Digital Storage Oscilloscopes

TDS1000B Series • TDS2000B Series

CHARACTERISTICS

TDS1000B and TDS2000B Series Digital Storage Oscilloscopes

	TDS1001B	TDS1002B	TDS1012B	TDS2002B	TDS2004B	TDS2012B	TDS2014B	TDS2022B	TDS2024B
Display (1/4 VGA LCD)	Mono	Mono	Mono	Color	Color	Color	Color	Color	Color
Bandwidth*2	40 MHz	60 MHz	100 MHz	60 MHz	60 MHz	100 MHz	100 MHz	200 MHz	200 MHz
Channels	2	2	2	2	4	2	4	2	4
External Trigger Input	Included on all models								
Sample Rate on each channel	500 MS/s	1.0 GS/s	1.0 GS/s	1.0 GS/s	1.0 GS/s	1.0 GS/s	1.0 GS/s	2.0 GS/s	2.0 GS/s
Record Length		2.5 K points at all time-bases on all models							
Vertical Resolution	8 bits								
Vertical Sensitivity	2 mV to 5 V/div on all models with calibrated fine adjustment								
DC Vertical Accuracy	+3% on all models								
Vertical Zoom	Vertically expand or compress a live or stopped waveform								
Maximum Input Voltage	300V _{RMS} CAT II; derated at 20 dB/decade above 100 kHz to 13V _{pk-pk} AC at 3 MHz								
Position Range	2 mV to 200 mV/div +2 V; >200 mV to 5 V/div +50 V								
Bandwidth Limit	20 MHz for all models								
Input Coupling	AC, DC, GND on all models								
Input Impedance	$1~\text{M}\Omega$ in parallel with 20pF								
Time Base Range	5 ns to 50 sec/div	5 ns to 50 sec/div	5 ns to 50 sec/div	5 ns to 50 sec/div	5 ns to 50 sec/div	5 ns to 50 sec/div	5 ns to 50 sec/div	2.5 ns to 50 sec/div	2.5 ns to 50 sec/div
Time Base Accuracy	50 ppm								
Horizontal Zoom	Horizontally expand or compress a live or stopped waveform								
I/O INTERF	RFACES								
	Included on all models: 2 USB 2.0 Ports								
USB Ports	USB host port on front panel supports USB flash drives								
	USB device port on back of instrument supports connection to PC and all PictBridge compatible printers								
GPIB	Optional								
NON-VOLATILE STORAGE									
Reference Waveform Display	(2) 2.5 K point reference waveforms								
Waveform									

Storage w/o USB Flash Drive	(2) 2.5 K point	(2) 2.5 K point	(2) 2.5 K point	(2) 2.5 K point	(4) 2.5 K point	(2) 2.5 K point	(4) 2.5 K point	(2) 2.5 K point	(4) 2.5 K point	
Waveform Storage with USB Flash Drive	96 or more reference waveforms per 8 MB									
Setups w/o USB Flash Drive	10 front panel setups									
Setups with USB Flash Drive	4000 or more front panel setups per 8 MB									
Screen Images with USB Flash Drive	128 or more screen images per 8 MB (the number of images depends on file format selected)									
Save All	12 or more Save All operations per 8 MB.									
with USB Flash Drive	A single Save All operation creates 3 to 9 files (setup, image, plus one file for each displayed waveform)									

^{*2} Bandwidth is 20 MHz at 2 mV/div, all models

Acquisition Modes

Peak Detect - High frequency and random glitch capture. Captures glitches as narrow as 12 ns (typical) using acquisition hardware at all time base settings from 5 μ s/div to 50 s/div.

Sample - Sample data only.

Average - Waveform averaged, selectable: 4, 16, 64, 128.

Single Sequence - Use the Single Sequence button to capture a single triggered acquisition sequence at a time.

Roll Mode - At acquisition time base settings of >100 ms/div.

Trigger System

Trigger Modes - Auto, Normal, Single Sequence.

Trigger Types

Edge (rising / falling) - Conventional level-driven trigger. Positive or negative slope on any channel. Coupling selections: AC, DC, Noise Reject, HF Reject, LF Reject.

 ${\bf Video}$ - Trigger on all lines or individual lines, odd/even or all fields from composite video, or broadcast standards (NTSC, PAL, SECAM).

Pulse Width (or Glitch) - Trigger on a pulse width less than, greater than, equal to, or not equal to, a selectable time limit ranging from 33 ns to $10 \, \text{s}$.

Trigger Source

2-channel models - CH1, CH2, Ext, Ext/5, AC Line.

4-channel models - CH1, CH2, CH3, CH4, Ext, Ext/5, AC Line.

Trigger View

Displays trigger signal while trigger view button is depressed.

Trigger Signal Frequency Readout

Provides a frequency readout of the trigger source.

Cursors

Types - Amplitude, Time.

Measurements - $[\Delta]T$, $1[\Delta]T$ (frequency), $[\Delta]V$.

Automatic Waveform Measurements

Period, Frequency, +Width, -Width, Rise Time, Fall Time, Max, Min, Peak-to-Peak, Mean, Cycle RMS.

Waveform Math

Operators -

Add, Subtract, Multiply, FFT.

FFT -

Windows, Hanning, Flat Top, Rectangular, 2048 sample points.

Sources -

2-channel models: CH1 - CH2, CH2 - CH1, CH1+CH2, CH1xCH2

4-channel models: CH1 - CH2, CH2 - CH1, CH3 - CH4, CH4 - CH3, CH1 + CH2, CH3 + CH4, CH1 x CH2, CH3 x CH4

Autoset Menu

Single-button, automatic setup of all channels for vertical, horizontal and trigger systems, with undo Autoset.

Signal Type	Autoset Menu Choices			
Square Wave	Single-cycle, Multi-cycle, Rising or Falling Edge			
Sine Wave	Single-cycle, Multi-cycle, FFT Spectrum			
Video (NTSC, PAL, SECAM)	Field: All, Odd or Even			
	Line: All or Selectable Line Number			

Autorange

Automatically adjust vertical and/or horizontal oscilloscope settings when probe is moved from point to point, or when the signal exhibits large changes.

Display Characteristics

Display -

Color models: ¼ VGA passive color LCD with color on black background with adjustable multi-level contrast.

Monochrome models: ¼ VGA backlit passive LDC with adjustable multi-level contrast and inverse video selectable from front panel.

Interpolation -

Sin(x)/x.

Display Types -

Dots, vectors.

Persistence -

Off, 1 s, 2 s, 5 s, infinite.

Format -

YT and XY.

Environmental and Safety

Temperature - Operating: 0 °C to +50 °C.

Non-operating: -40 °C to +71 °C.

Humidity - Operating and Non-operating: up to 80% RH at or below +40 °C. Operating and Non-operating: up to 45% RH up to +50 °C.

Altitude - Operating and Non-operating: up to 3,000 m.

Electromagnetic Compatibility - Meets Directive 89/336/EEC, amended by 93/68/EEC, meets or exceed EN55011 Class A Radiated and Conducted Emissions; FCC 47 CFR, Part 15, Subpart B, Class A; Australian EMC Framework, demonstrated per Emission Standard AS/NZS 2064; Russian GOST EMC regulations.

Safety - UL610100-1:2003, CSA22.2 No. 61010-1:2003, EN61010-1:2001, IEC61010-1:2001.

Physical Characteristics

Instrument						
Dimensions	mm	in.				
Width	326.3	12.85				
Height	158.0	6.22				
Depth	124.2	4.89				
Weight	kg	lbs.				
Instrument only	2.0	4.4				
with accessories	2.2	4.9				
Instrument Shipping						
Package Dimensions	mm	in.				
Width	476.2	18.75				
Height	266.7	10.5				
Depth	228.6	9.0				
RM2000B Rackmount	mm	in.				
Width	482.6	19.0				
Height	177.8	7.0				
Depth	108.0	4.25				