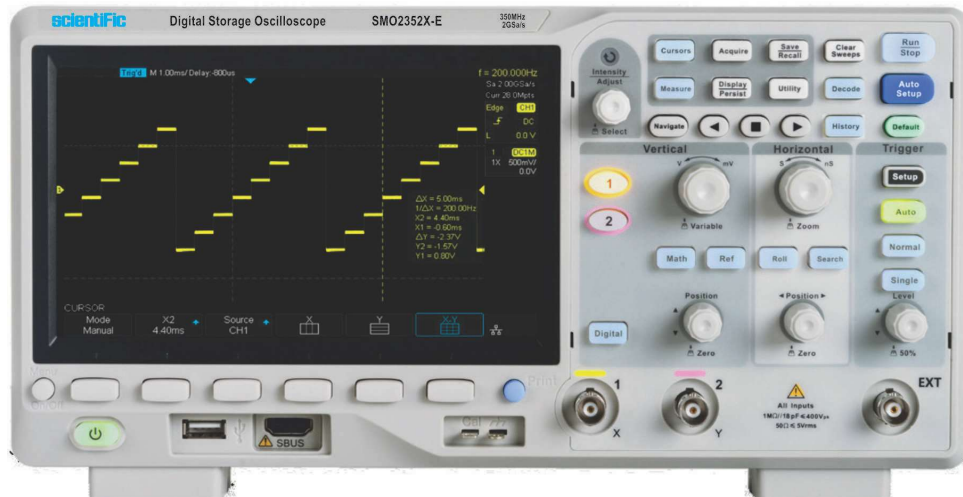


Digital Storage Oscilloscope SMO2000X-E Series



Advance Features

- Signal Bandwidth: 200/350 MHz
- Sampling rate: Max. 2 GSa/s
- Record length 28 Mpts (Single Channel), 14 Mpts (Two Channels)
- Newest generation of SPO (Super Phosphor Oscilloscope) technology
- Waveform capture rate up to 400,000 wfms/s
- Serial decode / trigger functions (I2C, SPI, UART, RS232, CAN, LIN)
- Smart Trigger functions: Window, Runt, Interval, DropOut, Pattern
- Advanced math operations (FFT, d/dt, integrate, square root)
- 1 Mpoints FFT
- High Speed P/F function.
- Channel waveforms & its FFT display on split screen.
- 38 parameters of automatic measurements
- 256 level intensity grading display
- 7.0" TFT LCD (800 x 480)
- Independent vertical scale & position control knobs for each channel
- Standard Interface
- Support USB Host, USB Device (USB TMC), LAN (VXI-11), GPIB (Optional), Pass/Fail, Trigger Out.
- 16 Digital channels (MSO) (option)
- Bode plot
- Search and navigate
- USB AWG module(option)
- USB WIFI adapter(option)
- Web Browser based control
- Supports web control and virtual instrument control panel for both PC and mobile terminals
- Web control update rate of up-to 10 times/s provides nearly real-time update rate

Technical Specifications	SMO2202X-E
Bandwidth	200 MHz
Sampling Rate	2 GSa/s (Single Channel), 1 GSa/s (Two Channels)
Memory Depth (Max)	Max. 28 Mpts/Ch (Single Channel), 14 Mpts/Ch (Two Channels)
Peak Detect	1 ns
Average	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
Vertical System	
Bandwidth	200 MHz
Rise Time	1.8 ns
Channels	2 + EXT
Vertical Resolution	8 Bits
Vertical Scale (Probe 1X)	500 μ V/div – 10 V/div (1-2-5)
Vertical Offset Range	102 mV – 1V : ± 20 V, 1.02 V – 10 V : ± 200 V
Vertical Gain Accuracy	5mV/ div –10V/div : $\leq \pm 3.0\%$, $\leq 2mV/div : \leq \pm 4.0\%$
Bandwidth Limit (-3 dB)	20 MHz
Coupling	DC, AC and GND
Input Impedance	DC : (1 M $\Omega \pm 2\%$) (18 pF ± 2 pF)
Max. Input Voltage	1 M Ω : ≤ 400 VPK (DC+ Peak AC ≤ 10 kHz)
Probe Attenuation Factors	0.1X, 0.2X, 0.5X, 1X, 2X, 5X, 10X,, 1000X, 2000X, 5000X, 10000X

Technical Specifications		SMO2202X-E
Horizontal System		
Time Base Range		500 ps – 100 s/div
Waveform Capture		Up to 110,000 wfm/s (normal mode), 400,000 wfm/s (sequence mode)
Display Format		Y-T, X-Y, Roll
Time Base Accuracy		± 25 ppm
Roll Mode		50 ms/div – 100 s/div (1-2-5 step)
Trigger System		
Trigger Level	Internal : EXT : EXT/5 :	± 4.5 div from screen center ± 0.6 V ± 3 V
Hold of Range		80 ns to 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 (EXT.)		DC: Passes all components of the signal AC: Blocks DC components and attenuates signals below 10 Hz LFRJ: Blocks the DC components and attenuates low-frequency components below 6 kHz HFRJ: Attenuates high-frequency components above 200 kHz
Trigger Mode		Auto, Normal, Single
Trigger Sensitivity	Internal :	0.6 div, DC to Max BW
	EXT :	200 mVpp, DC to 10 MHz 300 mVpp, 10 MHz to Max BW frequency (External 50 Ω)
	EXT/5 :	1 Vpp, DC – 10 MHz 1.5 Vpp, 10 MHz -Max BW frequency (External 50 Ω)
Trigger Source		CH1, CH2, EXT, EXT / 5, AC Line
Trigger Type		Edge, Slope, Pulse, Video, Window, Interval, Dropout, Runt, Pattern, Serial Trigger
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		CH1 / CH2 / EXT / (EXT/5) / AC Line
Slope Trigger		
Slope		Rising, Falling
Limit Range		<, >, < >, > <
Source		CH1 / CH2
Time Range		2 ns – 4.2 s
Resolution		1 ns
Pulse Trigger		
Polarity		+ wid, -wid
Limit Range		<, >, < >, > <
Source		CH1 / CH2
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		CH1 / CH2
Sync		ANY, Select
Trigger Condition		Line, Field
Window Trigger		
Window Type		Absolute, Relative
Source		CH1 / CH2
Interval Trigger		
Slope		Rising, Falling
Limit Range		<, >, < >, > <
Source		CH1 / CH2
Time Range		2 ns – 4.2 s
Resolution		1 ns
Dropout Trigger		
Timeout Type		Edge, State
Source		CH1 / CH2
Slope		Rising, Falling
Time Range		2 ns – 4.2 s
Resolution		1 ns

Technical Specifications		SMO2202X-E
Runt Trigger		
Slope		+wid , -wid
Limit Range		<, >, <>, > <
Source		CH1 / CH2
Time Range		2 ns – 4.2 s
Resolution		1 ns
Pattern Trigger		
Pattern Setting		Invalid, Low, High
Logic		AND, OR, NAND, NOR
Source		CH1 / CH2
Limit Range		<, >, <>, > <
Time Range		2 ns – 4.2 s
Resolution		1 ns
Search		
Event		Edge, Slope, Pulse, Interval, Runt
Event Number		Y-T: 700 ROLL: No limitation Stop After ROLL: 700
Serial Trigger		
I2C Trigger		
Condition		Start, Stop, Restart, No Ack, EEPROM, 7 bits Address & Data, 10 bits Address & Data, Data Length
Source (SDA/SCL)		CH1, CH2
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) CH1, CH2
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) CH1, CH2
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 Rate (Selectable)		600 / 1200 / 2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200 bit/s
Baud Rate (Custom)		300 bit/s – 5000000 bit/s
Can Trigger		
Condition		All, Remote, ID, ID + Data, Error
Source		CH1, CH2
ID		STD (11 bit), EXT (29 bit)
Data Format		Hex
Data Length		1 – 2 byte
Baud Rate (Selectable)		5k / 10k / 20k / 50k / 100k / 125k / 250k / 500k / 800k / 1M bit/s
Baud Rate (Custom)		5 kbit/s – 1 Mbit/s
LIN Trigger		
Condition		Break, Frame ID, ID + Data, Error
Source		CH1, CH2
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
List		1 – 7 lines
Threshold Level		- 4.5 – 4.5 div

Technical Specifications		SMO2202X-E	
SPI Decoder			
Signal	SCL, MISO, MOSI, CS (2 channel scopes can only use 2 signal identifiers))		
Edge Select	Rising, Falling		
Idle Level	Low, High		
Bit Order	MSB, LSB		
Threshold Level	-4.5 – 4.5 div		
List	1 – 7 lines		
UART 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 Level	-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 Specific Package Revision	Ver 1.3, Ver 2.0		
Threshold	-4.5 – 4.5 div		
List	1 – 7 lines		
Signal Measurement			
Source	CH1, CH2, Math, Ref, History		
Number of Measurements	Display 4 measurements at the same time, 5 measurements displayed in statistics table		
Measurement Range	Screen region, Gate region		
Auto Measurement			
Measurement Parameters	38 (Types)		
Vertical (Voltage)	Vmax, Vmin, Vpp, Vamp, Vtop, Vbase, Mean, Cmean, Stdev, Cstd, Vrms, Crms, FOV, FPPE, ROV, RPRE, Level@X		
Horizontal (Time)	Period, Freq, +Wid, -Wid, Rise Time, Fall Time, Bwid, +Dut, -Dut, Delay, Time@Level		
Delay	Phase, FRR, FRF, FFR, FFF, LRR, LRF, LFF, Skew		
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, Std-Dev, Count		
Counter	Hardware 6 Digit counter (channels are selectable)		
Math Functions			
Operations	Add, Subtract, Multiply, Divide, FFT, d/dt, Integration, Square Root		
FFT Window	Hanning, Hamming, Blackman, Rectangular, Flattop		
FFT Display	Full Screen, Split, Exclusive		
USB AWG Option : SMO2000X-E-FG			
Channel	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 to +1.5 V (50 Ω load), -3 to + 3 V (High-Z load)		
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		
Insulation Voltage	±42 Vpk (for SUG1012I only)		
Sine			
Frequency	1 μHz to 25 MHz		
Offset Accuracy (10 kHz)	± (1% x Offset Setting Value +3 mVpp)		
Amplitude Flatness (10 kHz, 5 Vpp)	± 0.3 dB		
SFDR	DC to 1 MHz (-60 dBc) 1 MHz to 5 MHz (-55 dBc) 5 MHz to 25 MHz (-50 dBc)		
HD	DC to 5 MHz (-50 dBc) 5 MHz to 25 MHz (-45 dBc)		
Square / Pulse			
Frequency	1 μHz to 10 MHz		
Duty Cycle	1% to 99%		
Rise/Fall Time	< 24 ns (10% to 90%)		
Overshoot	(1 kHz, 1 Vpp, Typical) < 3% (typical 1 kHz, 1 Vpp)		

Technical Specifications		SMO2202X-E
Pulse Width		> 50 ns
Jitter		< 500 ps + 10 ppm
Ramp		
Frequency		1 µHz to 300 kHz
Linearity (Typical)		< 0.1% of Pk-Pk (Typical, 1 kHz, 1 Vpp, 50% Symmetry)
Symmetry		0% to 100%
DC		
Offset Range		±1.5 V (50 Ω load) ±3 V (High-Z load)
Accuracy		± (offset * 1% + 3 mV)
Noise		
Bandwidth		> 25 MHz (-3 dB)
Arbitrary Wave		
Frequency		1 µHz to 5 MHz
Wave Length		16 kpts
Sampling Rate		125 MSa/s
Lead In		EasyWave and U-Disk
Digital Channels option : SMO2000X-E-16LA		
No. of Channels		16
Max. Sampling Rate		1 GSa/s
Memory Depth		14 Mpts/CH
Min. Detectable Pulse Width		4 ns
Level Group		D0 to D7, D8 to D15
Level Range		-8 V to 8 V
Logic Type		TTL, CMOS, LVCMOS3.3, LVCMOS2.5, custom
Skew		D0 to D15 : ±1 sampling interval Digital to Analog : ± (1 sampling interval +1 ns)
I/O		
Standard Ports		USB Host, USB Device , LAN, Pass/ Fail, Trigger Out
Pass/Fail		3.3 V TTL Output
Display (Waveform)		
Display Mode		Dot, Vector
Persist		Off, 1 sec, 5 sec, 10 sec, 30 sec, Infinite
Screen Saver		1min, 5min, 10min, 30min, 1hour, Off
General Information		
Display Type & Resolution		7.0 inches TFT LCD, 800 x 480 pixels
Range		8 x 14 divisions
Power		100 – 240 V AC, CAT II, 50 / 60 Hz
Power Consumption		50 W Max
Operating Condition		10°C to 50°C, ≤ 85% RH
Storage Condition		-20°C to +60°C, 85%RH @ 65°C, 24 Hours
Compliance		LVD IEC 61010-1:2010 EMC EN6 1326-1 : 2013
Dimension		W : 312 mm, D : 132.6 mm, H : 151 mm
Weight		N.W : 2.6 Kg ; G.W : 3.8 Kg
Standard Accessories		1:1 / 1:10 Probes, Power cord, USB cable, CD
Available Options		16 channel MSO Function : SMO2000X-E-16LA (inclusive of MSO Function Software + 16 channel Logic Analyzer Probe SLA1016)
		USB AWG Option : SMO2000X-E-FG (inclusive of USB AWG Software + USB Isolated AWG Module Hardware SAG1021I)
		Wireless Communication Function : SMO2000X-E-WIFI (inclusive of WIFI software + USB WIFI Adapter TL-WN725N)
		Isolated front end : ISFE

Subject to change

scientific

Scientific Mes-Technik Pvt. Ltd.

B-14, Industrial Estate, Pologround, Indore 452 015, India

☎ 0731-2422330/31/32/33

✉ sales@scientificindia.com

🌐 www.scientificindia.com

Bengaluru 080-23452635
Chennai 044-42054180
Gujarat +917567463752
Hyderabad +917095228811
Kanpur +919981329105

✉ bangalore@scientificindia.com
✉ chennai@scientificindia.com
✉ gujarat@scientificindia.com
✉ hyderabad@scientificindia.com
✉ up@scientificindia.com

Kolkata +919630945856
Mumbai +919850901735
New Delhi +918770013379
Pune +919603828884

✉ kolkata@scientificindia.com
✉ mumbai@scientificindia.com
✉ ndelhi@scientificindia.com
✉ pune@scientificindia.com

