TELEDYNE TEST TOOLS
Everywhereyoulook™

T3DSO1000HD Data Sheet

Digital Oscilloscope

Debug with Confidence

100 MHz – 200 MHz
12-bit High Resolution

Tools for Improved Debugging

• **12-bit ADC** – combined with low noise front end provides excellent noise performance.	✓ Get better insight on the signal being measured with minimal noise interference.
• **Waveform Capture** – rate up to 120,000 wfm/s (normal mode), and 500,000 wfm/s (sequence mode).	✓ Capture more time and show more waveform detail.
• **Math and Measure** – 9 basic math functions plus FFT and 50+ automatic measurement parameters.	✓ Extract results from waveforms and measurements.
• **Built-in web server** – supports remote control over LAN port.	✓ Save data for external analysis and screen images for reports.
• **History** – record function, the maximum recorded waveform length is 80,000 frames.	✓ Replay the changing waveform history.
• **Includes Bode Plot and Power Analysis applications as standard.**	✓ Common applications coverage as standard.
• **MSO** – Optional 16 Digital Channel Probe available.	✓ Add mixed signal debugging to your Oscilloscope.

T3DSO1104HD: 4 Channel 100 MHz
T3DSO1204HD: 4 Channel 200 MHz

About the T3DSO1000HD Series

Teledyne Test Tools T3DSO1000HD Digital Oscilloscopes are available in bandwidths of 100 MHz and 200 MHz, have maximum record length of 100 Mpts/ch, and display 4 analog channels + optional 16 digital channels mixed signal analysis ability.

The T3DSO1000HD series employs the latest technology which features a maximum waveform capture rate of up to 120,000 wfm/s (normal mode, up to 500,000 wfm/s in Sequence mode), 256-level intensity grading display function plus a color temperature display mode. It also employs an innovative digital trigger system with high sensitivity and low jitter. The trigger system supports multiple powerful triggering modes including serial bus triggering. Tools such as History waveform recording, Search and Navigate functions, Mask Test, Bode Plot, Power Analysis and Histogram allow for extended waveform records to be captured, stored, and analyzed. An impressive array of measurement and math capabilities, options for a 25 MHz arbitrary waveform generator, as well as serial decoding are also features of the T3DSO1000HD.

The large 10.1" display capacitive touch screen supports multi-touch gestures, with the addition of userfriendly UI design, can greatly improve the operation efficiency. It also supports mouse control, and remote web control over LAN.

Key Features

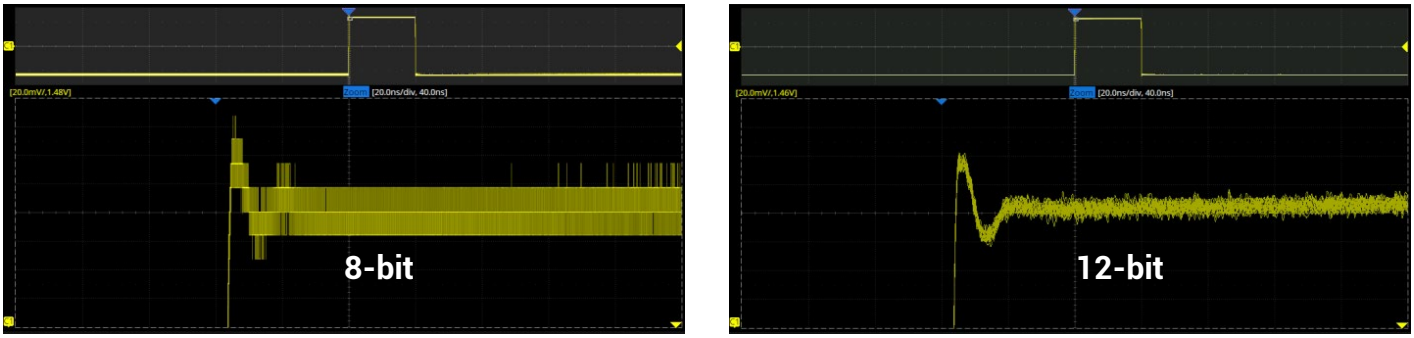
- 12-bit Analog-Digital Converters with sample rate up to 2 GSa/s
- Front ends with 70 µVrms noise floor @ 200 MHz bandwidth and 0.5 % DC gain accuracy
- 4 analog channels, up to 200 MHz bandwidth
- Waveform capture rate up to 120,000 wfm/s (normal mode), and 500,000 wfm/s (sequence mode)
- Supports 256-level intensity grading and color temperature display modes
- Up to 100 Mpts/ch record length
- Intelligent trigger: Edge, Slope, Pulse width, Window, Runt, Interval, Dropout, Pattern, Video (HDTV supported), Qualified, Nth edge, Delay, Setup/Hold time.
- Serial bus triggering and decoder, supports protocols I²C, SPI, UART, CAN, LIN, CAN-FD (decode only), FlexRay (decode only)
- 16 digital channels (optional)
- History waveform record (History) function, the maximum recorded waveform length is 80,000 frames.
- Automatic measurements on 50+ parameters, supports statistics with histogram, track, trend, Gating measurement, and measurements on Math, History and Ref.
- 4 Math traces (2 Mpts FFT, addition, subtraction, multiplication, division, integration, differential, square root, etc.), supports formula editor.
- High Speed hardware-based Average, ERES; High Speed hardware-based Mask Test function, with Mask Editor tool for creating user-defined masks.
- 25 MHz waveform generator (optional)
- Interfaces include: USB Hosts, USB Device (USBTMC), LAN (VXI-11/Telnet/Socket), Pass/Fail, Trigger Out
- Built-in web server supports remote control over the LAN port using a web browser. Supports SCPI remote control commands. Supports external mouse and keyboard.

Models and Key Specification

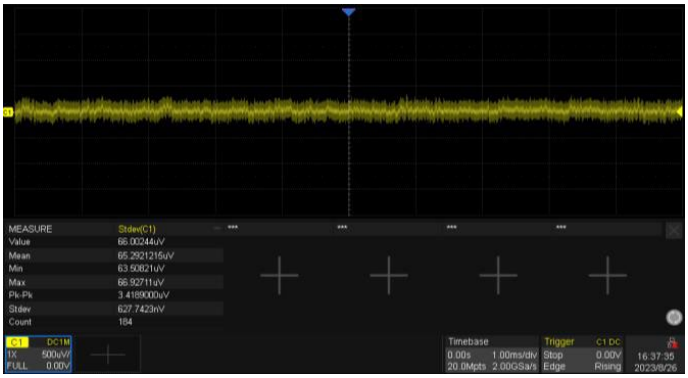
Model	T3DSO1104HD	T3DSO1204HD
Analog channels	4 + EXT (4CH Series: T3DSOxxx4HD)	
Bandwidth	100 MHz	200 MHz
Vertical resolution	12-bit	
Sample rate (Max.)	One channel mode: 2 GSa/s, Two channel mode: 1 GSa/s, Four channel mode: 500 MSa/s	
Memory depth (Max.)	One channel mode: 100 Mpts/ch, Two channel mode: 50 Mpts/ch, Four channel mode: 25 Mpts/ch	
Waveform capture rate (Max.)	Normal mode: 120,000 wfm/s; Sequence mode: 500,000 wfm/s	
Trigger type	Edge, Slope, Pulse width, Window, Runt, Interval, Dropout, Pattern, Video, Qualified, Nth edge, Delay, Setup/Hold time, Serial	
Serial trigger and decode (Standard)	I²C, SPI, UART, CAN, LIN, CAN FD (Decode Only), FlexRay (Decode Only)	
Measurement	50+ parameters, statistics, histogram, trend, and track supported	
Math	4 traces 2 Mpts FFT, +, -, x, ÷, ∫dt, d/dt, √, Identity, Negation, Absolute, Sign, ex, 10x, ln, lg, Interpolation, MaxHold, MinHold, ERES, Average. Supports formula editor.	
Data analysis	Search, Navigate, History, Mask Test, Counter, Bode plot, and Power Analysis	
Digital channel (optional)	16-channel; maximum sample rate up to 1 GSa/s; record length up to 10 Mpts	
USB AWG module (option)	One channel, 25 MHz, sample rate of 125 MHz, wavelength of 16 kpts, isolated output	
I/O	USB 2.0 Host x3, USB 2.0 Device, 10 M / 100 M LAN, External trigger, Auxiliary output (TRIG OUT, PASS/FAIL), SBUS (Digital MSO)	
Probe (Standard)	Four 100 MHz passive probes	Four 200 MHz passive probes
Display	10.1 TFT-LCD with capacitive touch screen (1024*600)	

FUNCTIONS & CHARACTERISTICS

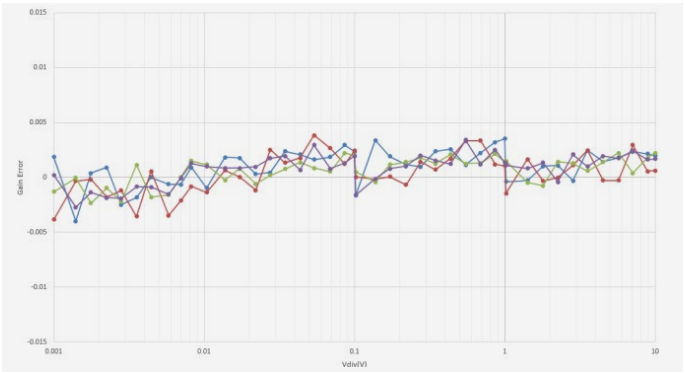
12-bit High Resolution



12-bit resolution shows you more details and less noise on the waveform.



Low noise floor: Only 70 µVrms at 200 MHz bandwidth

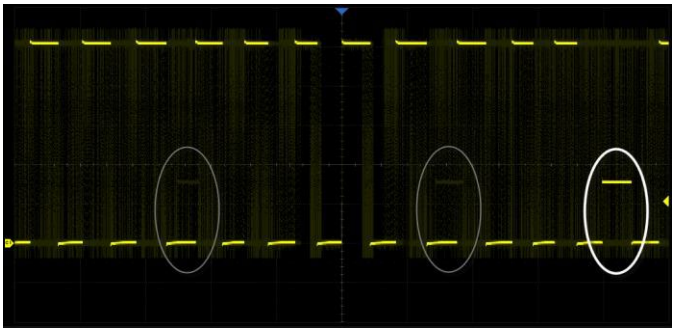


0.5 % DC gain accuracy

Excellent User Interface and User Experience

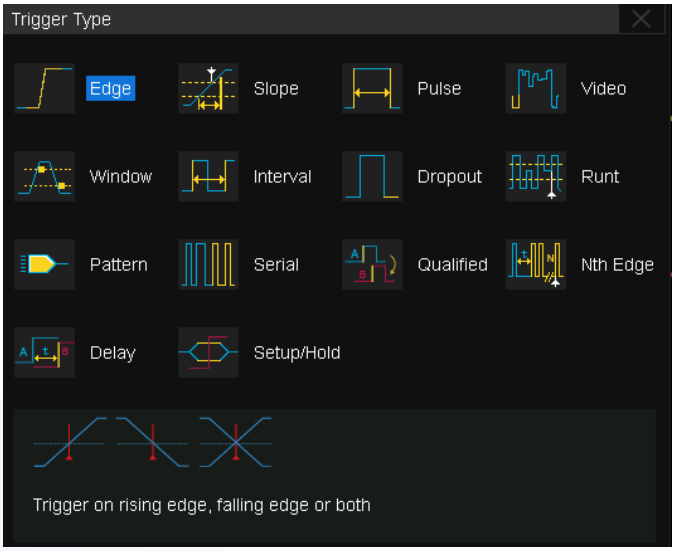
- 10.1" display with 1024x600 resolution
- Capacitive touch screen, supporting multi-touch gestures, can move or scale the waveform traces quickly by fingertouch movements, which greatly improves the operation efficiency
- Built-in WebServer supports remote control on a web page over LAN
- Supports external mouse and keyboard

High Waveform Update Rate



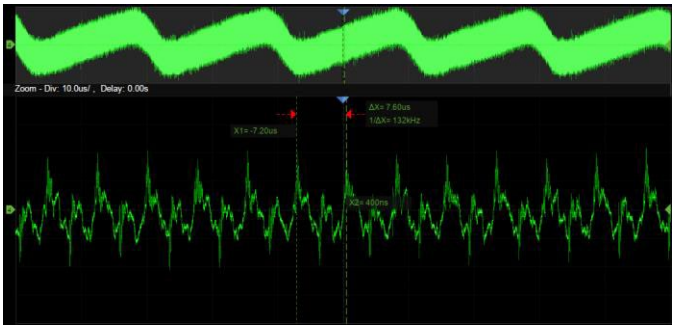
With a waveform update rate of up to 120,000 wfm/s, the oscilloscope can easily capture unusual or low-probability events. In Sequence mode, the waveform capture rate can reach 500,000 wfm/s.

Multiple Trigger Functions



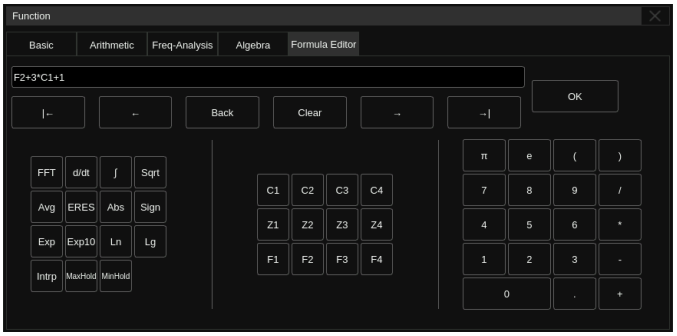
Edge, Slope, Pulse, Video, Windows, Runt, Interval, Dropout, Pattern, Qualified, Nth edge, Setup/hold, Delay, and serial trigger.

Deep Record Length

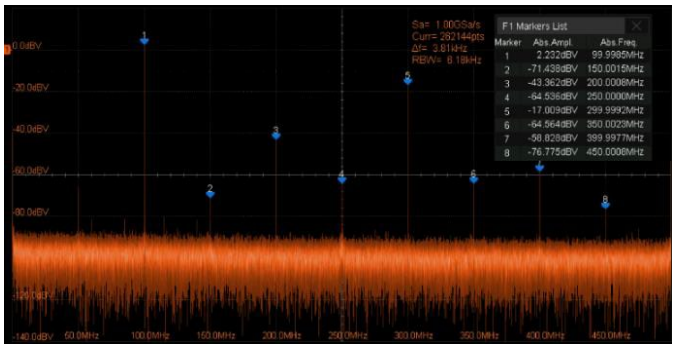


Using hardware-based Zoom technique and record length of up to 100 Mpts, users can select a slower time-base without compromising the sample rate, and then quickly zoom in to focus on the area of interest.

Advanced Math Function

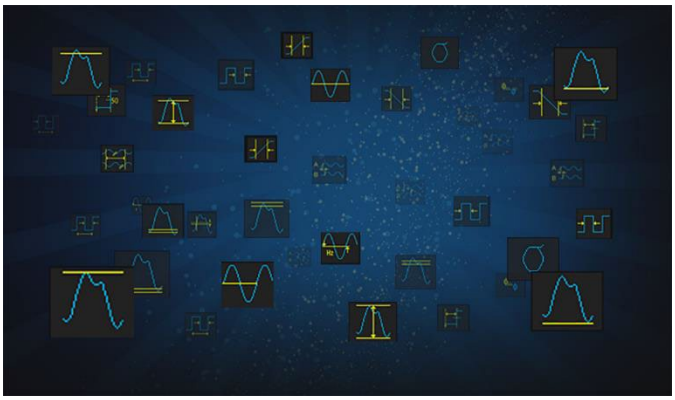


In addition to the traditional (+, -, X, /) operations, FFT, integration, differential, square root, and more are supported. Formula Editor is available for more complex operations. 4 math traces are available.



Hardware-accelerated FFT supports up to 2 Mpts operation. This provides high-frequency resolution with a fast refresh rate. The FFT function also supports a variety of window functions so that it can adapt to different spectrum measurement needs. Three modes (Normal, Average, and Max hold) can satisfy different requirements for observing the power spectrum. Auto peak detection and markers are supported.

Measurements of a Variety of Parameters



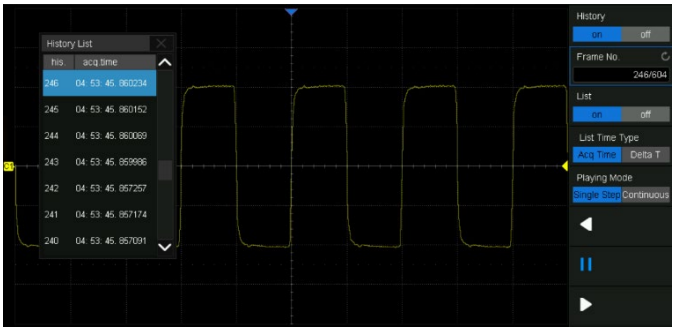
Parameter measurements include 4 categories: horizontal, vertical, miscellaneous, and CH delay providing a total of 50+ different types of measurements. Measurements can be performed within a specified gate period. Measurements on Math, Reference, and History frames are supported.

Parameter Statistics Function

Statistics show the current value, maximum value, minimum value, standard deviation, and mean value of up to 12 parameters simultaneously. A histogram is available to show the probability distribution of a parameter. Trend and Track are available to show the parameter value vs. time.

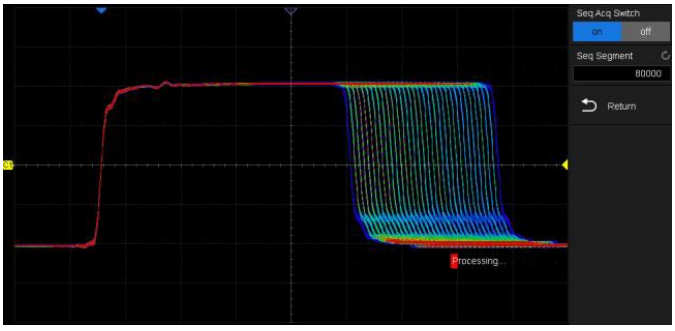
For horizontal parameters such as period, all results are extracted from a frame, instead of just calculating the first one. This accelerates statistics on horizontal measurements much more and enables distribution observation in a frame using Histogram and Track.

History Mode



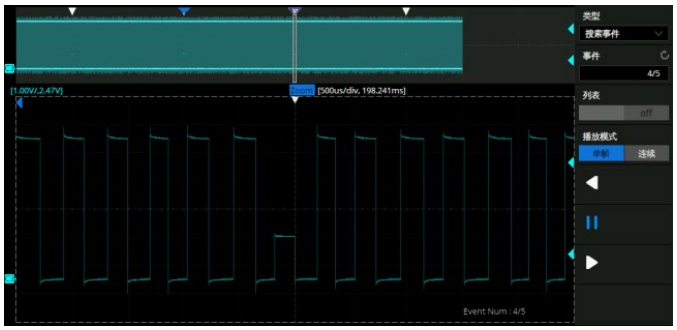
History function can record up to 80,000 frames of waveforms. The recording is executed automatically so that the customer can playback the history waveforms at any time to observe unusual events and quickly locate the area of interest using the cursors or measurements. The failed frames of the Mask Test can be stored as history.

Sequence Mode



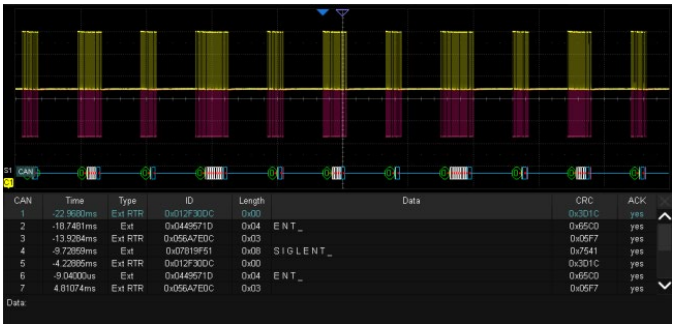
Segmented memory collection will store the waveform into multiple memory segments (up to 80,000) and each segment will store a triggered waveform as well the dead time information. The interval between segments can be as small as 2 µs. All segments can be played back using the History function.

Search and Navigate



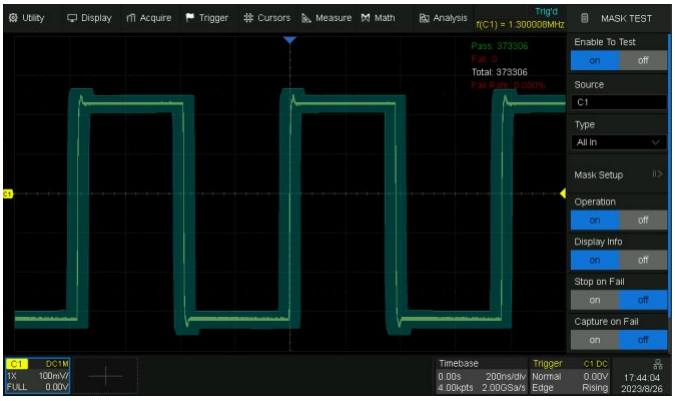
The oscilloscope can search events specified by the user in a frame. Events flagged by the Search can be recalled automatically using Navigate. It can also navigate by time (delay position) and history frames.

Serial Bus Decode

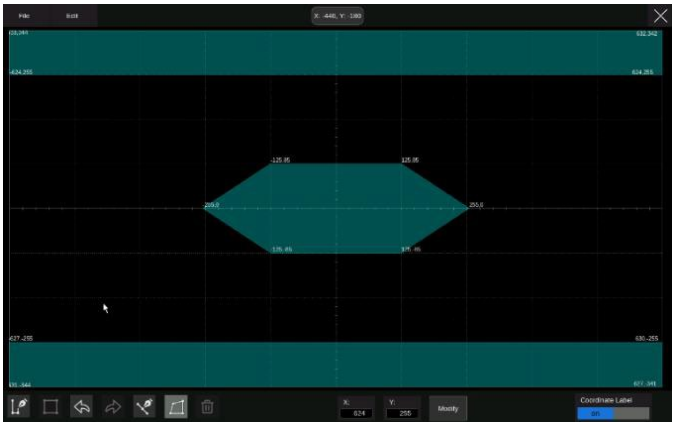


Display the decoded characters through the events list. Bus protocol information can be quickly and intuitively displayed in tabular form. I²C, SPI, UART, CAN, LIN, CAN FD, FlexRay are supported.

Hardware-based High-Speed Mask Test Function



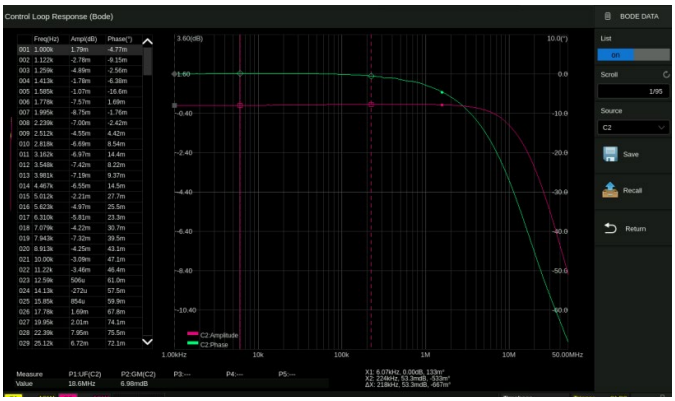
The oscilloscope utilizes a hardware-based Mask Test function, performing up to 14,000 Pass/Fail decisions each second. It is easy to generate userdefined test templates to provide trace mask comparisons, making it suitable for long-term signal monitoring or automated production line testing.



Built-in Mask Editor application helps to create custom masks.

FUNCTIONS & CHARACTERISTICS

Bode Plot

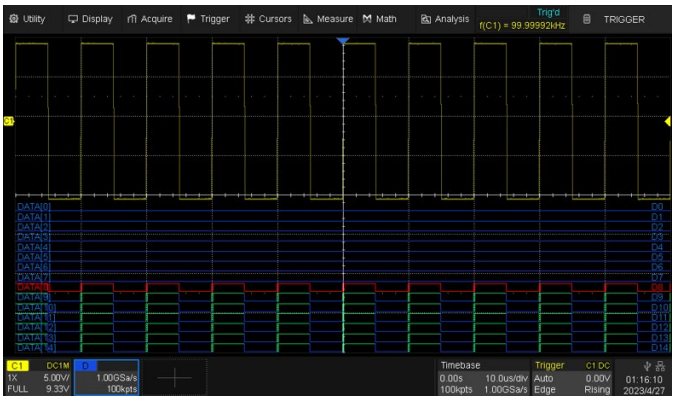


T3DSO1000HD can control the USB AWG module, control an independent Teledyne Test Tools T3AFG scan a devices amplitude and phase frequency response, and display the data as a Bode Plot. There is also a Vari-level Mode for accurately measuring Power Supply Control Loop Response (PSRR).

Power Analysis

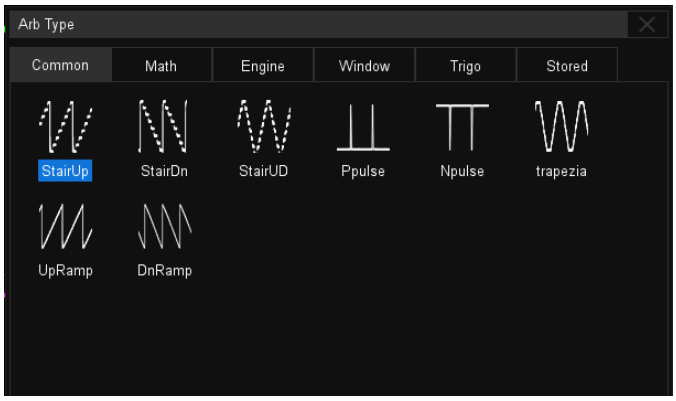
The Power Analysis option provides a full suite of power measurements and analysis, which greatly improve the measurement efficiency in switching power supplies and power devices design.

Digital Channels / MSO (Optional)



Four analog channels plus 16 digital channels enable users to acquire and trigger the waveforms then analyze the pattern, simultaneously with one instrument.

USB 25 MHz AWG module (Optional)



The USB waveform generator can output waveforms with up to 25 MHz frequency and ±3 V amplitude. Six basic waveforms together with multiple types of predefined waveforms and as user-defined arbitrary waveforms are supported.

Complete Connectivity

USB Host 2.0 x3, USB Device 2.0 (USBTMC), LAN (VXI-11/Telnet/ Socket), Auxiliary output (Pass/Fail, Trigger Out), etc.

SPECIFICATIONS

All specifications are not guaranteed unless the following conditions are met:

- The oscilloscope calibration period is current
- The oscilloscope has been working continuously for at least 30 minutes at the specified temperature (18 °C ~ 28 °C)

Acquire (analog)

Sample rate	One channel mode: 2 GSa/s, Two channel mode: 1 GSa/s, Four channel mode: 500 MSa/s
Memory depth	One channel mode: 100 Mpts/ch Two channel mode: 50 Mpts/ch, Four channel mode: 25 Mpts/ch
Waveform update rate	Normal mode: up to 120,000 wfm/s Sequence mode: up to 500,000 wfm/s
Intensity grading	256-level
Peak detect	2 ns
Sequence	Up to 80,000 segments, interval between triggers = 2 µs min.
History	Up to 80,000 frames
Interpolation	sinx/x, x

Vertical (analog)

Channel	4 + EXT (4CH Series: T3DSO1xx4HD),
Bandwidth (-3 dB) @50 Ω	T3DSO1104HD: 100 MHz T3DSO1204HD: 200 MHz
Flatness @50 Ω	DC – 10 % (BW): ± 1 dB 10 % – 50 % (BW): ± 2 dB 50 % – 100 % (BW): + 2 dB/-3 dB
Rise time @50 Ω (typical)	Typical 3.5 ns (T3DSO1104HD) Typical 1.8 ns (T3DSO1204HD)
Resolution	12-bit
ENOB[1] (typical)	8.4-bit
Noise floor[2] (rms, @50 Ω, typical, 1 mV/div)	70 µV (Full Bandwidth)
Range	8 divisions
Vertical scale (probe 1X)	1 MΩ: 0.5 mV/div – 10 V/div 50 Ω: 0.5 mV/div – 1 V/div
DC gain accuracy (typical)	0.5 mV/div ~ 4.95 mV/div: ±1.5 %; 5 mV/div ~ 10 V/div: ±0.5 %;
Offset accuracy	± (0.5 % of the offset setting + 0.5 % of full scale + 1 mV)
Offset range (probe 1X)	**1 MΩ:** 0.5 mV/div ~ 5 mV/div: ±1.6 V; 5.1 mV/div ~ 10 mV/div: ±4 V; 10.2 mV/div ~ 20 mV/div: ±8 V; 20.5 mV/div ~ 100 mV/div: ±8 V; 102 mV/div ~ 200 mV/div: ±80 V; 205 mV/div ~ 1 V/div: ±80 V; 1.02 V/div ~ 10 V/div: ±400 V **50 Ω:** 0.5 mV/div ~ 5 mV/div: ±1.6 V; 5.1 mV/div ~ 10 mV/div: ±4 V; 10.2 mV/div ~ 20 mV/div: ±8 V; 20.5 mV/div ~ 1 V/div: ±8 V
Bandwidth limit	Hardware Bandwidth limit: 20 MHz, 200 MHz
Low frequency response (AC coupling -3 dB)	2 Hz (typical)

[1] 24.99 MHz input, -0.25 dBFS, 20 mV/div, 50 Ω input impedance
[2] Use the "Stdev" measurement

SPECIFICATIONS

Vertical (analog)

Overshoot (150 ps edge @50 Ω, typical)	10 %
Coupling	DC, AC, GND
Impedance	1 MΩ : (1 MΩ ±2 %) ‖ (17 pF±2 pF) 50 Ω : 50 Ω ±1 %
Max. input voltage	1 MΩ ≤ 400 Vpk (DC + AC), DC ~ 10 kHz 50 Ω ≤ 5 V rms
SFDR	≥ 35 dBc
CH to CH Isolation (@50 Ω)	DC ~ Max BW: >40 dB
Probe Attenuation	1X, 10X, 100X, custom

Horizontal

Time scale	1 ns/div – 1000 s/div
Range	10 divisions
Display mode	Y-T, X-Y, Roll
Roll mode	≥ 50 ms/div
Skew (CH1 ~ CH4)	< 100 ps
Time base Accuracy	±25 ppm

Trigger

Mode	Auto, Normal, Single
Level	Internal: ± 4.1 div from the center of the screen EXT: ± 0.61 V EXT/5: ± 3.05 V
Hold off range	By time: 8 ns ~ 30 s (8 ns step)
Coupling	AC DC LFRJ HFRJ Noise RJ
Coupling Frequency Response (CH1 ~ CH4)	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 2.4 MHz
Coupling Frequency Response (EXT)	DC: Passes all components of the signal AC: Blocks DC components and attenuates signals below 18 Hz LFRJ: Attenuates the frequency components below 7.5 kHz HFRJ: Attenuates the frequency components above 250 kHz
Accuracy (typical)	CH1 ~ CH4: ±0.2 div EXT: ±0.3 div
Sensitivity	CH1 ~ CH4: DC ~ Max BW : 0.6div EXT: 200 mVpp, DC ~ 200 MHz EXT/5: 1 Vpp, DC ~ 200 MHz
Jitter	CH1 ~ CH4: <100 ps EXT: < 200 ps rms
Displacement	Pre-Trigger: 0 ~ 100 % memory Delay-Trigger: 0 ~ 10,000 div

Edge Trigger	
Source	CH1 ~ CH4 / EXT / (EXT/5) / AC Line / D0 ~ D15
Slope	Rising, Falling, Rising & Falling
Slope Trigger	
Source	CH1 ~ CH4
Slope	Rising, Falling
Limit range	<, >, in range, out of range
Time range	2 ns ~ 20 s, Resolution = 1 ns
Pulse Width Trigger	
Source	CH1 ~ CH4 / D0 ~ D15
Polarity	+width, -width
Limit range	<, >, in range, out of range
Time range	2 ns ~ 20 s, Resolution = 1 ns
Video Trigger	
Source	CH1 ~ CH4
Standard	NTSC, PAL, 720p/50, 720p/60, 1080p/50, 1080p/60, 1080i/50, 1080i/60, Custom
Synchronization	Any, Select
Trigger Condition	Line, Field
Window Trigger	
Source	CH1 ~ CH4
Window type	Absolute, Relative
Interval Trigger	
Source	CH1 ~ CH4 / D0 ~ D15
Slope	Rising, Falling
Limit range	<, >, in range, out of range
Time range	2 ns ~ 20 s, Resolution = 1 ns
Dropout Trigger	
Source	CH1 ~ CH4 / D0 ~ D15
Timeout type	Edge, State
Slope	Rising, Falling
Time range	2 ns ~ 20 s, Resolution = 1 ns
Runt Trigger	
Source	CH1 ~ CH4
Polarity	Positive, Negative
Limit range	<, >, in range, out of range
Time range	2 ns ~ 20 s, Resolution = 1 ns
Pattern Trigger	
Source	CH1 ~ CH4 / D0 ~ D15
Pattern Setting	Don't Care, Low, High
Logic	AND, OR, NAND, NOR
Limit range	<, >, in range, out of range
Time range	2 ns ~ 20 s, Resolution = 1 ns

Qualified Trigger	
Type	State, State with Delay, Edge, Edge with Delay
Qualified Source	CH1 ~ CH4
Edge Trigger Source	CH1 ~ CH4
Nth Edge Trigger	
Source	CH1 ~ CH4
Slope	Rising, Falling
Idle time	8 ns ~ 20 s, Resolution = 1 ns
Edge Number	1 ~ 65535
Delay Trigger	
Source A	CH1 ~ CH4
Source B	CH1 ~ CH4
Slope	Rising, Falling
Limit range	<, >, in range, out of range
Time range	2 ns ~ 20 s, Resolution = 1 ns
Serial Trigger	
Source	CH1 ~ CH4 / D0 ~ D15
Protocol	I²C, SPI, UART, CAN, LIN
I²C	Type: Start, Stop, Restart, No Ack, EEPROM, Address & Data, Data Length
SPI	Type: Data
UART	Type: Start, Stop, Data, Parity Error
CAN	Type: All, Remote, ID, ID+Data, Error
LIN	Type: Break, Frame ID, ID+Data, Error

Serial Decoder

Decoders	2
Threshold	-4.1 ~ 4.1 div
List	1 ~ 7 lines
Decoder type	Full duplex
I²C	
Source	CH1 ~ CH4 / D0 ~ D15
Signal	SCL, SDA
Address	7-bit, 10-bit
SPI	
Source	CH1 ~ CH4 / D0 ~ D15
Signal	CLK, MISO, MOSI, CS
Edge Select	Rising, Falling
Chip select	Active high, Active low, Clock timeout
Bit Order	LSB, MSB
UART	
Source	CH1 ~ CH4 / D0 ~ D15
Signal	RX, TX
Data Width	5-bit, 6-bit, 7-bit, 8-bit
Parity Check	None, Odd, Even, Mark, Space
Stop Bit	1-bit, 1.5-bit, 2-bit
Idle Level	Low, High
Bit Order	LSB, MSB
CAN	
Source	CH1 ~ CH4 / D0 ~ D15
LIN	
LIN Version	Ver 1.3, Ver 2.0
Source	CH1 ~ CH4 / D0 ~ D15
Baud Rate	600 bps, 1200 bps, 2400 bps, 4800 bps, 9600 bps, 19200 bps, Custom
CAN FD	
Source	CH1 ~ CH4
Nominal Baud Rate	10 kbps, 25 kbps, 50 kbps, 100 kbps, 250 kbps, 1 Mbps, Custom
Data Baud Rate	500 kbps, 1 Mbps, 2 Mbps, 5 Mbps, 8 Mbps, 10 Mbps, Custom
FlexRay	
Source	CH1 ~ CH4
Baud Rate	2.5 Mbps, 5 Mbps, 10 Mbps, Custom

Measurement

Automatic Measurement	
Source	CH1 ~ CH4, D0 ~ D15, Z1 ~ Z4, F1 ~ F2, Ref, History
Mode	Simple, Advanced
Range	Screen Gated: inside screen, definable with separate Gate cursors
Custom Threshold	Upper, Middle, Lower
No. of Measurements	Display 12 measurements at the same time (Display mode = M2)
Vertical Parameters	Max, Min, Pk-Pk, Top, Base, Amplitude, Mean, Cycle Mean, Stdev, Cycle Stdev, RMS, Cycle RMS, Median, Cycle Median, FOV, FPRE, ROV, RPRE, Level@Trigger
Horizontal Parameters	Period, Frequency, Time@max, Time@min, +Width, -Width, 10-90 % Rise time, 90-10 % Fall time, Rise time, Fall time, +Burst Width, -Burst Width, +Duty Cycle, -Duty Cycle, Delay, Time@Middle, Cycle-Cycle jitter
Miscellaneous Parameters	+Area@DC, -Area@DC, Area@DC, Absolute Area@DC, +Area@AC, -Area@AC, Area@AC, Absolute Area@AC, Cycles, Rising Edges, Falling Edges, Edges, Positive pulses, Negative pulses, Positive Slope, Negative Slope
Delay Parameters	Phase, FRFR, FRFF, FFFR, FFFF, FRLR, FRLF, FFLR, FFLF, Skew, Tsu@R, Tsu@F, Th@R, Th@F
Statistics	Current, Mean, Min, Max, Sdev, Count, Histogram, Trend, Track
Statistics Count	Unlimited, 1 ~ 1024
Cursors	
Source	CH1 ~ CH4, D0 ~ D15, F1 ~ F4, Ref, Histogram
Type	Manual: Time X1, X2, (X1-X2), (1/ΔT); Vertical Y1, Y2, (Y1-Y2) Track: Time X1, X2, (X1-X2) Measure: indicates the measurement on specific parameter

Math

Trace	F1 ~ F4
Source	CH1 ~ CH4, Z1 ~ Z4, F1 ~ F4
Operation	FFT, +, -, x, ÷, ∫dt, d/dt, √, Identity, Negation, |x|, Sign, ex, 10x, ln, lg, Interpolation, Max hold, Min hold, ERES, Average, Formula Editor
FFT	Length: 2 Mpts, 1 Mpts, 512 kpts, 256 kpts, 128 kpts, 64 kpts, 32 kpts, 16 kpts, 8 kpts, 4 kpts, 2 kpts Window: Rectangular, Blackman, Hanning, Hamming, Flattop Display: Full Screen, Split, Exclusive Mode: Normal, Max hold, Average Tools: Peaks, Markers

Analysis

Search	
Source	CH1 ~ CH4, History
Mode	Edge, Slope, Pulse, Interval, Runt
Copy setting	Copy from trigger, Copy to trigger
Navigate	
Type	Search event, Time, History frame
Mask Test	
Source	CH1 ~ CH4, Z1 ~ Z4
Mask creating	Auto (Create mask), Customized (Mask Editor)
Mask test speed	Up to 80,000 frames/s
Bode Plot	
Source	CH1 ~ CH4
Supported signal sources	USB AWG Module, Connection: USB, T3AFG series waveform generators, Connection: USB, LAN
Sweep type	Simple, Vari-level
Frequency	Mode: Linear, Logarithmic Range: 10 Hz ~ 120 MHz
Measure	Upper cutoff frequency, Lower cutoff frequency, Bandwidth, Gain margin, Phase margin
Power Analysis	
Measure	Power quality, Current Harmonics, Inrush current, Switching loss, Slew rate, Modulation, Output ripple, Turn on/turn off, Transient response, PSRR, Efficiency, SOA
Histogram	
Source	CH1 ~ CH4
Type	Horizontal, Vertical, Both
Counter	
Source	CH1 ~ CH4
Frequency resolution	7 digits
Totalizer	Counter on edges, supports Gate and Trigger

Digital Channels (optional)

Max. Sampling Rate	1 GSa/s
Memory Depth	10 Mpts/ch
Min. Detectable Pulse Width	3.3 ns
Level Group	D0 ~ D7, D8 ~ D15
Level Range	-10 V ~ 10 V
Logic Type	TTL, CMOS, LVCMOS3.3, LVCMOS2.5, Custom
Skew	D0 ~ D15: ±1 sampling interval Analog to Digital (Triggered On Digital): ± (1 sampling interval +1 ns) Digital to Analog (Triggered On Analog): ±4 ns

USB AWG Module (optional)

Channels	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 V ~ +1.5 V (into 50 Ω) -3 V ~ +3 V (into High-Z)
Waveforms	Sine, Square, Ramp, Pulse, DC, Noise, 45 Arbitrary
Output Impedance	50 Ω ± 2 %
Protection	Over voltage protection, Current limit
Sine	
Frequency	1 μHz ~ 25 MHz
Offset accuracy (10 kHz)	±(1 %*offset setting value +3 mVpp)
Amplitude flatness	±0.3 dB, compare to 10 kHz, 2.5 Vpp into 50 Ω
SFDR	DC ~ 1 MHz -60 dBc 1 MHz ~ 5 MHz -55 dBc 5 MHz ~ 25 MHz -50 dBc
Harmonic distortion	DC ~ 5 MHz -50 dBc 5 MHz ~ 25 MHz -45 dBc
Square/Pulse	
Frequency	1 μHz ~ 10 MHz
Duty cycle	1 % ~ 99 %
Edge	< 24 ns (10 % ~ 90 %)
Overshoot	< 3 % (typical, 1 kHz, 1 Vpp)
Pulse width	> 50 ns
Jitter (cycle-cycle)	< 500 ps + 10 ppm
Ramp	
Frequency	1 μHz ~ 300 kHz
Linearity	< 0.1 % of Pk-Pk (typical, 1 kHz, 1 Vpp, 50 % symmetry)
Channels	0 % ~ 100 %
DC	
Offset range	±1.5 V (into 50 Ω) ±3 V (into Hi-Z)
Accuracy	±(| setting value |*1 % + 3 mV)
Noise	
Bandwidth (-3 dB)	>25 MHz
Arbitrary Wave	
Frequency	1 μHz ~ 5 MHz
Waveform memory	16 kpts
Sample rate	125 MSa/s
Wave import	From EasyWaveX, from U-disk, directly from waveform data of analog channels

I/O

Front	USB 2.0 Host x2, SBUS: Digital MSO, Calibration Signal: 1 kHz, 3 V Square
Rear	USB 2.0 Host, USB 2.0 Device, LAN: 10/100 MbaseT (RJ45), External Trigger, EXT: ≤1.5 Vrms , EXT/5: ≤ 7.5 Vrms, Auxiliary Output: TRIG OUT (3.3 V LVCMOS), PASS/FAIL OUT (3.3 V TTL)

Display

Display Type	10.1 TFT LCD with capacitive touch screen
Resolution	1024 × 600
Contrast (typical)	500 : 1
Backlight (typical)	500 nit

Display Setting

Range	8 x 10 grid
Display Type	Dot, Vector
Persistence Time	OFF, 1 s, 5 s, 10 s, 30 s, infinite
Color Display	Normal, Color; Supports customer trace color
Language	Simplified Chinese, Traditional Chinese, English, French, Japanese, German, Spanish, Russian, Italian, Portuguese
Built-in Help System	Simplified Chinese, English

Environmental

Temperature	Operating: 0 °C ~ 50 °C Non-operating: -30 °C ~ 70 °C		
Humidity	Operating: 5 % ~ 90 % RH, 30 °C, degraded to 50 % RH at 50 °C Non-operating: 5 % ~ 95 %		
Altitude	Operating: ≤ 3,000 m, 25 °C Non-operating: ≤15,000 m		
Electromagnetic Compatibility	Meets EMC directive (2014/30/EU), meets or exceeds EN IEC 61326-1:2021, EN IEC 61326-2-1:2021 (Basic)		
	Conducted disturbance	CISPR 11/EN 55011	CLASS A group 1 150 kHz – 30 MHz
	Radiated disturbance	CISPR 11/EN 55011	CLASS A group 1 30 MHz – 1 GHz
	Electrostatic discharge (ESD)	IEC 61000-4-2/EN 61000-4-2	4.0 kV (Contact), 8.0 kV (Air)
	Radio-frequency electromagnetic field Immunity	IEC 61000-4-3/EN 61000-4-3	10 V/m (80 MHz to 1 GHz); 3 V/m (1.4 GHz to 2 GHz); 1 V/m (2.0 GHz to 2.7 GHz)
	Electrical fast transients (EFT)	IEC 61000-4-4/EN 61000-4-4	2 kV (Input AC Power Ports)
	Surges	IEC 61000-4-5/EN 61000-4-5	1 kV (Line to line) 2 kV (Line to ground)
	Radio-frequency continuous conducted Immunity	IEC 61000-4-6/EN 61000-4-6	3 V, 0.15 – 80 MHz
	Voltage dips and interruptions	IEC 61000-4-11/EN 61000-4-11	Voltage Dips: 0 % UT during 1 cycle; 40 % UT during 10/12 cycles; 70 % UT during 25/30 cycles Voltage interruptions: 0 % UT during 250/300 cycles
Safety	TUV Certified. Conforms to: UL 61010-1:2012/R: 2018-11; UL 61010-2-030:2018 CAN/CSA-C22.2 No. 61010-1:2012/A1:2018-11; CAN/CSA-C22.2 No. 61010-2-030:2018 EN 61010-1:2010+A1:2019; EN IEC 61010-2-030:2021		
RoHS	EU 2015/863		

Power Supply

Input Voltage & Frequency	100 ~ 240 Vrms 50/60 Hz
Power consumption	120 W max., 70 W typical, 4 W typical in standby mode

Mechanical

Dimensions	Length × Height × Width = 317.2 mm × 236.0 mm × 149.0 mm (including knobs and supporting legs)
Weight	Net Weight 4.1 kg, Gross Weight 5.6 kg

All T3DSO1000HD Series Oscilloscopes come with a 3 year Teledyne LeCroy warranty.

ORDERING INFORMATION

T3DSO2000HD Probes

Probe type	Model	Picture	Description
Passive	**T3PP350**		350 MHz bandwidth, 10 MΩ,10X Passive Probe. Replacement probe for the T3DSO1000HD series.
Logic Probe	**T3DSO1000-LS**		Optional 16 Channel Logic Probe.
USB AWG Module	**T3DSO1000-FGMOD-A**		Output Sine, Square, Ramp, pulse, Noise, DC and 45 built-in waveforms. The arbitrary waveforms can be accessed and edited by the EasyScope PC software

Ordering information

Description	12-bit, 100 MHz, 2 GSa/s, 4-CH, 100 Mpts/ch memory depth, 10.1" capacitive touch screen	**T3DSO1104HD**
	12-bit, 200 MHz, 2 GSa/s, 4-CH, 100 Mpts/ch memory depth, 10.1" capacitive touch screen	**T3DSO1204HD**
Standard Accessories	Standard Passive Probe appropriate to the oscilloscope bandwidth x 4	
	USB Cable	
	Power Cord	
	Quick Start Guide	
	Certificate of Calibration	
Optional Accessories	16 Channel MSO Probe	**T3DSO1000-LS**
	USB AWG Module	**T3DSO1000-FGMOD-A**
	350 MHz Passive Probe, 10:1, 10 MΩ	**T3PP350**

ABOUT TELEDYNE TEST TOOLS

TELEDYNE TEST TOOLS
Everywhereyoulook™

Company Profile

Teledyne LeCroy is a leading provider of oscilloscopes, protocol analyzers and related test and measurement solutions that enable companies across a wide range of industries to design and test electronic devices of all types. Since our founding in 1964, we have focused on creating products that improve productivity by helping engineers resolve design issues faster and more effectively. Oscilloscopes are tools used by designers and engineers to measure and analyze complex electronic signals in order to develop high-performance systems and to validate electronic designs in order to improve time to market.

The Teledyne Test Tools brand extends the Teledyne LeCroy product portfolio with a comprehensive range of test equipment solutions. This new range of products delivers a broad range of quality test solutions that enable engineers to rapidly validate product and design and reduce time-to-market. Designers, engineers and educators rely on Teledyne Test Tools solutions to meet their most challenging needs for testing, education and electronics validation.

Location and Facilities

Headquartered in Chestnut Ridge, New York, Teledyne Test Tools and Teledyne LeCroy has sales, service and development subsidiaries in the US and throughout Europe and Asia. Teledyne Test Tools and Teledyne LeCroy products are employed across a wide variety of industries, including semiconductor, computer, consumer electronics, education, military/aerospace, automotive/industrial, and telecommunications.

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