Acute MSO3000

6-in-1 Instrument

DAQ, DSO, DVM, Frequency Counter, Logic Analyzer, Protocol Analyzer



150 x 123 x 33 mm³
Device Weight: 400g

- PC-based, USB3.0 interface / powered (Type-A / Type-C)
- Record length : 128 (256) Mpts / Analog (Digital) CH

❶ Data Logger : HDD / SSD Storage

❷ DSO : 4 Channels, 1 GS/s S/R, 200 MHz bandwidth

❸ Digital Voltmeter : 3 digits

❹ Frequency Counter : 5 digits

❺ Logic Analyzer : 16 Channels, 2 GS/s Timing Analysis, 250 MHz State Analysis

Protocol Decode : 10BASE-T1S[1], CAN 2.0B/CAN FD, DP_Aux[1], eSPI, I²C, I²S, MII, MIPI I3C 1.1.1, MIPI SPMI 2, SPI Flash, SVI3[2], SVID[3], UART, USB PD 3.1, ...(100+)

Protocol Trigger : 10BASE-T1S[1], CAN2.0B/CAN FD, eSPI, MIPI I3C 1.1.1, SVI3[2], SVID[3], ... (30+)

❻ Protocol Analyzer : 10BASE-T1S[1], CAN2.0B/CAN FD, eSPI, MIPI I3C 1.1.1, SVI3[2], SVID[3], ... (20+)

Model	Vertical Resolution (DSO)	DSO Trigger / Protocol Trigger (DSO)	Protocol Trigger (Logic Analyzer)	Electrical Validation[*]
MSO3124E	8 bits	I / -	I	-
MSO3124B	8 bits	I, II / Yes	I, II	-
MSO3124H	8, 12~16 bits	I, II / Yes	I, II, III	-
MSO3124V	8, 12~16 bits	I, II / Yes	I, II, III	I2C, MIPI I3C, ...

Software Window



System Requirements

- USB 3.0 port
- Windows 7/8/10/11 (64-bit)
  Linux Ubuntu (64-bit)*
  macOS*
- PC RAM 16GB (recommended) or 8GB at least

* Free update by year end 2025.

Acute®
PC-based T&M Instruments
Acute Technology Inc.
Tel: +886-2-2999-3275 E-mail: service@acute.com.tw http://www.acute.com.tw

mipi® alliance

DSO Specifications (Main Device)

Model			MSO3124E	MSO3124B	MSO3124H	MSO3124V
Power	Power source		USB bus-power (+5V)			
	Static power consumption		4.5W			
	Max power consumption		7.7W			
Acquisition	Mode		Sample, Average, Envelope[*], Peak detect[*], High resolution[*]			
	Sampling (8 | 12 | ≧14 bits)	@ 1Ch	1 GS/s		1 GS/s | 500 MS/s | 100 MS/s	
		@ 2Ch	500 MS/s		500 MS/s | 250 MS/s | 100 MS/s	
		@ 4Ch	250 MS/s		250 MS/s | 125 MS/s | 100 MS/s	
	Record length (8 | ≧12 bits)	@ 1Ch	512 Mpts		512 Mpts | 256 Mpts	
		@ 2Ch	256 Mpts		256 Mpts | 128 Mpts	
		@ 4Ch	128 Mpts		128 Mpts | 64 Mpts	
Input	Input channels		4			
	Input coupling		AC/DC			
	Input impedance		1 MΩ ‖ <19 pF			
	Overvoltage protection		± 100 V (DC+AC peak)			
	Ch-Ch isolation		50dB @DC to 100MHz; 40dB @ 100MHz to 200MHz			
	Ch-Ch skew		100 ps between two channels with the same scale & coupling settings			
Temperature	Operating / Storage		5℃~40℃ (41℉~104℉) / -10℃~65℃ (14℉~149℉)			
I/O port	Trig-In		Workable：2.5V to 5V / Typical：TTL 3.3V (Rising/Falling)			
	Trigger pulse approval		> 8 ns			
	Trig-Out		TTL 3.3 V			
	Ref. Clock input		10MHz, Vpp=3.3 to 5V			
	Ref. Clock output		10MHz, TTL 3.3V			
	Connector type		MCX jack / female			
Vertical	Bandwidth		200 MHz			
	Rise time		1.75 ns @ 200 MHz; 3.5 ns @ 100 MHz; 7 ns @ 50 MHz			
	Resolution		8 bits		8, 12, 14, 15, 16 bits	
	Input sensitivity		2 mV/div to 10 V/div (Full-Scale: ±4 div/screen, ±1 div beyond screen)			
	Offset range		±150 V @ 2, 5, 10 V/div; ±1.5 V @ 0.2, 0.5, 1 V/div; ±1.5 V @ 2, 5, 10, 20, 50, 100 mV/div			
	DC accuracy		±3% of Full-Scale			
	Bandwidth limit		20 MHz, 100 MHz or Full			
Horizontal	Time scale		1 ns/div to 100 s/div (10 div/screen)			
	Time resolution		125 ps			
	Time accuracy		±10 ppm			
	Delay range		Pre-trigger: 0 to 100% of 1 screen; Post-trigger up to 50 sec.			
Trigger	Trigger mode		Auto, Normal, Single, Roll*			
	Source		Ch1, Ch2, Ch3, Ch4, Ext. (TTL only)			
	Coupling		DC, LF reject (50kHz), HF reject (50kHz), Noise reject			
	Trigger range		±4 div from window center			
	Vertical sensitivity		1 div or 5 mV @ <10 mV/div; 0.6 div @ ≧ 10 mV/div			
	Hold off range		~60 ns to 10 sec.			
	DSO I		Edge, Either, External, Falling, Rising, Video, Width			
	DSO II		---	Runt, Pattern/State, Timeout, Transition, Setup/Hold, B-Trigger, B-Event, Window		
Protocol Trigger & Decode			---	10BASE-T1S[1], BiSS-C, CAN 2.0B/CAN FD, DALI, DP_Aux[1], HID over I2C, I2C, I2S, LIN2.2, MDIO, Mini/Micro LED, MIPI I3C 1.1.1, MIPI RFFE 3, MIPI SPMI 2, Modbus, PMBus, ProfiBus, SENT, SMBus, SPI, SVI2, UART(RS232)[2], USB PD 3, USB1.1		
Protocol Decode			---	1-Wire, 3-Wire, AccMeter, APML, AVSBus, BSD, CEC, Closed Caption, CODEC_SSI, DDC(EDID), DMX512, FlexRay, HD Audio, HDLC, HDQ, HTSensor, I2C(EEPROM), IrDA, ISELED Digital RGB LED, JVC IR, LED_CTRL, M-Bus, MDDI, MHL CBUS, Microchip SWI, MICROWIRE, MIPI CSI LP, MIPI DSI LP, MIPI SoundWire, NEC IR, PCM, PDM, PECI, PS/2, PWM, QEI, QI, RC-5, RC-6, RT_SWI, S/PDIF, SDQ, Serialized IRQ, SGPIO, Smart Card (ISO7816), SMI, SSI, ST7669, SWIM, SWP, UNI/O, USB4/TBT3 SB, Wiegand		
Measurement/ Processing	Measurement		Frequency, Period, ±Duty, ±Period, Rise/ Fall Time, Delay, Phase; VMax, VMin, VHigh, VLow, Vpp, VAmp, VMid, VMean, VRMS, ±Overshoot, Rise/ Fall Preshoot; Edge Count, ±Pulse Count			
	Cursor		Time difference, Voltage difference			
	Math		+, -, x, ÷, XY, lAl, √A, Log(A), Ln(A), ∫Adt, e^A			
	FFT		Rectangular, Blackman, Hann, Hamming, Harris, Triangular, Cosine, Lanczos, Gaussian. (Vertical Scale: dBm RMS, dbV RMS, Linear RMS)			
	Export data		WORD, EXCEL, CSV, TEXT, HTML, MATLAB			
Electrical Validation (Protocol)[*]			---			I2C, I2S, MIPI I3C, MIPI RFFE, MIPI SPMI, PDM, SPI, UART(RS232)
Cascade	Max. channels expand		---		16 Ch (4x Device, 1 Master & 3 Slaves)	
	Trigger source		---		Main device only	
	Skew between Master & Slave		---		±2ns @ 1 GS/s ; ±4ns @ 500 MS/s ; ±8ns @ 250 MS/s	

[1] Optional 10BASE-T1S / DP_Aux adapter needed.
[2] To measure RS422/485, need to optional the ADP high-voltage differential probe.
[*] Free update by year end

© 2025 All right reserved. Acute Technology Inc. Acute and Acute logo is a registered trademark of Acute Technology Inc.

Logic Analyzer Specifications (LA POD)

Device LA POD		MSO3124E LA16E	MSO3124B LA16B	MSO3124H LA16H	MSO3124V LA16V
Timing analysis (Asynchronous, Max. sample rate)		2 GS/s			
State clock rate (Synchronous, external clock)		250MHz			
Storage		Conventional Timing, Transitional Timing			
Channels		16			
Record length		256 Mpts per channel			
Timing vs. Channels vs. Memory	Timing analysis	Available channels (Conventional / Transitional Timing) - Memory per channel			
	2 GS/s	(8/7)-512 Mpts			
	1 GS/s	(16/14)-256 Mpts			
	500 MS/s	(16/16)-256 Mpts			
	250 MS/s	(16/16)-256 Mpts			
Channel to channel skew		< 1ns			
Input	Input channels	16			
	Input impedance	75KΩ ‖ <2pF			
	Maximum (Non-destructive)	±50V			
	Operation	±30V			
	Sensitivity	0.25Vpp @50MHz, 0.5Vpp @150MHz, 0.8Vpp @250MHz			
Threshold	Group	2 (D0~D7, D8~D15 & CK0)			
	Range	±30V			
	Resolution	50mV			
	Accuracy	±100mV + 5%*Vth			
Trigger	Resolution	500ps			
	Channels	16			
	States	8			
	Events	8			
	Pre / Post	Yes			
	Pass counter	Yes (0~1048575 times)			
	Types	External, Manual, Multi Level, Setup/Hold Violation, Single Level, Timeout, Width			
	Protocol I	10BASE-T1S[1], BiSS-C, CAN2.0B/CAN FD, DP_Aux[1], HID over I2C, I2C, I2S, LIN2.2, MIPI I3C 1.1.1, SENT, SPI, UART, USB PD 3.1			
	Protocol II	---	DALI, LPC, MDIO, Mini/Micro LED, MIPI RFFE 3, MIPI SPMI 2, Modbus, PMBus, Profibus, SMBus, SVI2, USB1.1		
	Protocol III	---		eMMC 4.5, eSPI, MII, RGMII, RMII, SD 3.0 (SDIO 2.0), Serial Flash (SPI NAND), SVI3[2], SVID[3]	
Protocol Analyzer	I	10BASE-T1S[1], BiSS-C, CAN2.0B/CAN FD, DP_Aux[1], HID over I2C, I2C, I2S, LIN2.2, MIPI I3C 1.1.1, SPI, UART, USB PD 3.1			
	II	---	DALI, MDIO, MIPI RFFE 3, MIPI SPMI 2, Modbus, PMBus, Profibus, SMBus, USB1.1		
	III	---		eSPI, MII, RGMII, RMII, SVI3[2], SVID[3]	
Protocol Decode		1-Wire, 3-Wire, 7-Segment, 8b10b decoding, 10BASE-T1S[1],, AccMeter, ADC, APML, AVSBus, BiSS-C, BSD, BT1120, CAN 2.0B/FD, Close Caption, CODEC_SSI, DALI, DMX512, DP_Aux[1], EDID, eMMC 4.5, eSPI, FlexRay, HD Audio, HDLC, HDQ, HID over I²C, HID over SPI, HTSensor, I²C EEPROM, I²C, I²S, I80, IDE, IO-Link, IrDA, ISELED, ITU-R BT.656 (CCIR656), J1850, JTAG, JVC IR, LCD1602, LED_Ctrl, LIN 2.2, Line Decoding, Line Encoding, Lissajous, LPC, LPT, Math, M-Bus, MCTP over I²C/ I3C/ SMBus[4], MDDI, MDIO, MHL CBUS, Microchip SWI, Microwire, MII, Mini/Micro LED, MIPI CSI LP, MIPI DSI LP, MIPI I3C 1.1.1, MIPI RFFE 3, MIPI SoundWire 1.2, MIPI SPMI 2, Modbus, NAND Flash, NEC IR, OA3p, OATC6, PCM, PDM, PECI 3.0, PMBus, Profibus, PS/2, PWM, QEI, QI, QSPI, RC-5, RC-6, RGB Interface, RGMII, RMII, S/PDIF, SD 3.0 (SDIO 2.0), SENT, Serial Flash, Serial IRQ, SGPIO, Smart Card, SMBus (SBS, SPD), SMI, SPI, SPI-NAND, SSI, ST7669, SVI2, SVI3[2], SVID[3], SWD, SWIM, SWP, TDM, UART, ULPI, UNI/O, USB 1.1, USB4/TBT3 SB Channel, USB PD 3.1, Wiegand, ...			
Line Decoding		Biphase Mark, Differential-Manchester, Manchester (Thomas, IEEE802.3), Miller, Modified Miller, NRZI, ...			
Line Encoding		AMI(Standard, B8ZS, HDB3), Biphase Mark, CMI, Differential-Manchester, Manchester (Thomas, IEEE802.4), MLT-3, Miller, Modified Miller, NRZI, Pseudoternary, ...			
Packing List	LA POD	1			
	Flying lead cables (LA20P)	2			
	Gripper	20			

[1] Optional 10BASE-T1S / DP_Aux adapter needed.

[2] Upon request by user who is approved by AMD. SVI3 decode, trigger and protocol analyzer are supported ONLY by MSO3124H or MSO3124V.

[3] Upon request by user who has signed CNDA with Intel. SVID decode, trigger and protocol analyzer are supported ONLY by MSO3124H or MSO3124V.

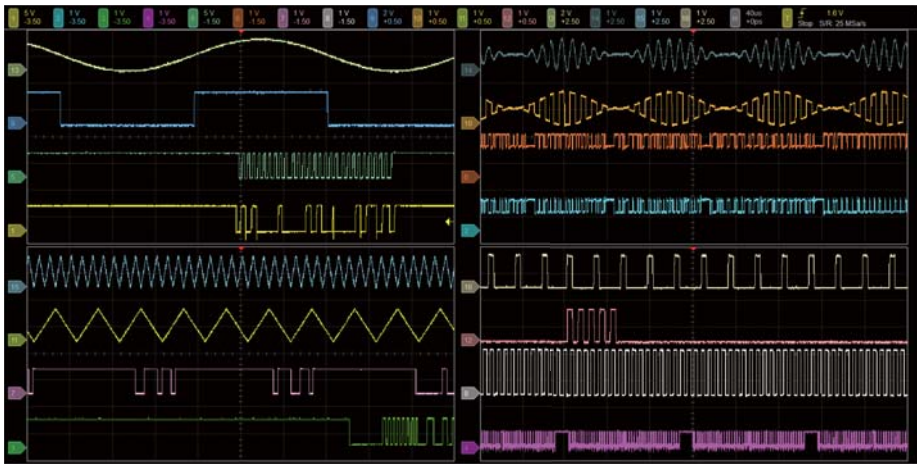
[4] MCTP over I²C/I3C/SMBus decode supports analysis of Ethernet / MCTP Control / NC-SI / PLDM packets.

DAQ

For real-time signal data monitoring.

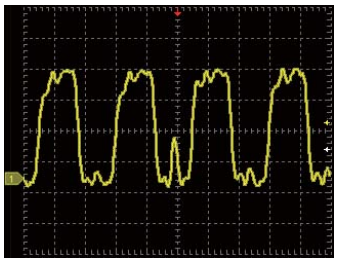
DSO

Multiple Devices Stack Mode：
Support DSO stack mode, up to 4 devices (16 channels) can be stacked together in the same time.



Functions：

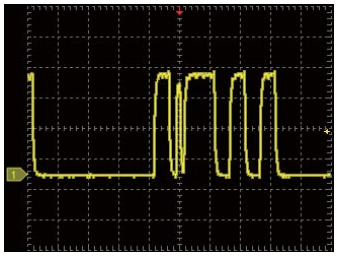
- **Edge Trigger**：Trigger on a rising/falling/either.
- **Pattern Trigger**：Trigger when logic inputs cause the selected function goes true.
- **Trigger Hold off**：Hold off time adjustable up to 10s.
- **Runt Trigger**：Use 2 voltage thresholds and pulse width to trigger on either/ positive or negative runt signals.



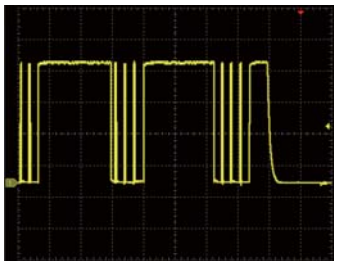
Positive Runt



Negative Runt

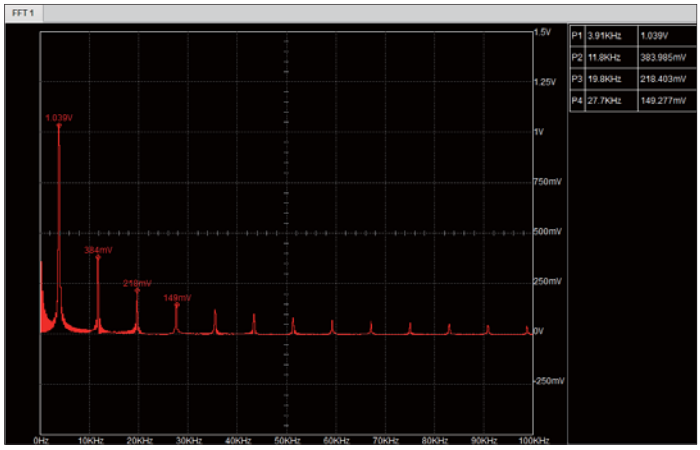


- **Pulse Width Trigger**
  Pulse width range from 8ns to 50s.



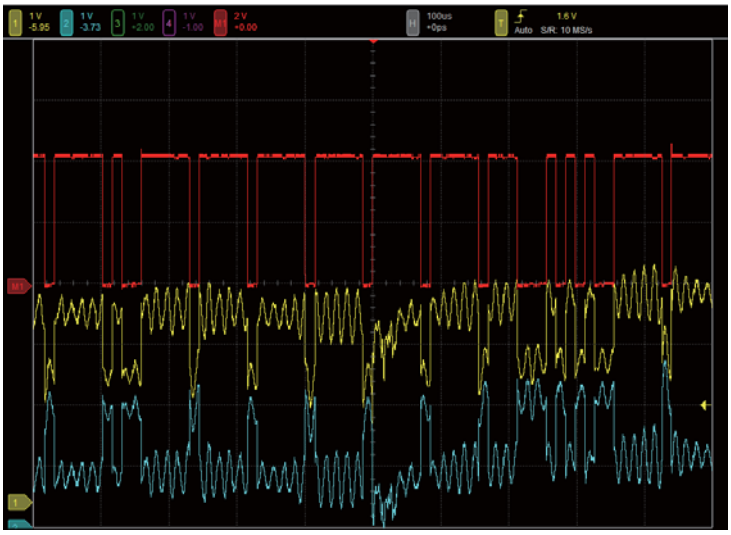
- **Timeout Trigger**
  Trigger when no pulse is detected within a specified time, range from 8ns to 50s.

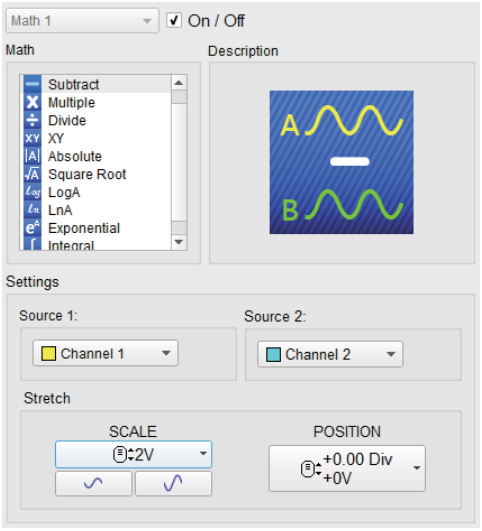
- **Spectrum analysis**
  (Fast Fourier transform, FFT)
  Apply FFT to the selected channel.



- **Math**

  Add, Subtract, Multiple, Divide, XY, Absolute, Square Root, LogA, LnA, Exponential, Integral

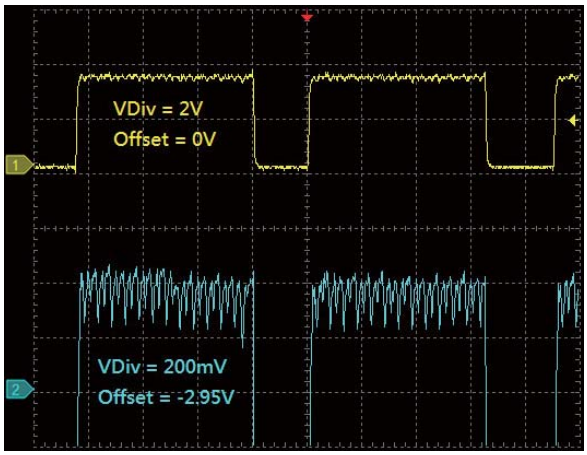




- **Vertical Offset**

  Right-press the mouse to offset the voltage vertically with the resolution from 2mV/Div to 10V/Div for both channels.

  The 16-bits resolution MSO3124H provides more noise details for this vertical offset function.



- **Trigger Coupling Mode**

  Provide DC Coupling, Low Frequency (LF) Reject, High Frequency (HF) Reject and Noise Reject function:

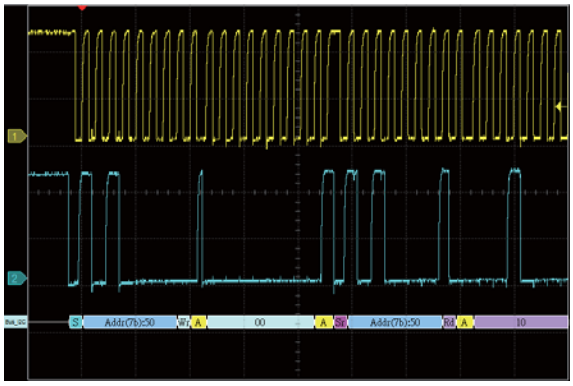
  LF Reject: Apply 50 kHz high pass filter to the signal before entering the Trigger circuit.

  HF Reject: Apply 50 kHz low pass filter to the signal before entering the Trigger circuit.

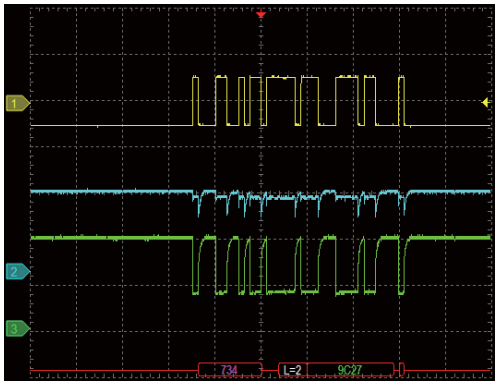
  Noise Reject: Lower the Trigger sensitivity to avoid false triggering.

- **Protocol Decode & Trigger Function**

  Provides, CAN/CAN-FD, I²C, LIN, MIPI I3C 1.1, ProfiBus, SPI, UART(RS232), USB1.1,... protocol decode and trigger function, which is able to trigger and decode on the specified Command/Address/Data...

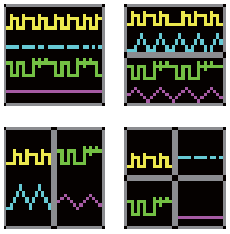


Decode the I²C waveforms



Decode the differential CAN signals with a differential probe.
(CH1: Differential Probe, CH2: CAN H, CH3: CAN L)
※ Supports CAN-FD, CAN2.0

• **Multiple Windows**



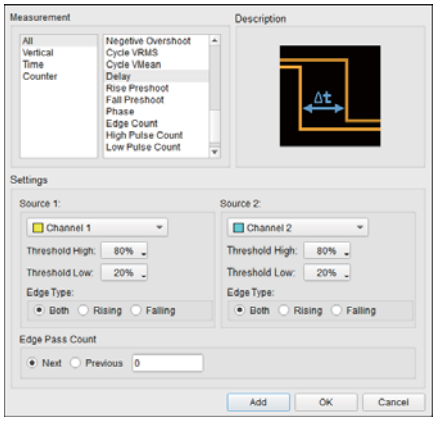
Multiple Window feature provides 4 display types (1x1, 2x1, 1x2, 2x2), which could displays 16 channels in maximum 4 different windows, provides clear waveform readability without lower the vertical resolution.

• **Measurement：**

More than 20 types of waveform measurements with customized threshold settings features, provides real-time update for vertical, time and channel to channel timing measurements with statistic features.

- Time: Frequency, Period, ±Duty, ±Period, Rise /Fall Time, Delay, Phase
- Vertical: VMax, VMin, VHigh, VLow, Vpp, VAmp, VMid, VMean, VRMS, ±Overshoot, Rise /Fall Preshoot
- Counter: Edge Count, ±Pulse Count



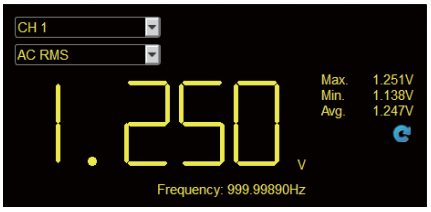


Digital Voltmeter (DVM) & Frequency Counter

Provides voltage root-mean-square, voltage average and frequency counter function for the selected channel.



Measure 1 KHz, 2.5 Vpp square waveforms by the measurement function.



Measure 1 KHz, 2.5 Vpp square waveforms by the DVM function.

Packing List



Device



USB3.0 Y cable (1.8M)
Type-C OTG Adapter



250 MHz Probe



Stack cable



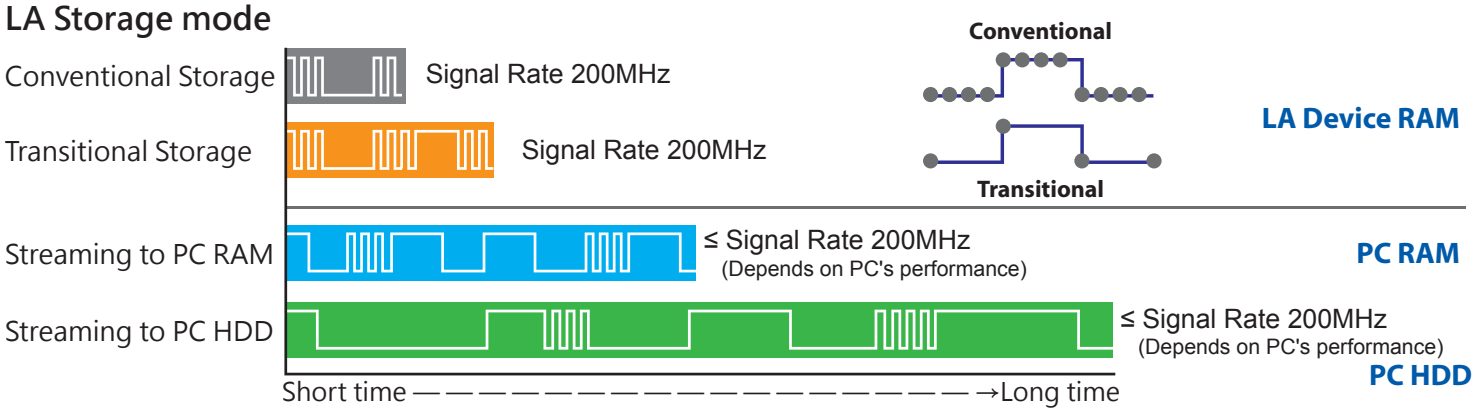
Handbag

Logic Analyzer

Built-in DSO to capture analog waveforms to compare with the digital waveforms.

Provides multiple storage modes, users could select to have long time recording or precision acquisition.

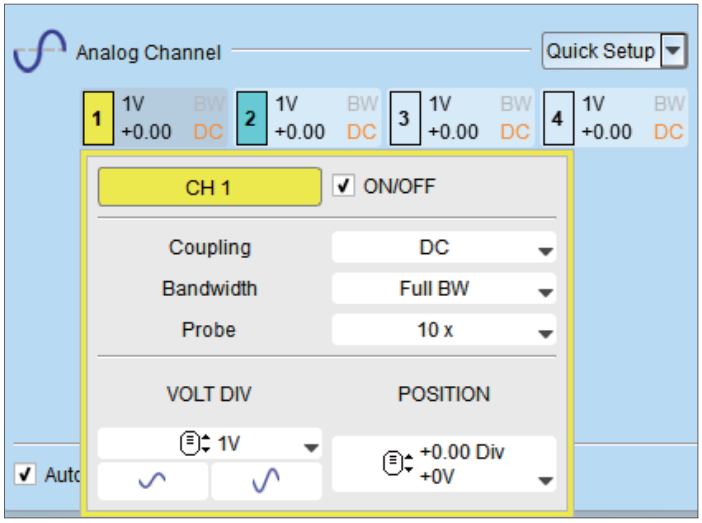
LA Storage mode



Analog waveform

Input Sensitivity: 2mV/div to 10V/div; Max. Sampling Rate: 1GS/s @ 1Ch

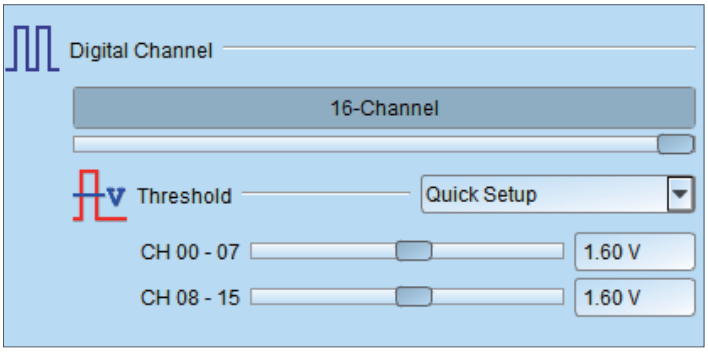
Can be used with High Voltage probe, Differential probe or Current probe.



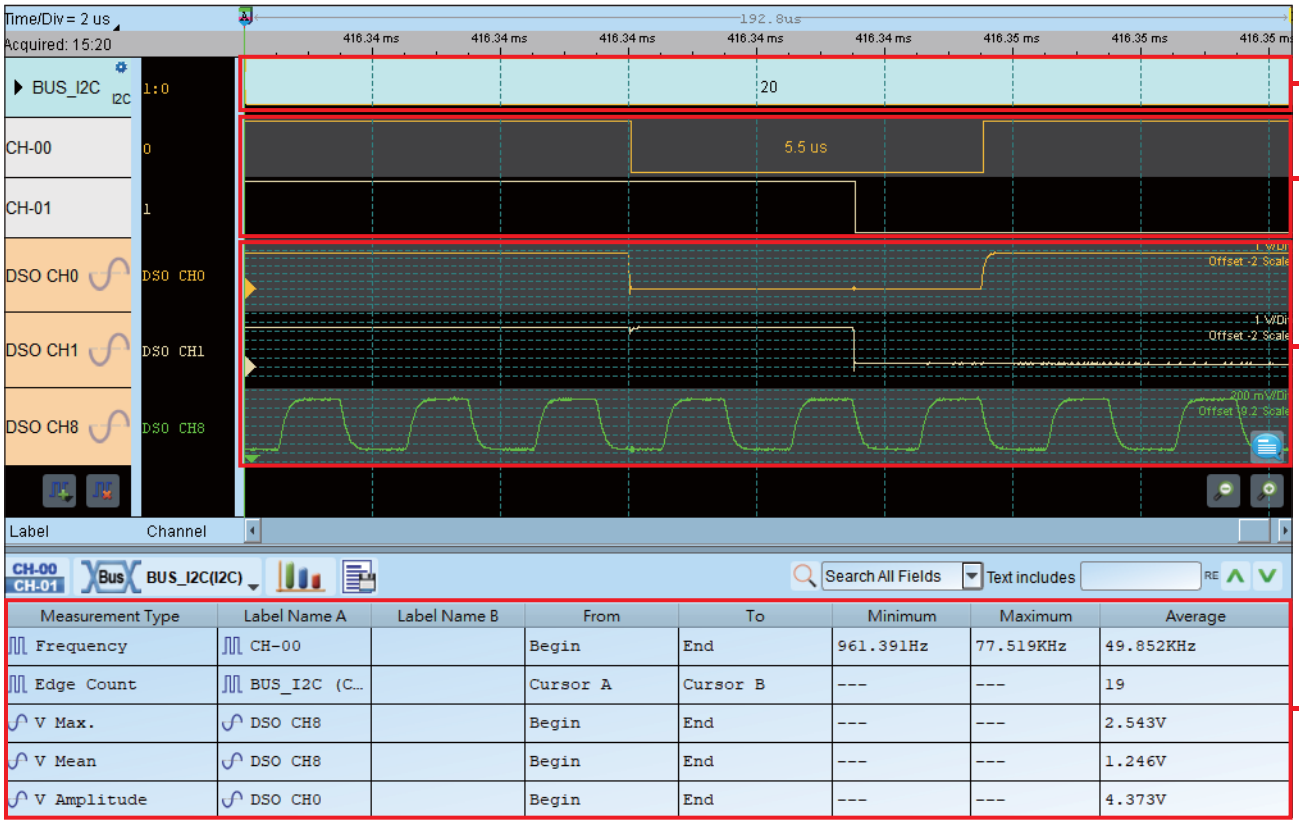
Digital waveform

Operation Range: ±30V

Max. Timing Analysis: 2GS/s @ 8Ch



Compare digital and analog waveforms at the same channel for statistics.



Measurement Type	Label Name A	Label Name B	From	To	Minimum	Maximum	Average
Frequency	CH-00		Begin	End	961.391Hz	77.519KHz	49.852KHz
Edge Count	BUS_I2C (C…		Cursor A	Cursor B	---	---	19
V Max.	DSO CH8		Begin	End	---	---	2.543V
V Mean	DSO CH8		Begin	End	---	---	1.246V
V Amplitude	DSO CH0		Begin	End	---	---	4.373V

Bus Decode

Digital waveforms

Analog waveforms

Report window

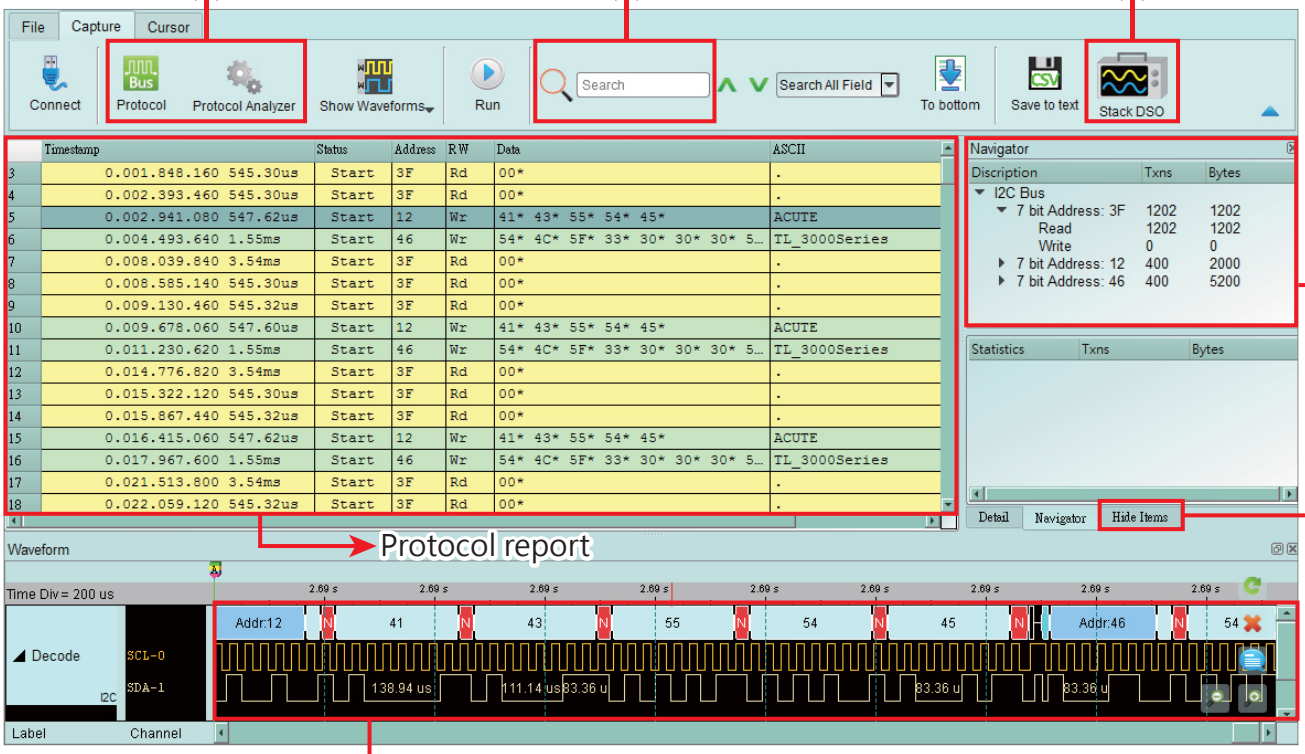
Protocol Analyzer

It is hardware decoding, may log protocol data very long time if without waveforms.
Application timing: Preliminary protocol debug.

Support multiple protocols with different operating modes

Real-time data search

Stack with a DSO as an MSO in logic analyzer mode



Real-time data statistics

Hide items for easy view

Protocol report

Show waveforms with bus decodes



Protocol Analyzer

Show real-time protocol data
Application timing: massive protocol data with some idles in between



Protocol Logger

Like data logger, save massive data into SSD hard drive
Application timing: massive protocol data



Protocol Monitor

Like dash cameras, record protocol data by the device's memory only
Application timing: trigger event only happens in very long time

Packing List



LA POD



Flying lead cables (LA20P)



Gripper