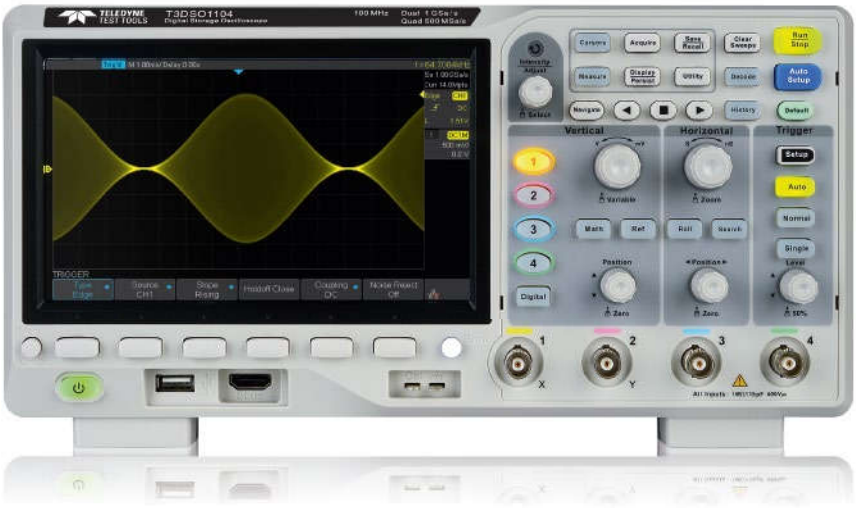
TELEDYNE TEST TOOLS
Everywhereyoulook™

T3DSO1000 / T3DSO1000A Data Sheet

Oscilloscopes

Debug with Confidence

100 MHz – 350 MHz



Tools for Improved Debugging

• **Long Capture** – Up to 28 Mpts interleaved.	✓ Capture more time and show more waveform detail.
• **Math and Measure** – 7 basic math functions plus FFT and 38 automatic measurement parameters.	✓ Extract results from waveforms and measurements.
• **Connectivity** – USB for mass storage, printing and PC control, plus LAN for fast data transfer.	✓ Save data for external analysis and screen images for reports.
• **Serial Bus Trigger and Decode** – I2C, SPI, UART, RS232, CAN, LIN.	✓ Debug serial buses directly in your Oscilloscope.
• **Waveform Sequence Recorder** – record and play back up to 80,000 waveforms.	✓ Replay the changing waveform history.
• **Optional MSO** – 16 Digital Channels (4 channel and A series only).	✓ Add mixed signal debugging to your Oscilloscope.

Key Specifications

Bandwidth	100 MHz, 200, 350 MHz
Channels	2 or 4
Memory	up to 14 Mpts/Ch (28 Mpts interleaved)
Sample Rate	up to 1 GS/s / 2 GS/s interleaved
Display	7" Bright TFT LCD (800 x 480)
Connectivity	USB Host, USB Device, LAN

PRODUCT OVERVIEW

T3DSO1102: 2 Channel 100 MHz
T3DSO1104: 4 Channel 100 MHz
T3DSO1202A: 2 Channel 200 MHz
T3DSO1204: 4 Channel 200 MHz
T3DSO1302A: 2 Channel 350 MHz

Teledyne Test Tools new T3DSO1000 Oscilloscopes feature two channel and four channel models. The two channel models are available with 100 MHz, 200 MHz and 350 MHz analog bandwidths, a single ADC with up to 2 GSa/s maximum sample rate, and memory up to 28 Mpts. The four channel scope is available in 100 and 200 MHz models and incorporates two 1 GSa/s ADCs and two 14 Mpts memory modules. When all channels are enabled, each channel has sample rate of 500 MSa/s, or 1 GS/s for the A series, and a standard record length of 7 Mpts, or 14 Mpts for the A Series. When only a single channel per ADC is active, the maximum sample rate and the maximum record length are doubled.

For ease-of-use, the most commonly used functions can be accessed with its user-friendly front panel design.

The T3DSO1000 series employs a new generation of high speed display technology that provides excellent signal clarity, fidelity and performance. The system noise floor is also lower than similar products in the industry. It comes with a minimum vertical input range of 500 uV/div, an innovative digital trigger system with high sensitivity and low jitter, and a waveform capture rate of 400,000 frames/sec (sequence mode). The T3DSO1000 also employs a 256-level intensity grading display function and a color temperature display mode not found in other models in this class. Teledyne Test Tools latest oscilloscope offering supports multiple powerful triggering modes including serial bus triggering. Serial bus decoding for IIC, SPI, UART, CAN, LIN bus types is included. The models also include History waveform recording, and sequential triggering that enable extended waveform recording and analysis.

Another powerful addition is the new 1 million point FFT math function that gives the T3DSO1000 very high frequency resolution when observing signal spectra. The new digital design also includes a hardware co-processor that delivers measurements quickly and accurately without slowing acquisition and front-panel response. The features and performance of Teledyne Test Tools T3DSO1000 family cannot be matched in this price class.

The four channel and A series includes even more functions, including: searching and navigating, on-screen Bode plot, 16 digital channels (Option), an external USB powered 25 MHz AWG module (Option), a USB WIFI adapter (Option), and an embedded application that allows remote control via web browser.

Key Features

- 100 MHz, 200 MHz and 350 MHz bandwidth models
- Two channel series have one ADC, four channel series have two ADCs. When all channels are enabled, each channel has a maximum sample rate of 500 MSa/s (1 Gsa/s for the A series). When a single channel per ADC is active, it has sample rate of 1 GSa/s (2 Gsa/s for the A Series)
- The newest generation of high speed display technology
  - › Waveform capture rate up to 100,000 wfm/s (normal mode), and 400,000 wfm/s (sequence mode)
  - › Supports 256-level intensity grading and color display modes Record length up to 28 Mpts
  - › Digital trigger system
- Intelligent trigger: Edge, Slope, Pulse Width, Window, Runt, Interval, Time out (Dropout), Pattern
- Serial bus triggering and decoding (Standard), supports protocols IIC, SPI, UART, RS232, CAN, LIN
- Video trigger, supports HDTV
- Low background noise with voltage scales from 500 µV/div to 10 V/div
- 10 types of one-button shortcuts, supports Auto Setup, Default, Cursors, Measure, Roll, History, Display/Persist, Clear Sweep, Zoom and Print Segmented acquisition (Sequence) mode, divides the maximum record length into multiple segments (up to 80,000), according to trigger conditions set by the user, with a very small dead time segment to capture the qualifying event.
- History waveform record (History) function, maximum recorded waveform length is 80,000 frames.

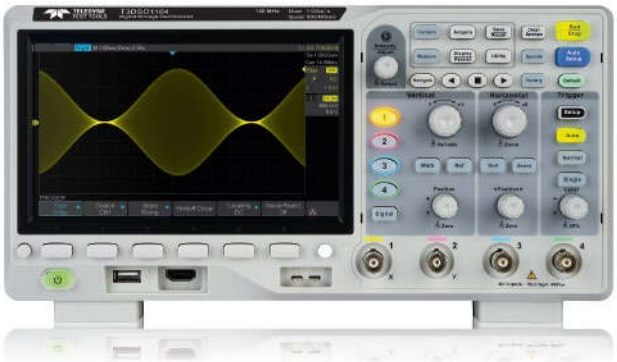
Models and key Specification

Model	T3DSO1102 T3DSO1104	T3DSO1204	T3DSO1202A	T3DSO1302A
Bandwidth	100 MHz	200 MHz	200 MHz	350 MHz
SamplingRate (Max.)	Two channel series have a single 1 GSa/s ADC, four channel series have two 1 GSa/s ADCs. When all channels are enabled, each channel has a maximum sample rate of 500 MSa/s. When a single channel per pair is active, that channel has sample rate of 1 GSa/s		The A series has a single 2 GSa/s ADC. When both channels are enabled, each channel has a maximum sample rate of 1 GSa/s. When a single channel is active, that channel has sample rate of 2 GSa/s	
Channels	4, no EXT (T3DSO1104 and T3DSO1204 four channel series) 2+EXT (T3DSO1102, T3DSO1202A and T3DSO1302A two channel series)			
Memory Depth (Max.)	7 Mpts/CH (not interleave mode); 14 Mpts/CH (interleave mode)		14 Mpts/CH (not interleave mode); 28 Mpts/CH (interleave mode)	
Waveform Capture Rate (Max.)	100,000 wfm/s (normal mode), 400,000 wfm/s (sequence mode)			
Trigger Type	Edge, Slope, Pulse Width, Window, Runt, Interval, Dropout, Pattern, Video			
Serial Trigger and decoder (Standard)	IIC, SPI, UART/RS232, CAN, LIN			
16 Digital Channels (Option not available on the T3DSO1102)	Maximum waveform capture rate up to 1 GSa/s, Record length up to 14 Mpts/CH			
USB AWG module (Option not available on the T3DSO1102)	One channel, 25 MHz, sample rate of 125 MHz, wave length of 16 kpts			
Bode plot (Not available on the T3DSO1102)	Minimum start frequency of 10 Hz, minimum scan bandwidth of 500 Hz, maximum scan bandwidth of 120 MHz (dependent on Oscilloscope and AWG bandwidth), 500 maximum scan frequency points			
USB WIFI adapter (Option not available on the T3DSO1102)	802.11b/g/b, WPA-PSK, the adapter must be purchased separately by the scope user (TP-Link TL-WN725N)			
I/O	USB Host, USB Device, LAN, Pass/Fail, Trigger Out, Sbus (Teledyne Test Tools MSO)			
Probe (Std)	2/4 pcs passive probe		2 pcs passive probe	
Display	7 inch TFT-LCD (800 x 480)			
Weight	All models except T3DSO1102: Without package 2.6 Kg; With package 3.8 Kg T3DSO1102: Without package 2.5 Kg; With package 3.5 Kg			

- Automatic measurement function for 38 parameters as well as Measurement Statistics, Zoom, Gating, Math, History and Reference functions
- 1 Mpts FFT
- Math and measurement functions use all sampled data points (up to 28 Mpts)
- Math functions (FFT, addition, subtraction, multiplication,division, integration, differential, square root)
- Preset key can be customized for user settings or factory "defaults"
- Security Erase mode
- High Speed hardware based Pass/ Fail function
- MSO, 16 digital channels[1)]
- Bode plot[1)]
- Search and navigate[1)]
- USB AWG module[1)]
- USB WIFI adapter[1)]
- Web Browser based control[1)]
- Large 7 inch TFT-LCD display with 800 * 480 resolution
- Multiple interface types: USB Host, USB Device (USB-TMC), LAN, Trigger Out
- Supports SCPI remote control commands
- Supports Multi-language display and embedded online help

[1)] Not available on the T3DSO1102.

7 inch TFT-LCD display and 10 one-button menus



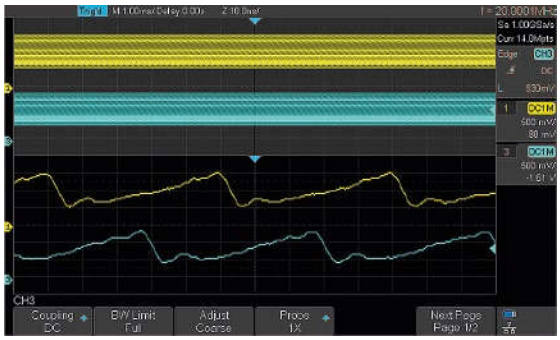
Front panel of T3DSO1104, T3DSO1202A, T3DSO1204, T3DSO1302A



Front panel of T3DSO1102

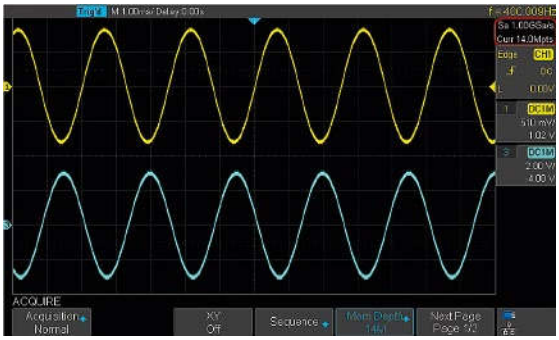
- 7-inch TFT-LCD display with 800 * 480 resolution
- Most commonly used functions are accessible using 10 different one-button operation keys: Auto Setup, Default, Cursor, Measure, Roll, History, Persist, Clear
- Sweep, Zoom, Print

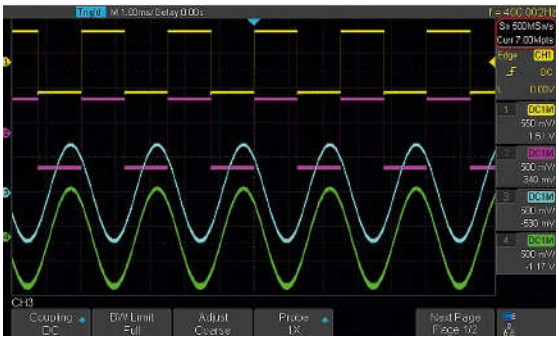
Record Length of Up to 28 Mpts depending on model and channels (single channel/pair mode).



Using hardware-based Zoom technologies and max record length of up to 28 Mpts, users are able to over-sample to capture longer time periods at higher resolution and use the zoom feature to see more details within each signal.

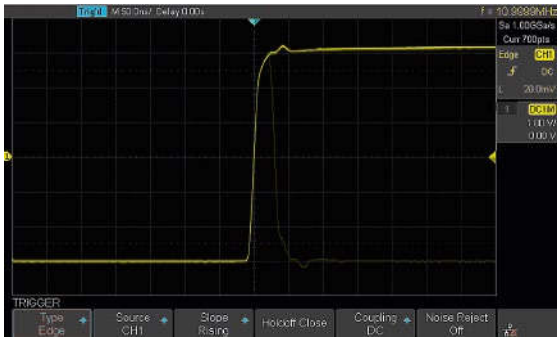
When all channels are enabled, each channel has a maximum sample rate of up to 1 GSa/s (depending on the model) When a single channel per pair is active, that channel has sample rate of up to 2 GSa/s (depending on the model)





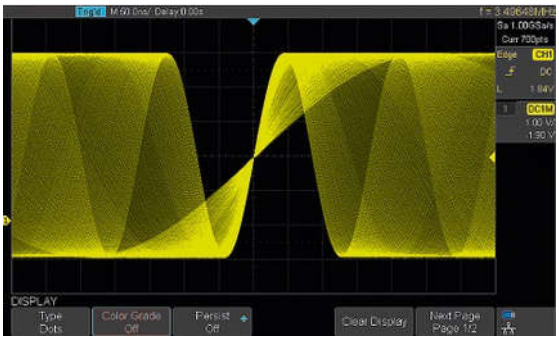
The four channel series has two 1 GSa/s ADC chips (channel 1 and 2 share one, channel 3 and 4 share another), so that each channel can achieve sample rates up to 500 MSa/s and work on bandwidths of 200 MHz when all channels are enabled.

Waveform Capture Rate Up to 400,000 wfm/s

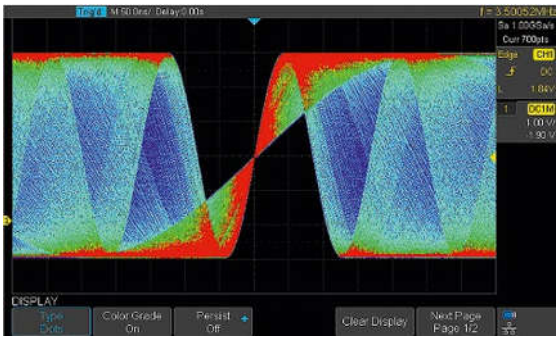


With a waveform capture rate of up to 400,000 wfm/s (sequence mode), the oscilloscope can easily capture the unusual or low-probability events.

256-Level Intensity Grading and Color Temperature Display

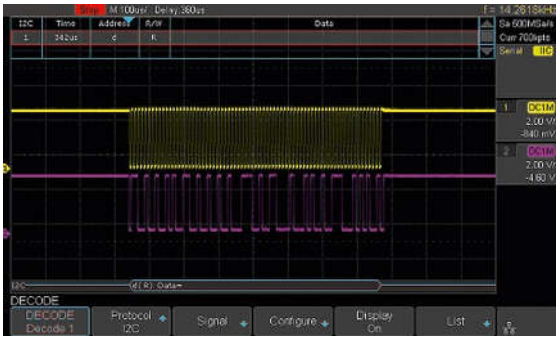


New display technology provides for fast refresh rates. The resulting intensity-graded trace is brighter for events that occur with more frequency and dims when the events occur with less frequency.



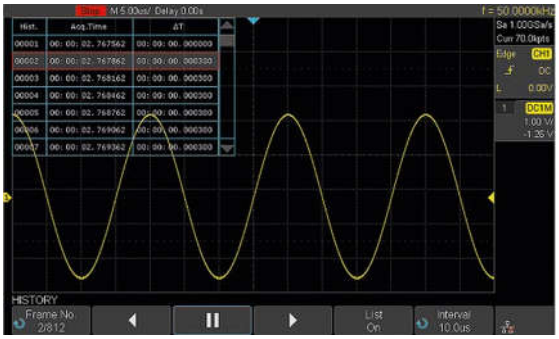
The color temperature display is similar to the intensity-graded trace function, but the trace occurrence is represented by different colors (color "temperature") as opposed to changes in the intensity of one color. Red colors represents the more frequent events, while blue is used to mark points that occur lest frequently.

Serial Bus Decoding Function (Standard)



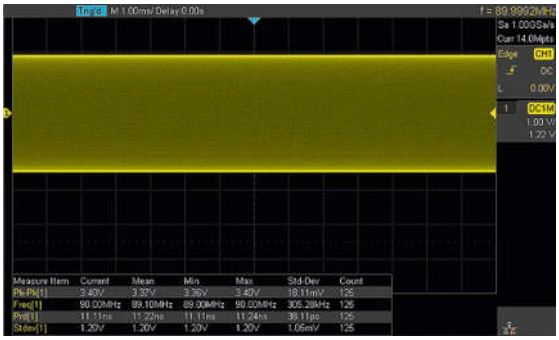
T3DSO1000 displays the decoding through the events list. Bus protocol information can be quickly and intuitively displayed in a tabular format.

History Waveforms (History) Mode and Segmented Acquisition (Sequence)



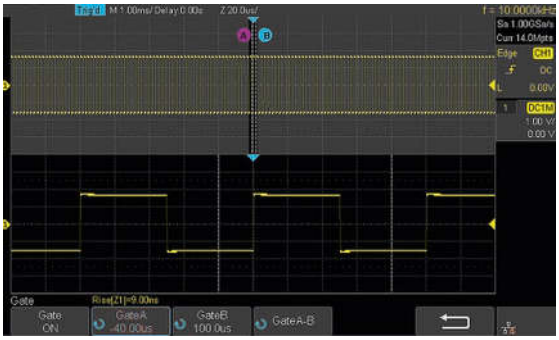
Playback the latest triggered events using the history function. Segmented memory collection will store trigger events into multiple (Up to 80,000) memory segments, each segment will store triggered waveforms and timestamp each frame.

True measurement to 14 M points or 28 M points depending on the model



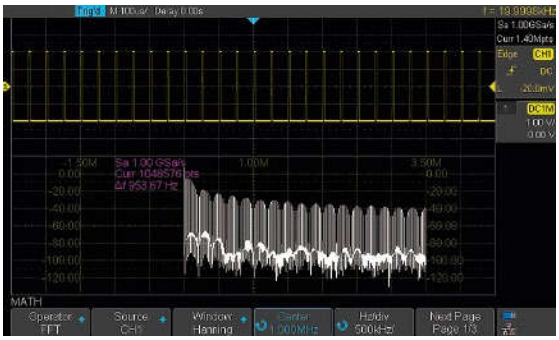
At any one timebase, T3DSO1000 can measure using all acquired sample points. This ensures the accuracy of measurements while the math coprocessor decreases measurement time and increases ease-of-use.

Gate and Zoom Measurement



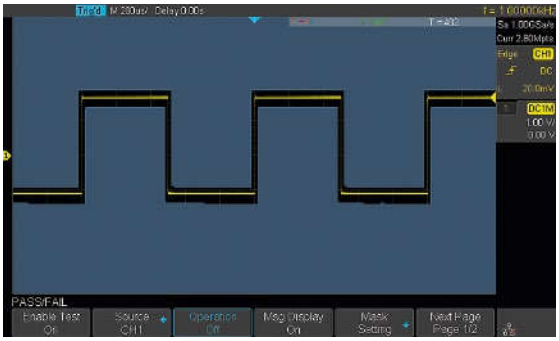
Through Gate and Zoom measurement, the user can specify an arbitrary interval of waveform data analysis and statistics. This helps avoid measurement errors that can be caused by invalid or extraneous data, greatly enhancing the measurements' validity and flexibility.

1 M points FFT



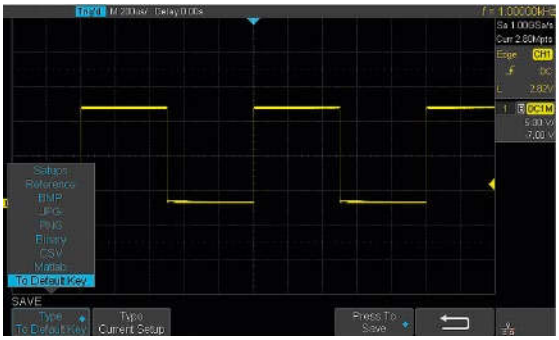
The math co-processor enables FFT analysis of incoming signals using up to 1 M samples per waveform. This provides high frequency resolution with a fast refresh rate. The FFT function also supports a variety of window functions so that it can adapt to different spectrum measurement needs.

Hardware-Based High Speed Pass/Fail function



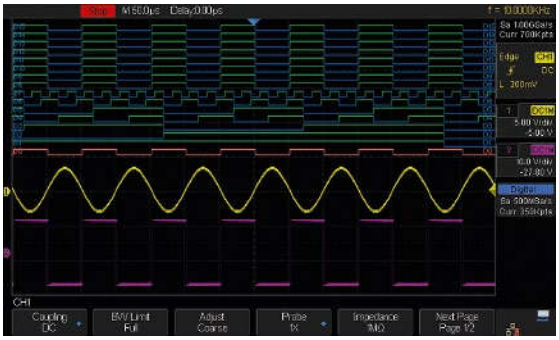
The T3DSO1000 utilizes a hardware-based Pass/Fail function, performing up to 40,000 Pass/Fail decisions each second. Easily generate user defined test templates provide trace mask comparison making it suitable for long-term signal monitoring or automated production line testing.

Customizable Default Key



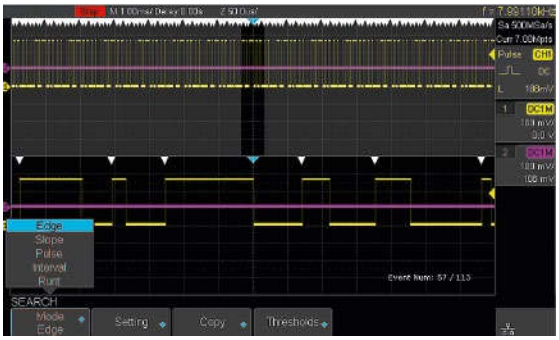
The current parameters of the oscilloscope can be preset to Default Key through the Save menu.

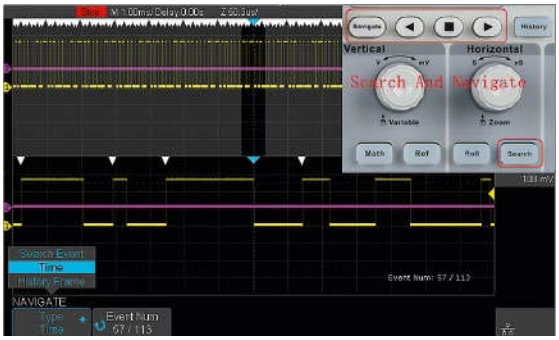
16 Digital Channels/MSO (Option not available on the T3DSO1102)



16 digital channels enables users to acquire and trigger on the waveforms then analyze the pattern, simultaneously with one instrument. Color coded logic levels clearly differentiate high and low states.

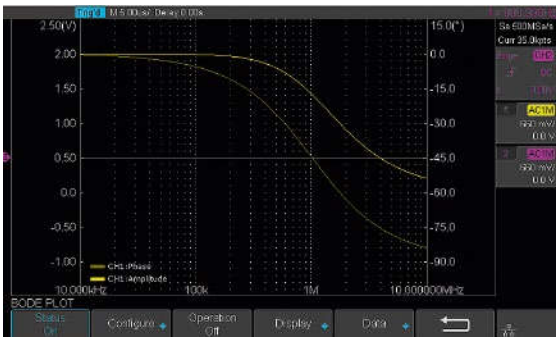
Search and Navigate (not available on the T3DSO1102)

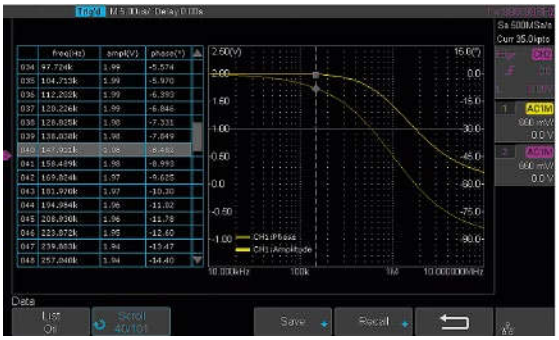




The T3DSO1000 series can search events specified by the user in a frame. It can also navigate by time (delay position) and historical frames. Search and Navigate is not available on the T3DSO1102.

Bode Plot (not available on the T3DSO1102)





T3DSO1000 can control the USB AWG module, control an independent Teledyne Test Tools T3AFG instrument, scan an object's amplitude and phase frequency response, and display the data as a Bode Plot. It can also show the result lists, and export the data to a USB disk. Not available for the T3DSO1102.

USB WiFi Adapter (Option not available on the T3DSO1102)



USB WiFi Adapter

WiFi control of instrumentation can provide a convenient and safe method of configuring and collecting data. This new feature works with a Teledyne Test Tools approved WiFi adapter to provide wireless control and communications with Teledyne Test Tools 4 channel scopes. Option not available for the T3DSO1102.
The approved adapter is the TP-Link TL-WN725N (not supplied).

USB 25 MHz AWG Module (Option not available on the T3DSO1102)



The T3DSO1000 series supports an optional USB 25 MHz function/arbitrary waveform generator that is operated from the USB host connection. Functions include Sine, Square, Ramp, Pulse, Noise, DC and 45 built-in waveforms. The arbitrary waveforms can be accessed and edited by the Teledyne Test Tools PC software. Option not available for the T3DSO1102.

Complete Connectivity



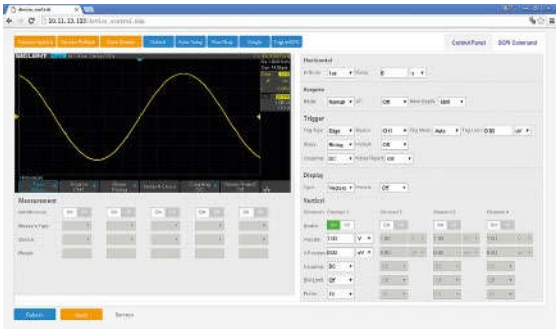
Back panel of T3DSO1104, T3DSO1202A, T3DSO1204, T3DSO1302A



Back panel of T3DSO1102

T3DSO1000 supports USB Host, USB Device (USB-TMC), LAN(VXI-11), Pass/Fail and Trigger Out.

Web control (not available on the T3DSO1102)



With the new embedded web server, users can control the Oscilloscopes from a simple web page. This provides remote troubleshooting and monitoring capabilities.

SPECIFICATIONS

Model	T3DSO1102, T3DSO1104, T3DSO1204	T3DSO1202A, T3DSO1302A
Acquire System		
Sampling Rate	1 GSa/s (single channel/pair), 500 MSa/s (two channels/pair)	2 GSa/s (single channel), 1 GSa/s (two channels)
Memory Depth	Max 14 Mpts/Ch (single channel/pair), 7 Mpts/Ch (two channels/pair)	Max 28 Mpts/Ch (single channel), 14 Mpts/Ch (two channels)
Peak Detect	2 nsec (Four channel series) 4 nsec (Two channel series)	1 nsec
Average	Averages: 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	
Input		
Channels	4, no EXT (four channel series) 2+EXT (two channel series)	2+EXT
Coupling	DC, AC, GND	
Impedance	DC: (1 MΩ ± 2 %) || (15 pF ± 2 pF) (Four channel series) DC: (1 MΩ ± 2 %) || (18 pF ± 2 pF) (Two channel series)	DC: (1 MΩ ± 2 %) || (18 pF ± 2 pF) DC: (50 Ω ± 2 %)
Max.Input voltage	1 MΩ ≤ 400 Vpk (DC + Peak AC <= 10 kHz)	1 MΩ ≤ 400 Vpk (DC + Peak AC <= 10 kHz) DC: 50 Ω: < 5V rms
CH to CH Isolation	DC-Max BW > 40 dB	
Probe attenuation	0.1X, 0.2X, 0.5X, 1X, 2X, 5X, 10X.....1000X, 2000X, 5000X, 10000X	
Vertical System		
Bandwidth (– 3 dB)	200 MHz (T3DSO1204) / T3DSO1202A) 350 MHz (T3DSO1302A) 100 MHz (T3DSO1102 / T3DSO1104)	
Vertical Resolution	8-bit	
Vertical Scale (Probe 1X)	500 µV/div – 10 V/div (1-2-5 sequence)	
Offset Range (Probe 1X)	500 µV – 118 mV: ± 2 V 120 mV – 1.18 V: ± 20 V 1.2 V – 10 V: ± 200 V	500 µV – 100 mV: ± 2 V 102 mV – 1 V: ± 20 V 1.02 V – 10 V: ± 200 V
Bandwidth Limit	20 MHz ± 40 %	20 MHz ± 40 %
Bandwidth Flatness	DC – 10 % (BW): ± 1 dB 10 % – 50 % (BW): ± 2 dB 50 % – 100 % (BW): + 2 dB/–3 dB	DC – 60 % (BW): ± 1 dB 60 % – 100 % (BW): + 1 dB/–3 dB
Low Frequency Response (AC – 3 dB)	≤ 10 Hz (at input BNC)	≤ 2 Hz (at input BNC)
Noise	ST-DEV ≤ 0.5 division (< 1 mV/div) ST-DEV ≤ 0.2 division (< 2 mV/div) ST-DEV ≤ 0.1 division (≥ 2 mV/div)	
SFDR including harmonics	≥ 35 dB	
DC Gain Accuracy	≤ ± 3.0%: 5 mV/div – 10 V/div ≤ ± 4.0%: ≤ 2 mV/div	
Offset Accuracy	± (1 % * Offset + 1.5 % * 8 * div + 2 mV): ≥ 2 mV/div ± (1 % * Offset + 1.5 % * 8 * div + 500 uV): ≤ 1 mv/div	
Risetime	Typical 1.0 ns (T3DSO1302A) Typical 1.8 ns (T3DSO1202A / T3DSO1204) Typical 3.5 ns (T3DSO1102 / T3DSO1104)	
Overshoot (500 ps Pulse)	< 10 %	
Horizontal System		
Timebase Scale	1.0 ns/div – 100 s/div	500 ps/div – 100 s/div
Channel Skew	< 100 ps	
Waveform Capture Rate	Up to 100,000 wfm/s (normal mode), 400,000 wfm/s (sequence mode)	
Intensity grading	256 Levels	
Display Format	Y-T, X-Y, Roll	
Timebase Accuracy	± 25 ppm	
Roll Mode	50 ms/div – 100 s/div (1-2-5 step)	

Model	T3DSO1102, T3DSO1104, T3DSO1204	T3DSO1202A, T3DSO1302A

Trigger System

Trigger Mode	Auto, Normal, Single	
Trigger Level	Internal: ± 4.5 div from the center of the screen EXT: ± 0.6 V (Two channel series) EXT/5: ± 3 V (Two channel series)	
Holdoff Range	80 ns – 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 20 Hz LFRJ: Blocks the DC component and attenuates the low-frequency components below 7 KHz HFRJ: Attenuates the high-frequency components above 160 KHz	DC: Passes all components of the signal AC: Blocks DC components and attenuates signals below 10 Hz LFRJ: Blocks the DCcomponent and attenuates the low-frequency components below 6 KHz HFRJ: Attenuates the high-frequency components above 200 KHz
Trigger Accuracy (Typical)	Internal: ± 0.2 div EXT (Two channel series): ± 0.4 div	
Trigger Sensitivity	DC – Max BW 0.6 div EXT (Two channel series): 200 mVpp DC – 10 MHz 300 mVpp 10 MHz – BW frequency EXT/5 (Two channel series): 1 Vpp DC – 10 MHz 1.5 Vpp 10 MHz – BW frequency	
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	All channels/ EXT/ (EXT/5)/ AC Line (Two channel series) All channels/ AC Line (Four channel series)

Slope Trigger

Slope	Rising, Falling
LimitRange	< , > , < > , > <
Source	All channels
TimeRange	2 ns – 4.2 s
Resolution	1 ns

Pulse Trigger

Polarity	+wid , -wid
Limit Range	< , > , < > , > <
Source	All channels
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	All channels
Sync	Any, Select
Trigger condition	Line, Field

Window Trigger

Window Type	Absolute, Relative
Source	All channels

Interval Trigger

Slope	Rising, Falling
Limit Range	< , > , < > , > <
Source	All channels
Time Range	2 ns ~ 4.2 s
Resolution	1 ns

Dropout Trigger

Timeout Type	Edge, State
Source	All channels
Slope	Rising, Falling
Time Range	2 ns ~ 4.2 s
Resolution	1 ns

Runt Trigger

Polarity	+wid , -wid
Limit Range	< , > , < > , > <
Source	All channels
Time Range	2 ns ~ 4.2 s
Resolution	1 ns

Pattern Trigger

Pattern Setting	Invalid, Low, High
Logic	AND, OR, NAND, NOR
Source	All channels
Limit Range	< , > , < > , > <
Time Range	2 ns ~ 4.2 s
Resolution	1 ns

Serial Trigger

I2C Trigger	
Condition	Start, Stop, Restart, No Ack, EEPROM, 7 bits Address & Data, 10 bits Address & Data, Data Length
Source (SDA/SCL)	All channels
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, Don't care
SPI Trigger	
Condition	Data
Source (CS/CL/Data)	All channels
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)	All channels
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 (Selectable)	600/1200/2400/4800/9600/19200/38400/57600/115200 bit/s
(Custom)	300 bit/s ~ 5,000,000 bit/s
CAN Trigger	
Condition	Start, Remote, ID, ID + Data, Error
Source	All channels
ID	STD (11 bit), EXT (29 bit)
Data Format	Hex
Data Length	1~2 byte
Baud Rate (Selectable)	5 k/10 k/20 k/50 k/100 k/125 k/250 k/500 k/800 k/1 M bit/s
LIN Trigger	
Condition	Break, Frame ID, ID+Data, Error
Source	All channels
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
Threshold	-4.5 ~ 4.5 div
List	1 ~ 7 lines
SPI Decoder	
Signal	SCL,MISO, MOSI, CS * NOTE 2 channel scopes can only use 2 signal identifiers
Edge Select	Rising, Falling
Idle Level	Low, High
Bit Order	MSB, LSB
Threshold	-4.5 ~ 4.5 div
List	1 ~ 7 lines
UART / RS232 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	-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 Specification Package Revision	Ver1.3, Ver2.0
Threshold	-4.5 ~ 4.5 div
List	1 ~ 7 lines

Measurement

Source	All channels, All channels in Zoom, Math, All References, History	
Number of Measurements	Display 5 measurements at the same time	
Measurement Range	Screen region, Gate region	
Measurement Parameters (38 Types)		
Vertical (Voltage)	Max	Highest value in input waveform
	Min	Lowest value in input waveform
	Pk-Pk	Difference between maximum and minimum data values
	Ampl	Difference between top and base in a bimodal signal, or between max and min in an unimodal signal
	Top	Value of most probable higher state in a bimodal waveform
	Base	Value of most probable lower state in a bimodal waveform
	Mean	Average of all data values
	Cmean	Average of data values in the first cycle
	Stdev	Standard deviation of all data values
	Cstd	Standard deviation of all data values in the first cycle
	VRMS	Root mean square of all data values
	Crms	Root mean square of all data values in the first cycle
	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
	Level@X	the voltage value of the trigger point
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
	-Dut	Ratio of negative width to period
	Delay	Time from the trigger to the first transition at the 50 % crossing
	Time@Level	Time from the trigger to each rising edge at the 50 % crossing. When Statistics is Off, it shows the time from the trigger to the last rising edge at the 50 % crossing. When Statistics is On, it shows the Current, Mean, Min, Max, Standard Deviation of time from the trigger to each rising edge at the 50 % crossing in multiple frames (number = Count).
Delay	Phase	Calculate the phase difference between two edges
	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
	LRF	Time from the first rising edge of channel A to the last falling edge of channel B
	LFR	Time from the first falling edge of channel A to the last rising edge of channel B
	LFF	Time from the first falling edge of channel A to the last falling edge of channel B
	Skew	Time of source A edge minus time of nearest source B edge
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, Stdev, Count	
Counter	Hardware 6 bit counter(channels are selectable)	

Math Function

Operation	+ , - , * , / , FFT , d/dt , ∫dt , √
FFT window	Rectangular, Blackman, Hanning, Hamming, Flattop
FFT display	Full Screen, Split, Exclusive
Number of Decoders	2

USB AWG Module (Not available on the T3DSO1102)

Channel	1
Max. Output Frequency	25 MHz
Sampling Rate	125 MSa/s
Frequency Resolution	1 μHz
Frequency Accuracy	± 50 ppm
Vertical Resolution	14-bits
AmplitudeRange	-1.5 ~ +1.5 V (50 Ω) -3 ~ +3 V (High-Z)
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

Sine

Frequency	1 μHz ~ 25 MHz
Offset Accuracy (10 kHz)	± (1 % * Offset Setting Value + 1 mVpp)
Amplitude flatness (10 kHz, 5 Vpp)	± 0.3 dB
SFDR	DC ~ 1 MHz -60 dBc 1 MHz ~ 5 MHz -55 dBc 5 MHz ~ 25 MHz -50 dBc
HD	DC ~ 5 MHz -50 dBc 5 MHz ~ 25 MHz -45 dBc

Square/Pulse

Frequency	1 μHz ~ 10 MHz
Duty Cycle	1 % ~ 99 %
Rise/Fall time	< 24 ns (10 % ~ 90 %)
Overshoot (1 kHz,1 Vpp, Typical)	< 3 % (typical 1 kHz, 1 Vpp)
Pulse Width	> 50 ns
Jitter	< 500 ps + 10 ppm

Ramp

Frequency	1 μHz ~ 300 kHz
Linearity (Typical)	< 0.1 % of Pk-Pk (Typical, 1 kHz, 1 Vpp, 100 % Symmetry)
Symmetry	0 % ~ 100 % (Adjustable)

DC

Offset range	± 1.5 V (50 Ω) ± 3 V (High-Z)
Accuracy	± (|offset| * 1 % + 3 mV)

Noise

Bandwidth	> 25 MHz (-3 dB)

Arbitrary Wave

Frequency	1 μHz ~ 5 MHz
Wave Length	16 kpts
Sampling Rate	125 MSa/s
Waveform Entry	EasyScope and USB-Stick

SPECIFICATIONS

Digital Channels (Not available on the T3DSO1102)

No. of Channels	16
Max. Sampling Rate	1 GSa/s
Memory Depth	14 Mpts/CH
Min. Detectable Pulse Width	4 ns
Level Group	D0~D7, D8~D15
Level Range	-8 V ~ 8 V
Logic Type	TTL, CMOS, LVCMOS3.3, LVCMOS2.5, custom
Skew[2]	D0~D15: ±1 sampling interval Analog To Digital: ± (1 sampling interval +1 ns)

I/O

Standard	USB Host, USB Device, LAN, Pass/Fail, Trigger Out
Pass/Fail	3.3 V TTL Output

Display (Screen)

Display Type	7-inch TFT LCD
Display Resolution	800 × 480
Display Color	24 bit
Contrast (Typical)	500:1
Backlight	300 nit
Range	8 x 14 divisions

Display (Waveform)

Display Mode	Dot, Vector
Persist Time	Off, 1 Sec, 5 Sec, 10 Sec, 30 Sec, Infinite
Color Display	Normal, Color
Screen Saver	1 min, 5 min, 10 min, 30 min, 1 hour, Off
Language	Simplified Chinese, Traditional Chinese, English, French, Japanese, Korean, German, Russian, Italian, Portuguese

Environments

Temperature	Operating: 10 ~ +40 Non-operating: -20 ~ +60
Humidity	Operating: 85 % RH, 40 Deg C, 24 hours Non-operating: 85 % RH, 65 Deg C, 24 hours
Height	Operating: ≤ 3000 m Non-operating: ≤ 15,266 m
Electromagnetic Compatibility	2004/108/EC) Execution Standard EN 61326-1:2006 EN 61000-3-2:2006 + A2:2009, EN 61000-3-3:2008
Safety	2006/95/EC
	Execution Standard EN 61010-1:2010 / EN 61010-2-030:2010

Power Supply

Input Voltage	100 ~ 240 VAC, CAT II, Auto selection
Frequency	50/60/400 Hz
Power	50 W Max

Mechanical (T3DSO1104, T3DSO1204, T3DSO1202A, T3DSO1302A)

Dimensions	Length: 312 mm / Width: 132.6 mm / Height: 151 mm
Weight	N.W: 2.6 kg; G.W: 3.8 kg

Mechanical (T3DSO1102)

Dimensions	Length: 312 mm / Width: 134 mm / Height: 150 mm
Weight	N.W: 2.5 Kg; G.W: 3.5 Kg

All T3DSO1000 Series Oscilloscopes come with a 3 year return to Teledyne LeCroy warranty.

Probes and Accessories

Probe	Model	Picture	Description
Passive Probes (T3DSO1102, T3DSO1104, T3DSO1202A, T3DSO1204)	**T3PP300**		Passive Probe, Bandwidth: 300 MHz
Passive Probes (T3DSO1302A)	**T3PP350**		Passive Probe, Bandwidth: 350 MHz
USB AWG Module	**T3DSO1000-FGMOD**		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

Product Name	**T3DSO1102** 100 MHz Two Channels	
	T3DSO1104 100 MHz Four Channels	
	T3DSO1202A 200 MHz Two Channels	
	T3DSO1204 200 MHz Four Channels	
	T3DSO1302A 350 MHz Two Channels	
Standard Accessories	USB Cable -1	
	Quick Start -1	
	Passive Probe -4 / 2	
	Certification -1	
	Power Cord -1	
Optional Accessories	16 Channel MSO Software (Not available for T3DSO1102)	T3DSO1000-MSO or T3DSO1000A-MSO
	16 Channel Logic Analyzer Lead (Not available for T3DSO1102)	T3DSO1000-LS (Requires T3DSO1000-MSO or T3DSO1000A-MSO Software)
	AWG Software (Not available for T3DSO1102)	T3DSO1000-FG or T3DSO1000A-FG
	USB AWG Module Hardware (Not available for T3DSO1102)	T3DSO1000-FGMOD (Requires T3DSO1000-FG or T3DSO1000A-FG)
	WIFI Software (Not available for T3DSO1102) Does not include the TP-Link TL-WN725N, see below	T3DSO1000-WIFI or T3DSO1000A-WIFI

For Wi-Fi support the T3DSO1000-WIFI/T3DSO1000A-WIFI option is required and the TP-Link TL-WN725N. The TP-Link TL-WN725N is NOT supplied as part of the T3DSO1000-WIFI/T3DSO1000A-WIFI option. The TP-Link TL-WN725N is not available through Teledyne Test Tools and should be purchased separately.

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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T3 stands for Teledyne Test Tools.

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