# Acute TravelScope
# Digital Storage Oscilloscope

150 x 123 x 33 mm³
Device Weight: 400g

- PC-based, USB3.0 interface / powered (Type-A / Type-C)
- Record length : 128Mpts/ch
- Channel : 4
- Sample rate : 1 GS/s
- Bandwidth : 200 MHz
- Data Logger (HDD / SSD Storage)
- Digital Voltmeter : 3 digits
- Frequency Counter : 5 digits
- DSO Trigger I : Edge, Either, External, Falling, Rising, Video, Width
- DSO Trigger II : Runt, Pattern/State, Timeout, Transition, Setup/Hold, B-Trigger, B-Event, Window
- Protocol Trigger/ Decode : BiSS-C, CAN 2.0B/CAN FD, DALI, DP_Aux[1], MIPI I3C 1.1, USB PD 3, …

| Model | Vertical Resolution | Cascade | DSO Trigger | Protocol Trigger/ Decode | Electrical Validation[*] |
|-------|--------------------|---------|-------------|--------------------------|--------------------------|
| TS3124E | 8 bits | - | I | - | - |
| TS3124B | 8 bits | - | I, II | Yes | - |
| TS3124H | 8, 12~16 bits | 16 Ch (4x Device) | I, II | Yes | - |
| TS3124V | 8, 12~16 bits | 16 Ch (4x Device) | I, II | Yes | 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 from time to time.
* Free update by year end 2023.

# TS3000

| Model | | | TS3124E | TS3124B | TS3124H | TS3124V |
|---|---|---|---|---|---|---|
| **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** | | | --- | 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, MIPI RFFE 3, MIPI SPMI 2, Modbus, PMBus, ProfiBus, SENT, SMBus, SPI, SVI2, UART, 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, \|A\|, √A, Log(A), Ln(A), ∫Adt, eᴬ | | | |
| | 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 DP_Aux adapter needed.

[2] To measure RS422/485, need to optional the ADP high-voltage differential probe.

[*] Free update from time to time.

# Functions :

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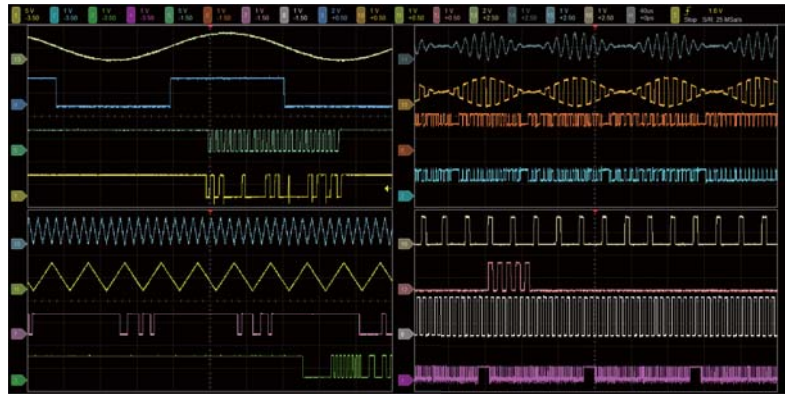


- **Runt Trigger**：Use 2 voltage thresholds and pulse width to trigger on either/ ±runt signals.
- **Timeout Trigger**：Trigger when no pulse is detected within a specified time, range from 2ns to 50s.
- **Pulse Width Trigger**：Pulse width range from 8ns to 50s.



| Positive Runt | Negative Runt | Width | Timeout |
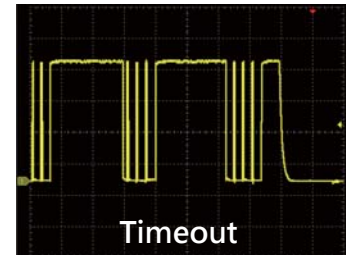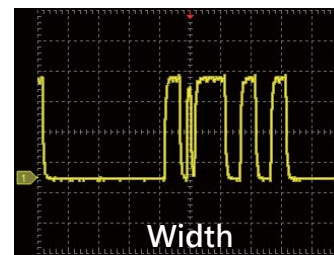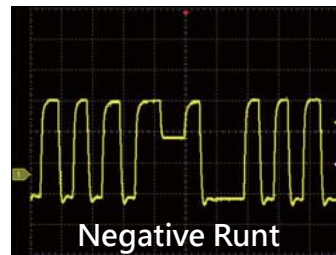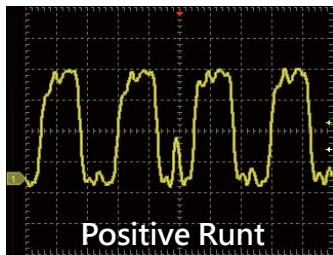
- **Vertical Offset & Zone View**

  Voltage division from 2mV/Div - 10V/Div combined with the channel independent Vertical Offset settings, which can be used for glitch measurement and analysis on DC power, and observing the ripple and overshooting voltage on DC offseted voltage. It is also possible to use 16Bit high vertical resolution mode (TS3124H/V) with the Zone View feature to observe the DC voltage and ripple signal together in the same time.
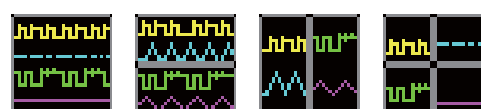


- **Spectrum analysis (Fast Fourier transform, FFT)**

  Apply FFT to the selected channel.
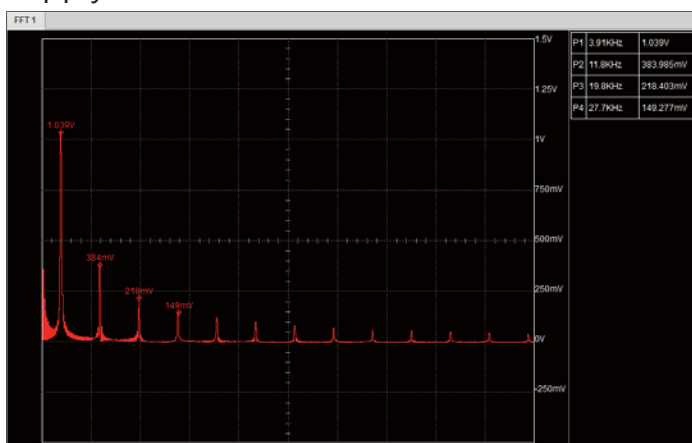


- **Multiple Windows**

  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

**Math:** Add, Subtract, Multiple, Divide, XY, Absolute, Square Root, LogA, LnA, Exponential, Integral
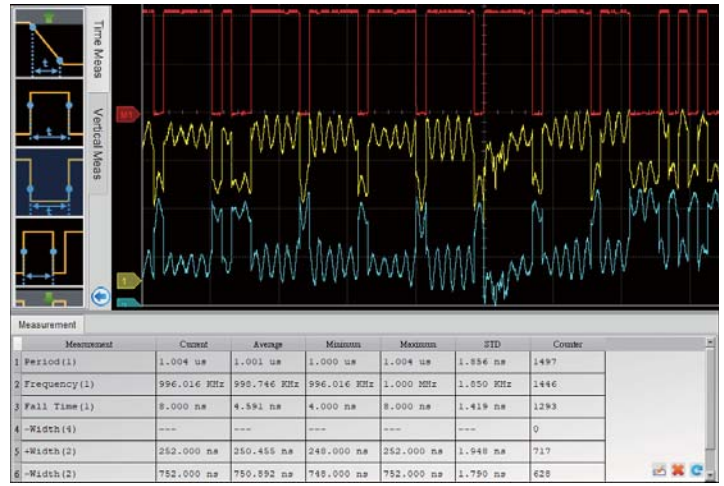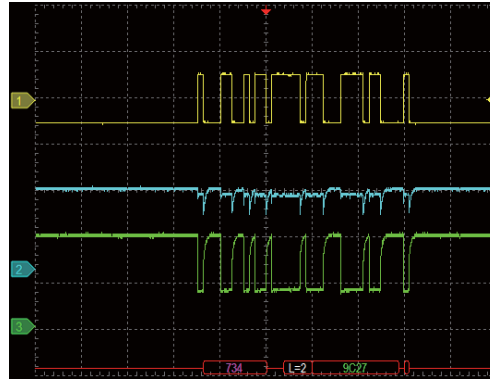
## • Protocol Decode & Trigger Function

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...
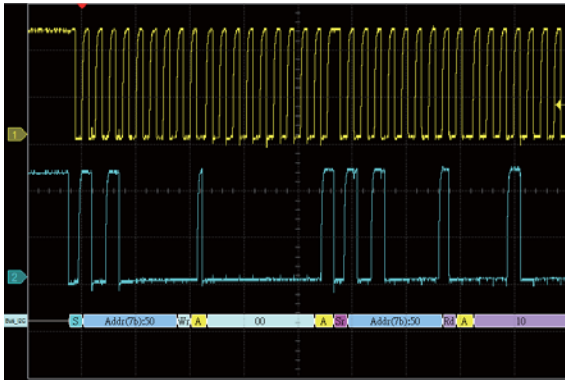
Decode the I²C waveforms

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

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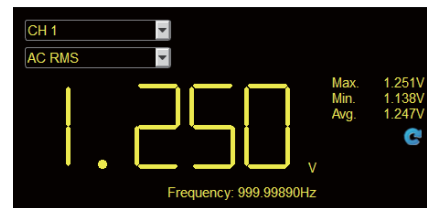
Measure 1 KHz, 2.5 Vpp square waveforms by the DVM function.

## | Packing List

| Device | USB3.0 Y cable (1.8M) Type-C OTG Adapter | 250 MHz Probe | Stack cable | Handbag |