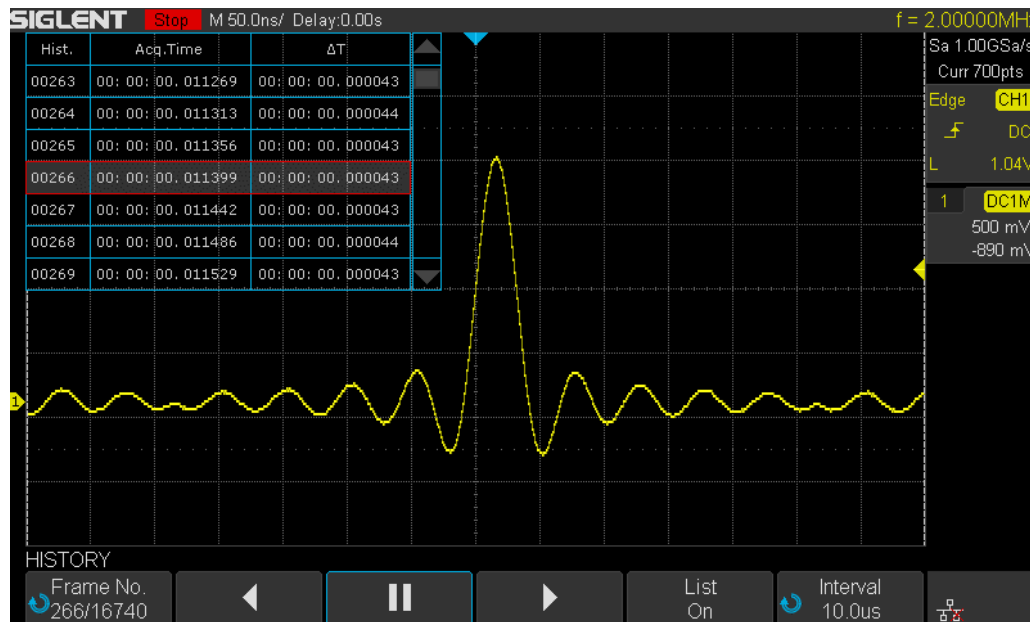
Advanced Debugging and Analysis Toolkit

- Sequence Mode
 - The oscilloscope storage is divided into multiple segments, the oscilloscope records one frame per trigger event
  - Removes the "relatively redundant" information segment, improve storage depth utilization
  - The minimum dead time is 2.5 μs and the equivalent waveform capture rate is as high as 400,000 wfm/s
  - The interval of the trigger frame can be calculated using history mode
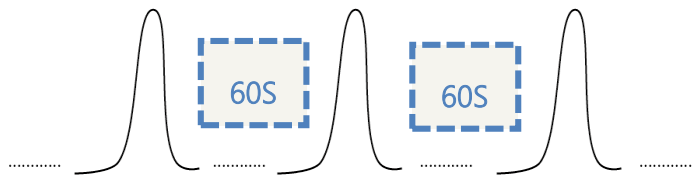
Advanced Debugging and Analysis Toolkit

- Typical application of sequence
  - Capture fast changes in the waveform, to compensate for a slower capture rate at a given sweep speed
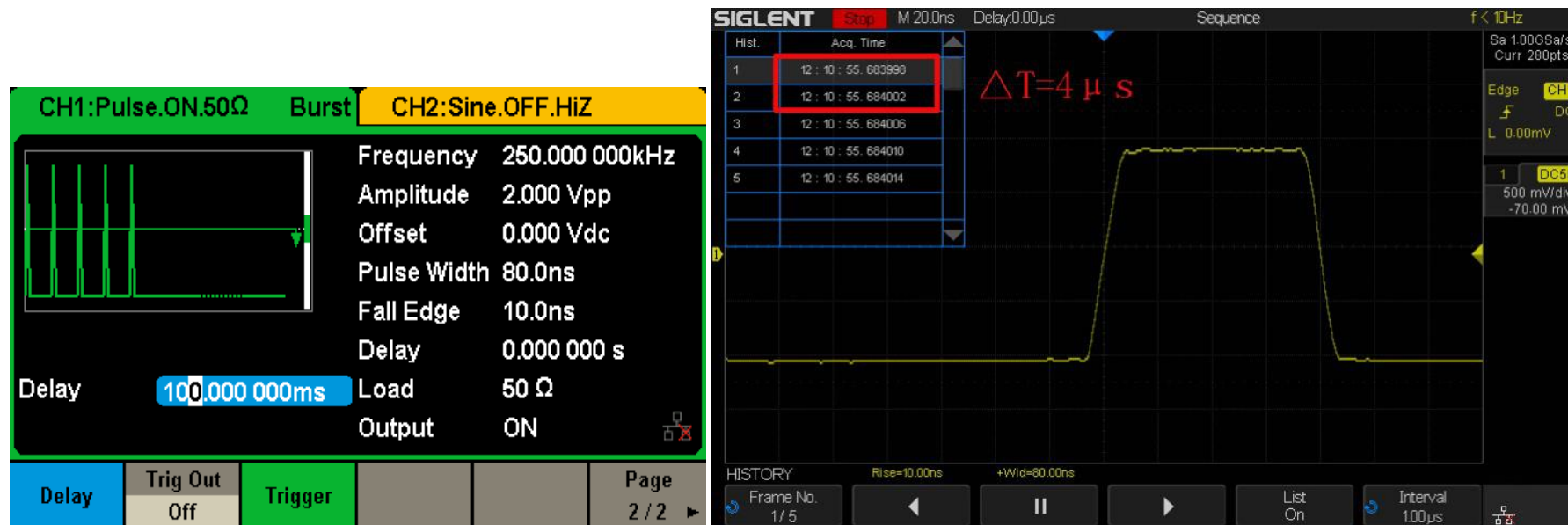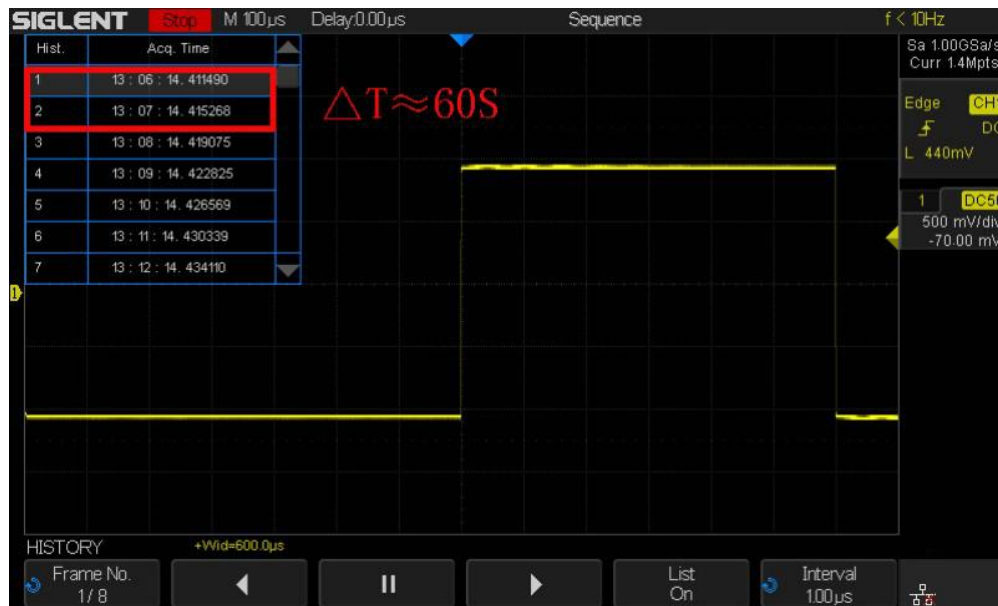
Advanced Debugging and Analysis Toolkit

- Typical application of Sequence
  - Capture long periods of interest signals or rare, occasional signals

If we want to increase the sampling time at limited storage depths using traditional oscilloscopes, we must first reduce our sampling rate which will result in a reduced horizontal resolution

Advanced Debugging and Analysis Toolkit

- Typical application of Sequence
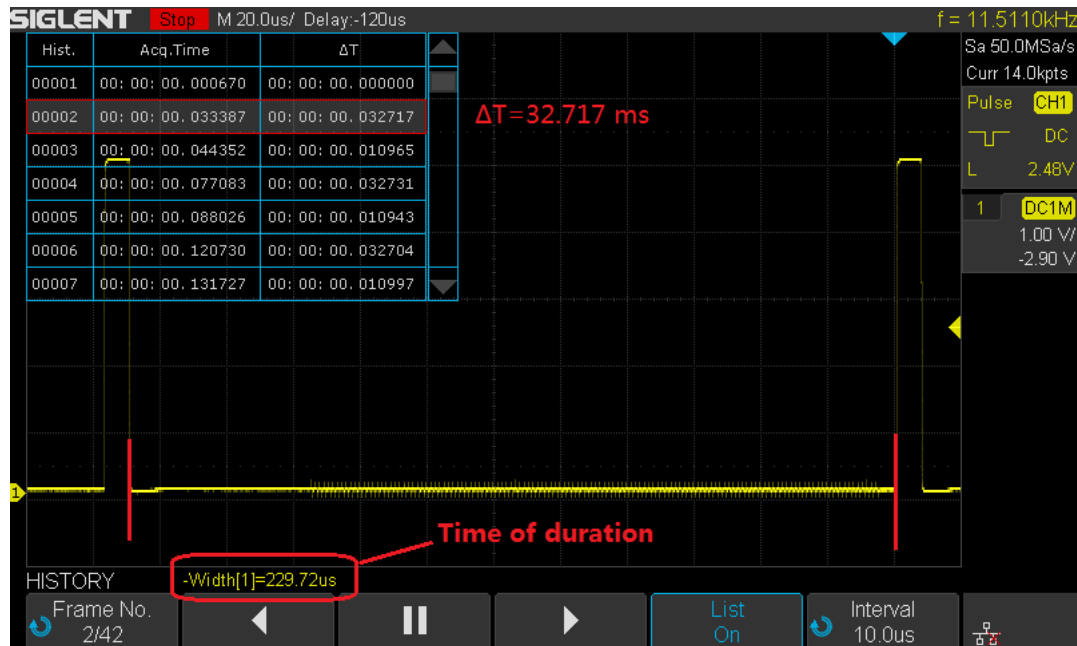 - Look for abnormal events in the signal
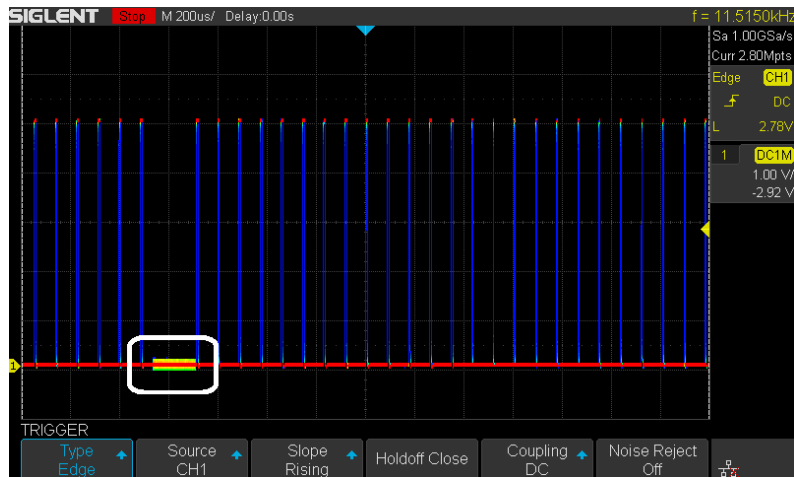
In real-time sampling mode, we found an abnormal signal (the negative pulse signal with the burr in the figure above). How can we determine the probability of its occurrence?

Advanced Debugging and Analysis Toolkit

- Eres Mode
  - Users can reduce the noise bandwidth through digital filtering to improve the signal to noise ratio effectively.
  - The maximum equivalent of enhanced 3 Bit ENOB, which is equivalent to improving the vertical resolution of the oscilloscope. And, it doesn't have to rely on the signal cycle and trigger point for stability.
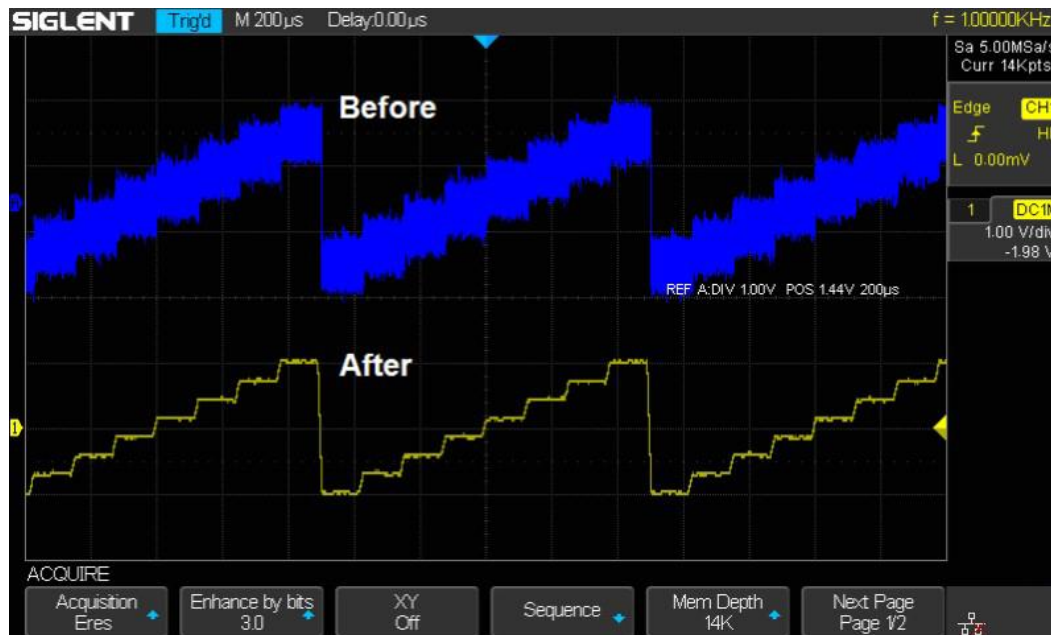
Advanced Debugging and Analysis Toolkit

- High Speed Hardware-Based Pass/Fail Function
    - Custom templates
    - High speed – high throughput - accurate measurements
        - Based on hardware implementation, the maximum execution rate of 40,000 times/s is achieved
    - Build an unattended detection environment
        - Stop data collection
        - Buzzer alarm
        - 3.3 V TTL output, can be used as an external excitation source (Pass/Fail Out)
        - Continuously compare waveforms to an existing "gold" waveform for Pass/Fail detection
        - …..

3.3V TTL Output

Serial bus triggering and decoding

- Trigger and decode types
    - IIC
    - SPI
   - RS232/UART
    - CAN
    - LIN

USB Arbitrary Waveform Generator (4-channel series only, option)

- External 25 MHz USB arbitrary waveform generator module via USB Host
- AWG can output: sine, square, triangular, pulse, noise, DC and 45 built-in arbitrary waveforms
- Users can edit arbitrary waveforms with included PC software

16-channel digital / MSO (4-channel series only, option)

- 16-channel
- Maximum sampling rate 1 GSa/s
- 14 Mpts/CH memory depth
- Support logic type: TTL, CMOS, LVCMOS3.3, LVCMO2.5, Custom
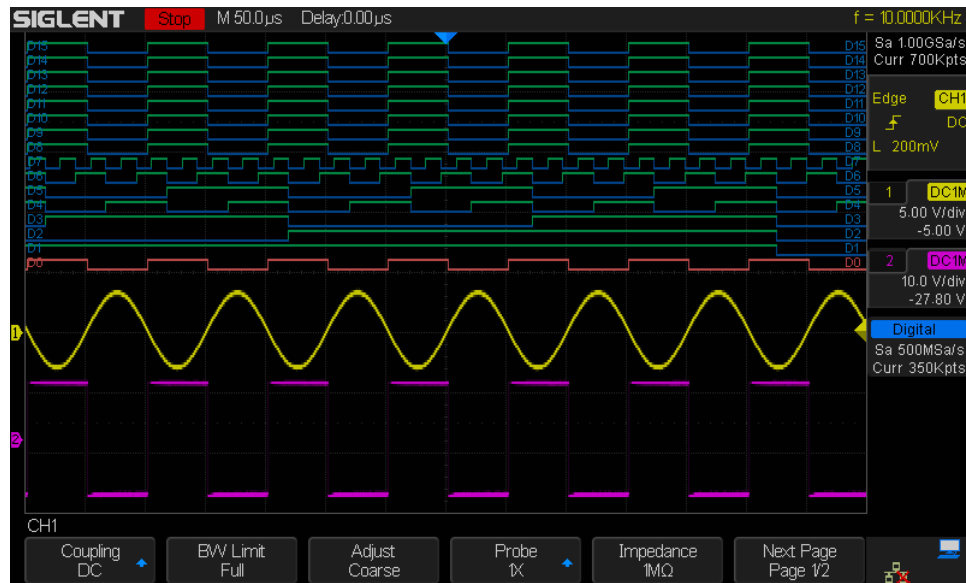
Bode Chart (4-channel series only, option)

The SDS1000X-E can control the USB AWG module or the independent source device to perform amplitude-frequency as well as phase-frequency analysis on the scan. The results are display in a Bode diagram or list, and the user can export the scan data
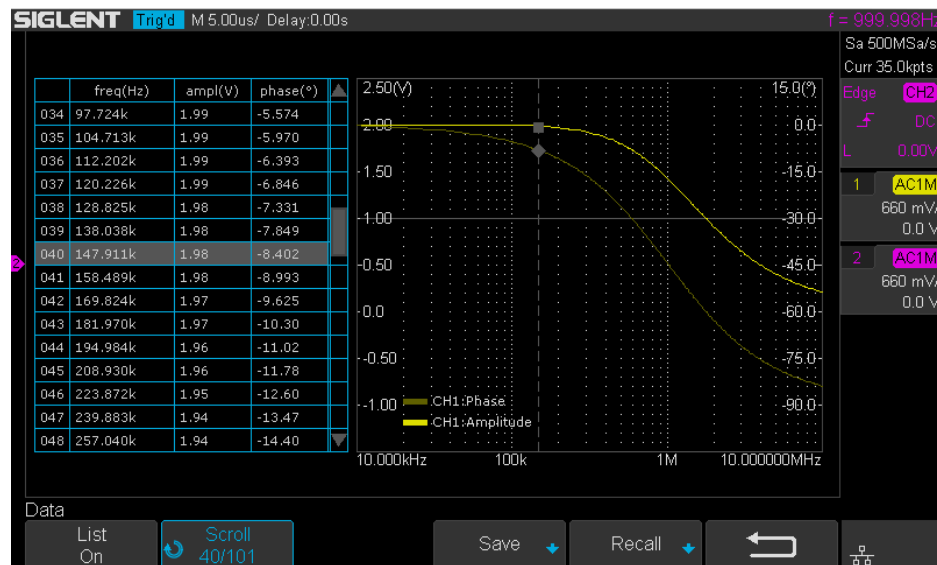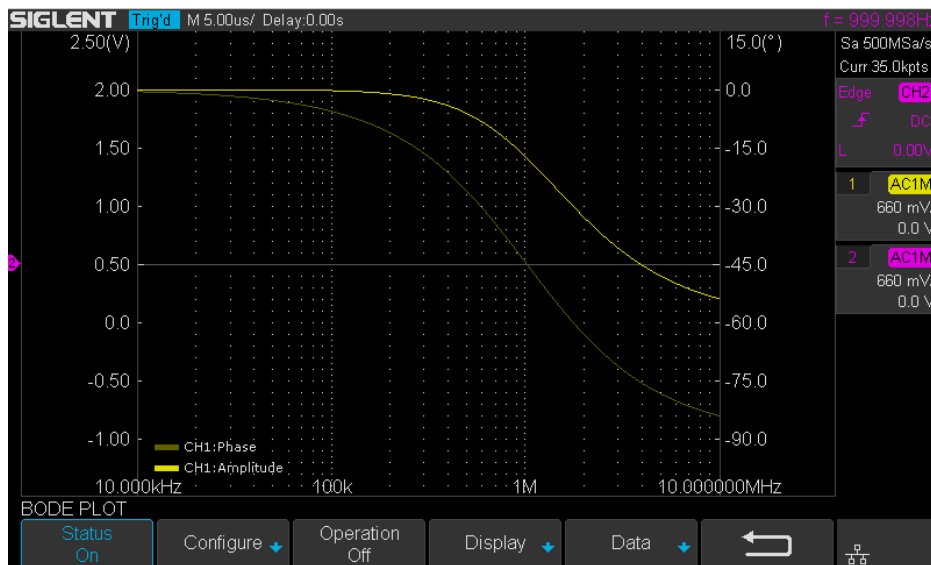
Search and Navigation (4-channel series only, option)

- SDS1000X-E can do an automatic search for a frame having the specified conditions, and the search results will be stored and marked for further analysis. Then, with the help of the Navigate feature, the events of interest can be quickly located and analyzed.
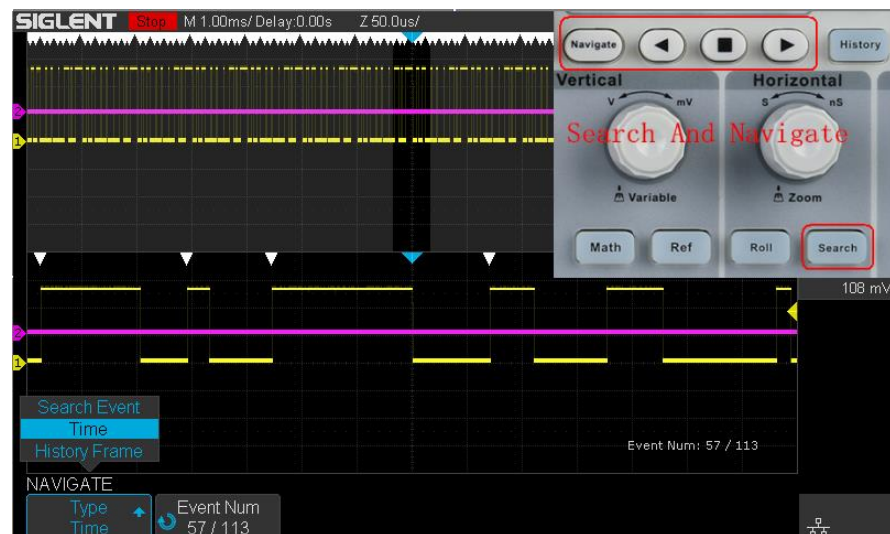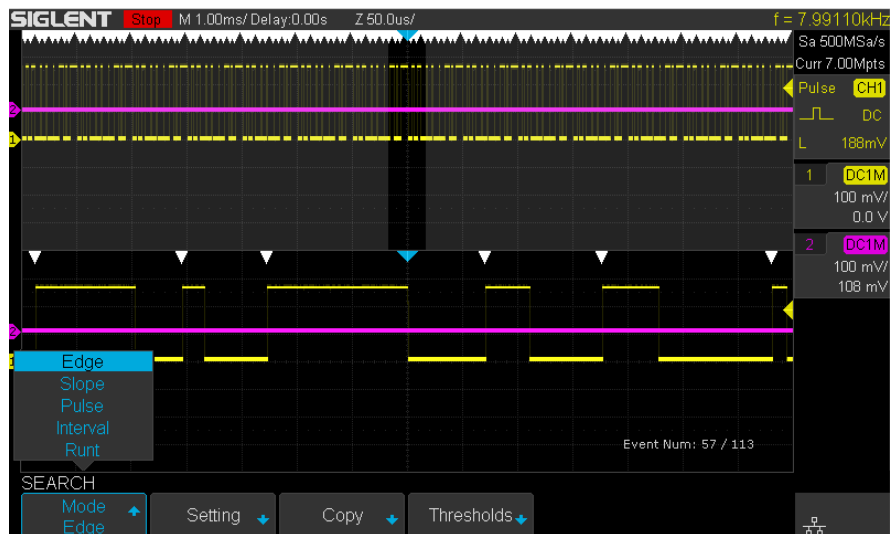
WLAN (4-channel series only, option)

The SDS1000X-E accesses the USB wireless communication module via the USB Host, and allows quick connection of the oscilloscope to your network via wireless LAN.

Remote Control Through Web (4-channel series only, option)

The SDS1000X-E employs an embedded Web Server. Thus, remote control of the instrument can be realized without the need to install a special driver and host computer software. Users can observe the waveform and get measurement results by remote control.
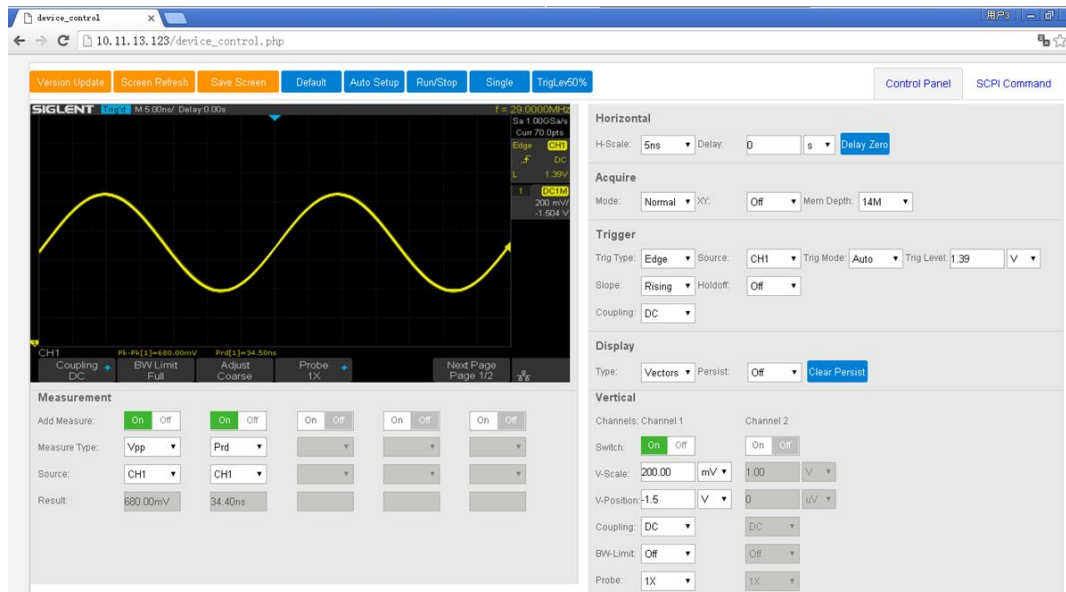
SDS1000X-E Ordering Information

Description	Product Name
100 MHz, 4 CH, 1 GSa/s (max), 14 Mpts, 7 inch TFT LCD	SDS1104X-E
200 MHz, 2 CH, 1 GSa/s (max), 14 Mpts, 7 inch TFT LCD	SDS1202X-E
200 MHz, 4 CH, 1 GSa/s (max), 14 Mpts, 7 inch TFT LCD	SDS1204X-E

Optional Accessories	
AWG Software (four Channel series only)	SDS1000X-E-FG
USB AWG Hardware (four Channel series only)	SAG1021
WIFI Software (four Channel series only)	SDS1000X-E-WIFI
USB WIFI Adapter (four Channel series only)	TL_WN725N
16 Channels MSO Software (four Channel series only）	SDS1000X-E-16LA
16 Channels Logic Analyzer (four Channel series only）	SLA1016
Isolated Front End	ISFE
STB Demo Source	STB-3
High Voltage Probe	HPB4010
Differential Probe	DPB4080/DPB5150/DPB5150A/DPB5700/DPB5700A
Current Probe	CP4020/CP4050/CP4070/CP4070A/CP5030/CP5030A/CP5150/CP5500

Thank You!

The Best Value in Electronic Test & Measurement