

Description

CalBench consoles can be fitted with various oscilloscopes depending on customer requirements. Each scope offers excellent accuracy and high performance, and are ideal for maintenance of electronic equipment and general purpose laboratory work.

Dual-channel universal digital oscilloscopes, available in 50 MHz, 70 MHz, 100 MHz and 150 MHz bandwidth modules. It includes a 2 Mpts memory depth that helps to ensure accurate waveform resolution and to capture longer signal lengths. With its 7 inch TFT-LCD (800*480) screen, there is adequate screen space to help better see and analyze waveform details.

Along with a 1 GSa/s sampling rate, the 7021/22/23 support 32 parameters measurements and common mathematical operations to speed up complex / repetitive measurements.

Basic Specifications

Modules (standard range shown, Siglent/RS PRO RSDS1000CML+/DL+ series, others upon request)

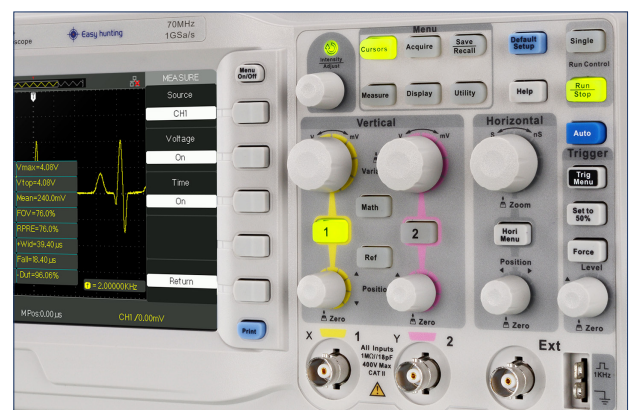
7020 (SDS1052DL+)	Digital Oscilloscope Module - 50MHz, 2 channel
7021 (SDS1072CML+)	Digital Oscilloscope Module - 70MHz, 2 channel
7022 (SDS1102CML+)	Digital Oscilloscope Module - 100MHz, 2 channel
7023 (SDS1152CML+)	Digital Oscilloscope Module - 150MHz, 2 channel
Display	TFT LCD
Bandwidth	7020: 50 MHz. 7021: 70 MHz. 7022: 100 MHz. 7023: 150 MHz
Sampling Rate (Max.)	7020: 500 MSa/s. 7021,22,23: 1 GSa/s
Channels	2 +EXT
Memory Depth (Max.)	7020: 32 Kpts. 7021/22/23: 2 Mpts
Trigger Types	Edge, Pulse, Video, Slope, Alternate
Interfaces	USB Host, USB Device, LAN, Pass/Fail
Supplied Probe	7020/21: 2x passive probe (70 MHz) 7022: 2x passive probe (100 MHz) 7023: 2x passive probe (200 MHz)

Display 7 inch TFT LCD (800x480)
Module width 420 mm (primary or secondary console fitting)

Due to continuous development Time Electronics reserves the right to change specifications without prior notice.

Features

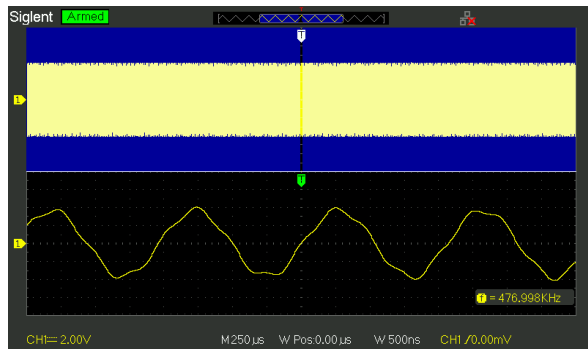
- 150 MHz, 100 MHz, 70 MHz, 50 MHz bandwidth modules
- Real-time sampling rate up to 1 GSa/s, Equivalent-time sampling rate up to 50 GSa/s
- Memory Depth up to 2 Mpts
- Trigger types: Edge, Pulse, Video, Slope, Alternate
- Waveform math functions: +, -, *, /, FFT
- 6 digital frequency counter
- Supports Multi-language display and embedded online help
- Screensaver from 1 minute to 5 hours
- Digital filter and waveform recorder function
- Shortcut storage function key
- 7 inch TFT-LCD display with 800 * 480 resolution



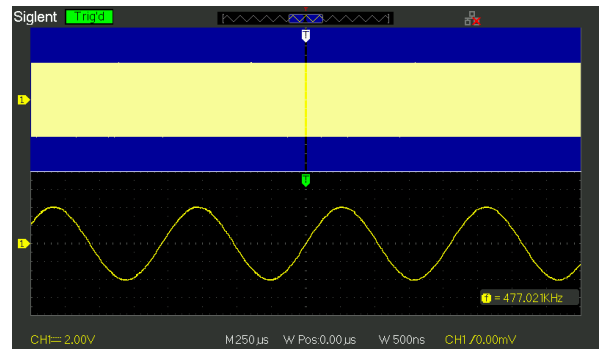


Functions & Characteristics

Memory Depth up to 2 Mpts



Normal Memory (40 Kpts)



Long Memory (2 Mpts)

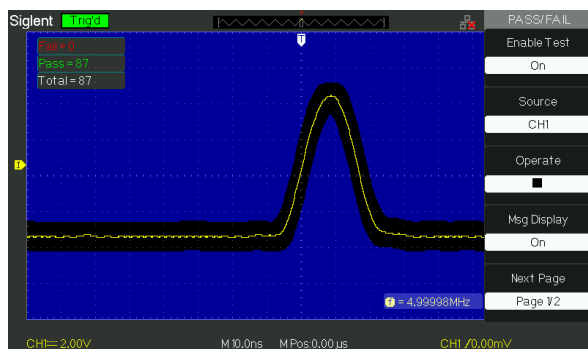
Using the long memory mode, users are able to use a higher sampling rate to capture more of the signal, and quickly zoom to focus on the area of interest.

32 parameters auto measurements and 5 parameters display



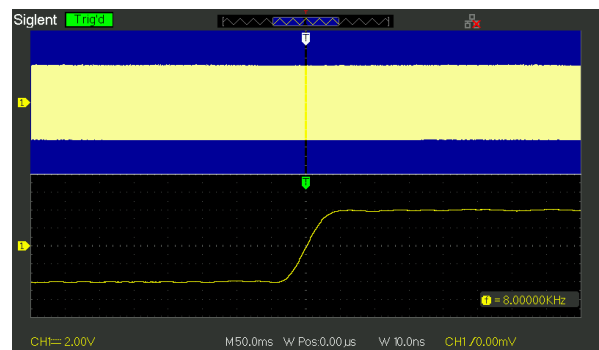
The modules support voltage, time and delay measurement types, with a total of 32 different parameters. The user is able to select five measurements to display on the screen. All measurement parameters can also be displayed simultaneously.

Pass/Fail Function



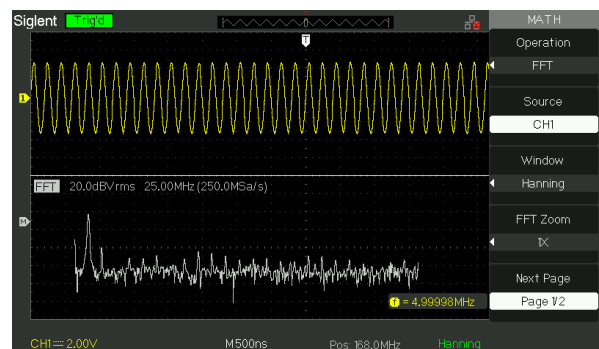
With easy to generate user-defined test templates, the oscilloscope compares the current measured trace to the template mask trace making it suitable for long-term signal monitoring or automated production line testing.

Zoom Function



Zoom can extend a partial segment of the waveform, giving the user not only an overview of the whole signal but also a detailed view of the zoomed-in segment. The Zoom feature is a convenient way to locate a specific segment of a signal while zooming in to see the details.

Math Function

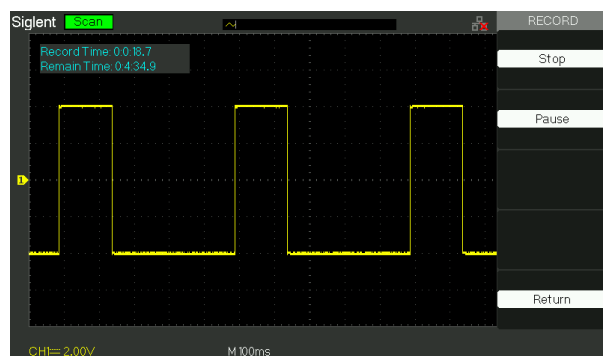


Each oscilloscope provides 5 kinds of math operation: +, -, *, /, FFT, supporting channel waveform and FFT waveform in either split display windows or both signals appearing on the full screen.

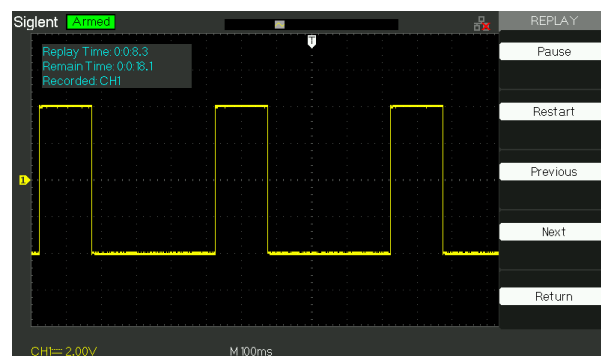


Characteristics

Digital Recorder

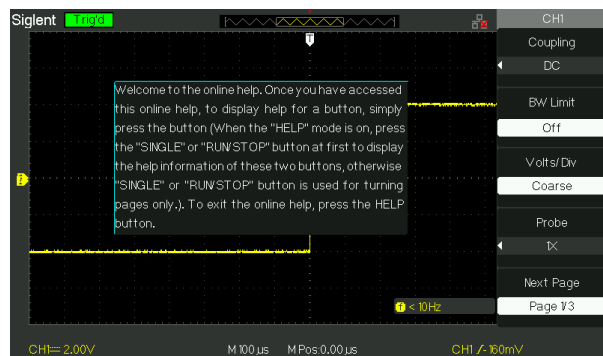


The digital recorder is able to record data in real-time and without any dead time. Each scope can supply 7 M of memory for the recorder and support a USB disk.



Replaying the data for user to observe and analyze.

Embedded Online Help



Supports Multi-language display and embedded online help, familiarizes the user with all the functions of in a short time.

Specifications

Acquire System	
Real-time Sampling Rate	7020 - SDS1052DL+ : 500 MSa/s 7021/22/23 - SDS1072CML+/SDS1102CML+/SDS1152CML+ : 1 GSa/s
Memory Depth	7020 - SDS1052DL+ : 32 Kpts 7021/22/23 - SDS1072CML+/SDS1102CML+/SDS1152CML+ : 40 Kpts (Normal Mode) ; 2 Mpts (Long Memory Mode)
Acquire Mode	Normal, Peak Detect, Average
Average	Averages: 4, 16, 32, 64, 128, 256
Waveform interpolation	Sinx,X
Input	
Channel	2
Coupling	DC, AC, GND
Impedance	DC: (1 M Ω \pm 2%) (18 pF \pm 3 pF) 50 Ω : 50 Ω \pm 2%
Max. Input voltage	400 V , 1 M Ω
Channel Isolation	> 100:1
Probe attenuator	1 X, 10 X, 50 X, 100 X, 500 X , 1000 X

**Horizontal System**

Timebase Scale	150 MHz 2.5 ns/div - 50 s/div 100 MHz 2.5 ns/div - 50 s/div 70 MHz 5.0 ns/div - 50 s/div 50 MHz 5.0 ns/div - 50 s/div
Channel Skew	<500 ps
Display Format	Y-T, X-Y, Scan
Timebase Accuracy	±50 ppm
Scan Mode	100 ms/div ~ 50 s/div

Vertical System

Bandwidth (-3 dB)	150 MHz (7023 - SDS1152 CML+) 100 MHz (7022 - SDS1102 CML+) 70 MHz (7021 - SDS1072 CML+) 50 MHz (7020 - SDS1052 DL+)
Vertical Resolution	8 bit
Vertical Scale (Probe 1 X)	2 mV/div - 10 V/div (1-2-5)
Offset Range (Probe 1 X)	2 mV - 200 mV: ± 1.6 V; 206 mV ~ 10 V: ± 40 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	STDEV≤0.6 div (≥ 5 mV/div) STDEV≤0.7 div (2 mV/div)
DC Gain Accuracy	≤ ±3.0%: 5 mV/div ~10 V/div ≤±4.0%: ≤2 mV/div
DC Measurement Accuracy	± [3%× (reading + offset) +1%× offset +0.2 div+2 mV] , ≤100 mV/div ±[3%× (reading + offset) +1%× offset +0.2 div+100 mV] , >100 mV/div
Rise time	Typical 2.3 ns (7023 - SDS1152 CML+) Typical 3.5 ns (7022 - SDS1102 CML+) Typical 5.0 ns (7021 - SDS1072 CML+) Typical 7.0 ns (7020 - SDS1052 DL+)
Overshoot (500 ps Pulse)	<10%

Trigger System

Trigger Mode	Auto, Normal, Single
Trigger Level Range	Internal: ±6 divisions from center of screen EXT: ±1.2 V EXT/5: ±6 V
Hold off Range	100 ns ~ 1.5 s
Trigger Coupling	AC, DC, LF Rej, HF Rej
Trigger Sensitivity	1 Divisions: DC-10 MHz 1.5 Divisions: 10 MHz - Max BW
Trigger Displacement	Pre-trigger: Memory depth/ (2*sampling) Delay Trigger: 260 div

Edge Trigger

Slope	Rising, Falling, Rising & Falling
Source	CH1/CH2/EXT/(EXT/5)/AC Line

Slope Trigger

Slope	Rising, Falling
Limit Range	<, >, =
Source	CH1/CH2
Time Range	20 ns ~ 10 s

Pulse Trigger

Polarity	+wid , -wid
Limit Range	<, >, =
Source	CH1/CH2
Pulse Range	20 ns - 10 s

Video Trigger

Signal Standard	NTSC, PAL/Secam
Source	CH1/CH2
Trigger condition	odd field, even field, all lines, line num

**Measure System**

Source CH1, CH2

Measurement Parameters (32 Types)

Vertical (Voltage)	Vmax	Highest value in input waveform
	Vmin	Lowest value in input waveform
	Vpp	Difference between maximum and minimum data values
	Vamp	Difference between top and base in a bimodal signal ,or between max and min in an unimodal signal
	Vtop	Value of most probable higher state in a bimodal waveform
	Vbase	Value of most probable lower state in a bimodal waveform
	Mean	Average of all data values
	Vmean	Average of data values in the first cycle (Condition: there is an entire period)
	Vrms	Root mean square of all data values
	Crms	Root mean square of all data values in the first cycle (Condition: there is an entire period)
	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
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
Delay	Phase	Calculates the phase difference between two edges (Condition: there is an entire period)
	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 (Condition: there is an entire period)
	LRF	Time from the first rising edge of channel A, to the last falling edge of channel B (Condition: there is an entire period)
	LFR	Time from the first falling edge of channel A, to the last rising edge of channel B (Condition: there is an entire period)
Cursors	LFF	Time from the first falling edge of channel A, to the last falling edge of channel B
Cursors	Manual mode, Track mode and Auto mode	
Counter	Hardware Counter (Resolution 1 Hz)	

Display (Screen)

Display Type	7 inch TFT-LCD
Display Resolution	800×480
Display Color	24 bit
Contrast (Typical)	500:1
Backlight	300 nit
Wave display range	8 x 16 div
Wave Display Mode	Dots, Vectors
Persist	Off, 1 s, 2 s, 5 s, Infinite
Menu Display	2 sec, 5 sec, 10 sec, 20 sec, Infinite
Screen-Saver	Off, 1 min, 2 min, 5 min, 10 min, 15 min, 30 min, 1 hour, 2 hour, 5 hour
Color mode	Normal , Invert
Language	English, Simplified Chinese, Traditional Chinese, Arabic, French, German, Russian, Portuguese Spanish, Japanese, Korean, Italian