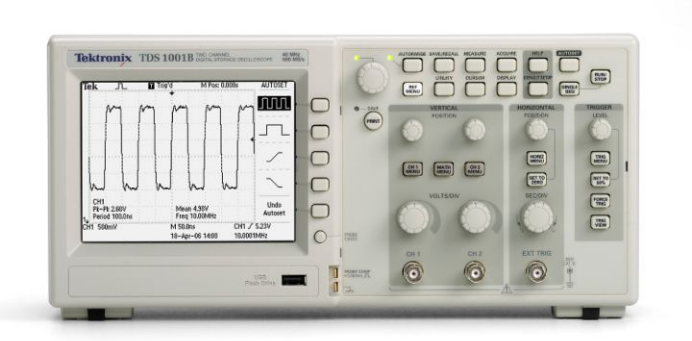
Digital Storage Oscilloscopes

TDS1000B Series Data Sheet



The TDS1000B Series digital storage oscilloscopes deliver an unbeatable combination of performance and ease of use, at a price you can afford.

Key performance specifications

- 40 MHz, 60 MHz, and 100 MHz bandwidths
- Sample rates up to 1 GS/s real time

Key features

- 2 channels
- Monochrome LCD display
- Advanced triggers including pulse width trigger and line-selectable video trigger
- FFT standard on all models
- 12 automatic measurements
- Multiple-language user interface and context-sensitive help
- Lifetime Warranty (Limitations apply. For terms and conditions, visit www.tektronix.com/lifetimewarranty)

Connectivity

- Removable data storage using the front-panel USB port
- Seamless PC connectivity through the USB device port, with OpenChoice® and NI SignalExpress® PC software
- Direct print to all PictBridge®-compatible printers through the USB device port

Applications

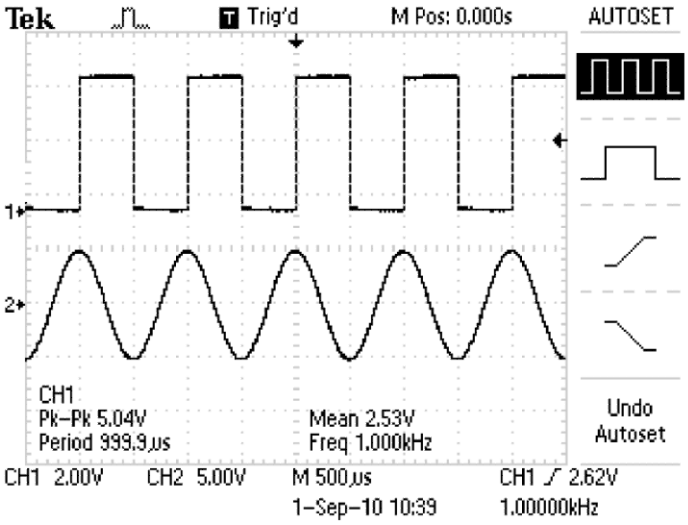
- Design and debug
- Education and training
- Manufacturing test and quality control
- Service and repair

Affordable digital precision

With up to 100 MHz bandwidth and 1 GS/s maximum sample rate, no other digital storage oscilloscope offers as much bandwidth and sample rate for the price. The TDS1000B Series oscilloscopes provide accurate real-time acquisition up to their full bandwidth, the same record length at all time base settings, advanced triggers to isolate signals of interest, and 12 standard automatic measurements on all models. Their Fast Fourier Transform (FFT) and waveform add, subtract, and multiply math functions allow you to analyze, characterize, and troubleshoot circuits.

Quick and easy waveform capture

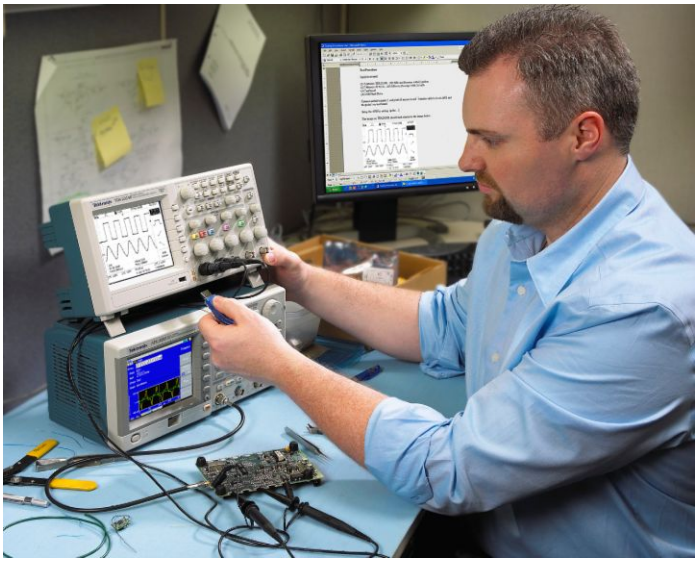
The simple user interface with classic analog-style controls makes these instruments easy to use, reducing learning time and increasing efficiency. Innovative features such as the Autoset Menu, Probe Check Wizard, and Context-sensitive Help Menu optimize instrument setup and operation.



Quickly and easily capture waveforms.

Flexible data transfer

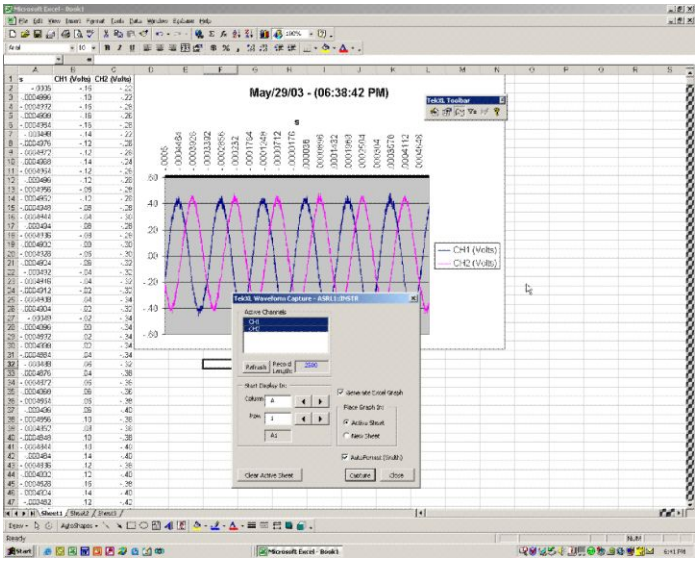
With USB host and device ports which enable removable data storage, seamless PC connectivity, and direct printing, no other digital storage oscilloscope offers as much flexibility and ease of data transfer for the price.



Conveniently use your USB flash drive to store screenshots and waveform data.

Simple documentation and analysis

Easily capture, save, and analyze measurement results with OpenChoice® PC Communications Software. Simply pull screen images and waveform data into the stand-alone desktop application or directly into Microsoft® Word and Excel. To complement OpenChoice®, National Instruments SignalExpress® Tektronix Edition Software provides you with extended capabilities, including advanced analysis, remote oscilloscope control, and live waveform analysis. Alternatively, if you prefer not to use the PC, you can simply print your image directly to any PictBridge®-compatible printer using the USB device port.



Easily capture, save, and analyze measurement results with OpenChoice® PC Communications Software.

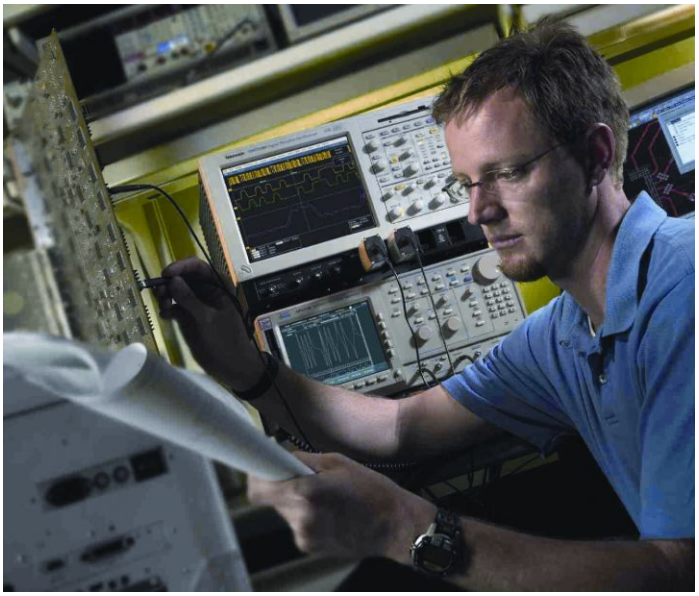
Performance you can count on

Depend on Tektronix to provide you with performance you can count on. In addition to industry-leading service and support, every TDS1000B Series oscilloscope comes backed with a Lifetime Warranty as standard.

Limitations apply. For terms and conditions, visit http://www.tektronix.com/lifetimewarranty.

Complete measurement solution

The AFG3000 Series arbitrary function generator pairs with the TDS1000B Series digital storage oscilloscopes to deliver the two elements of a complete measurement solution – stimulus and acquisition. This instrument combines the capabilities of a function generator with the power of an arbitrary waveform generator, offering the performance needed to accurately verify, validate, and characterize designs with ease and confidence at a price you can afford.



The Tektronix customer service advantage

You can trust Tektronix to offer unequaled engineering expertise and a customer-centric approach to ensure the optimal performance of your Tektronix products and maximize the lifetime value of your Tektronix investment. With service from Tektronix you get:

- Access to the source of product knowledge; unsurpassed technical expertise
- Your challenges solved by front-line technical experts, design engineering reinforcement, and online support tools
- Comprehensive and thorough support provided worldwide, including software and firmware updates, data reports, and adjustments
- Efficiency and convenience; no-hassle service from initial service call to turnaround and delivery
- Flexible repair and calibration service with access to the best on-call technical trouble shooting staff in the industry, with over 20 years of training per support engineer
- Customer-centric approach dedicated to serving your needs everyday with services designed to optimize your product performance, increase productivity and ROI by delivering a fixed cost of ownership, and efficient management of service

Specifications

Model overview

	TDS1001B	TDS1002B	TDS1012B
Analog channels	2	2	2
Bandwidth (20 MHz at 2 mV/div, all models)	40 MHz	60 MHz	100 MHz
Sample rate (each channel)	500 MS/s	1.0 GS/s	1.0 GS/s
Record length (all channels)	2.5K points at all time bases	2.5K points at all time bases	2.5K points at all time bases

Vertical system – Analog channels

Vertical resolution	8 bits
Input sensitivity range	2 mV to 5 V/div on all models with calibrated fine adjustment
DC gain accuracy	±3%, from 10 mV/div to 5 V/div
Maximum input voltage	300 V_{RMS} CAT II; derated at 20 dB/decade above 100 kHz to 13 V_{p-p} AC at 3 MHz
Offset range	2 mV to 200 mV/div: ±1.8 V >200 mV to 5 V/div: ±45 V
Bandwidth limit	20 MHz
Input coupling	AC, DC, GND
Input impedance	1 MΩ in parallel with 20 pF

Horizontal system – Analog channels

Time base range	5 ns to 50 s/div
Time base accuracy	50 ppm

Input/Output ports

USB interface	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 interface	Optional

Data storage

Nonvolatile storage

Reference waveform display	2.5K point reference waveforms
Waveform storage without USB flash drive	2.5K point
Maximum USB flash drive size	64 GB
Waveform storage with USB flash drive	96 or more reference waveforms per 8 MB
Setups without 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 with USB flash drive	12 or more Save All operations per 8 MB
	A single Save All operation creates 3 to 9 files (setup, image, plus one file for each displayed waveform)

Acquisition system

Acquisition modes

Peak Detect	High-frequency and random glitch capture. Captures glitches as narrow as 12 ns (typical) at all time base settings from 5 µs/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
Roll	At acquisition time base settings of >100 ms/div

Trigger system

External trigger input	Included on all models
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
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 s

Trigger source	Two channel models: CH1, CH2, Ext, Ext/5, AC Line
	Four channel models: CH1, CH2, CH3, CH4, Ext, Ext/5, AC Line

Waveform measurements

Cursors	
Types	Amplitude, Time
Measurements	ΔT, 1/ΔT, ΔV
Automatic measurements	Period, Frequency, +Width, –Width, Rise Time, Fall Time, Max, Min, Peak-to-Peak, Mean, RMS, Cycle RMS, Cursor RMS, Duty Cycle, Phase, and Delay

Waveform math

Arithmetic	Add, Subtract, Multiply
Math functions	FFT
FFT	Windows: Hanning, Flat Top, Rectangular 2048 sample points

Display system

Display type	¼ VGA backlit passive LCD with adjustable multilevel contrast and inverse video selectable from front panel
Autoset menu	Single-button, automatic setup of all channels for vertical, horizontal, and trigger systems, with undo Autoset
Square wave	Single Cycle, Multicycle, Rising or Falling Edge
Sine wave	Single Cycle, Multicycle, FFT Spectrum
Video (NTSC, PAL, SECAM)	Field: All, Odd, or Even Line: All or Selectable Line Number
Interpolation	Sin (x)/x
Waveform styles	Dots, vectors
Persistence	Off, 1 s, 2 s, 5 s, infinite
Format	YT and XY
Languages available	English, French, German, Italian, Japanese, Korean, Portuguese, Russian (requires Russian firmware, indicated by "RUS" suffix), Simplified Chinese, Spanish, Traditional Chinese

Environmental

Temperature	
Operating	0 to +50 ºC
Nonoperating	–40 to +71 ºC
Humidity	
Operating and nonoperating	Up to 85% RH at or below +40 ºC Up to 45% RH up to +50 ºC
Altitude	
Operating and nonoperating	Up to 3,000 m (9,843 ft.)
Regulatory	
Electromagnetic compatibility	Meets Directive 2004/108/EC, EN 61326-2-1 Class A; Australian EMC Framework
Safety	UL61010-1:2004, CSA22.2 No. 61010-1:2004, EN61010-1:2001, IEC61010-1:2001

Physical characteristics

Dimensions

	mm	in.
Height	158.0	6.22
Width	326.3	12.85
Depth	124.2	4.89

Shipping dimensions

	mm	in.
Height	266.7	10.5
Width	476.2	18.75
Depth	228.6	9.0

Weight

	kg	lb.
Instrument only	2.0	4.4
...with accessories	2.2	4.9

Ordering Information

TDS1000 models

TDS1001B	40 MHz, 2 Ch, 500 MS/s, Monochrome DSO
TDS1002B	60 MHz, 2 Ch, 1 GS/s, Monochrome DSO
TDS1012B	100 MHz, 2 Ch, 1 GS/s, Monochrome DSO

Instrument options

Power plug options

Opt. A0	North America power plug (115 V, 60 Hz)
Opt. A1	Universal Euro power plug (220 V, 50 Hz)
Opt. A2	United Kingdom power plug (240 V, 50 Hz)
Opt. A3	Australia power plug (240 V, 50 Hz)
Opt. A5	Switzerland power plug (220 V, 50 Hz)
Opt. A6	Japan power plug (100 V, 110/120 V, 60 Hz)
Opt. A10	China power plug (50 Hz)
Opt. A11	India power plug (50 Hz)
Opt. A99	No power cord

Language options

Opt. L0	English manual
Opt. L1	French manual
Opt. L2	Italian manual
Opt. L3	German manual
Opt. L4	Spanish manual
Opt. L5	Japanese manual
Opt. L6	Portuguese manual
Opt. L7	Simplified Chinese manual
Opt. L8	Traditional Chinese manual
Opt. L9	Korean manual
Opt. L10	Russian manual

Language options include translated front-panel overlay for the selected language(s).

Service options

Opt. CA1	Single Calibration or Functional Verification
Opt. D1	Calibration Data Report
TDSxxxxB-CA1 (Available after purchase)	Provides a single calibration event or coverage for the designated calibration interval, whichever comes first

Language options include translated front-panel overlay for the selected language(s). Probes and accessories are not covered by the oscilloscope warranty and Service Offerings. Refer to the datasheet of each probe and accessory model for its unique warranty and calibration terms.

Standard accessories

Probes

—	200 MHz Passive Probe (One per analog channel)

Accessories

Please specify power plug and manual language version when ordering.

—	Traceable Certificate of Calibration
—	Power Cord
—	User Manual
—	OpenChoice® Desktop Software
—	NI LabVIEW SignalExpress® Tektronix Edition LE Software

Recommended accessories

Probes

P2220	10X to 1X Switchable Passive Probe (200 MHz when 10X is selected)
P6101B	1X Passive Probe (15 MHz, 300 V_{RMS} CAT II rating)
P6015A	1000X High-voltage Passive Probe (75 MHz)
P5100	100X High-voltage Passive Probe (250 MHz)
P5200	High-voltage Active Differential Probe (25 MHz)
P6021	15 A, 60 MHz AC Current Probe
P6022	6 A, 120 MHz AC Current Probe
A621	2000 A, 5 to 50 kHz AC Current Probe
A622	100 A, 100 kHz AC/DC Current Probe/BNC
TCP303/TCPA300	150 A, 15 MHz AC/DC Current Probe/Amplifier
TCP305/TCPA300	50 A, 50 MHz AC/DC Current Probe/Amplifier
TCP312/TCPA300	30 A, 100 MHz AC/DC Current Probe/Amplifier
TCP404XL/TCPA400	500 A, 2 MHz AC/DC Current Probe/Amplifier

Accessories

TEK-USB-488	GPIB-to-USB Converter
SIGEXPTE	National Instruments SignalExpress Tektronix Edition Interactive Measurement Software – Professional Version
AC2100	Soft Carrying Case for Instrument
HCTEK4321	Hard Plastic Carrying Case for Instrument (requires AC2100)
RM2000B	Rackmount Kit
071-1075-xx	Programmer's Manual – English Only
071-1828-xx	Service Manual – English Only
174-4401-xx	USB Host-to-Device Cable, 3 ft. long

Lifetime Warranty

Covers labor and parts for defects in materials and workmanship for a minimum of 10 years, excluding probes and accessories. Lifetime is defined as 5 years after Tektronix discontinues manufacturing the product, but the warranty length shall be at least 10 years from date of original purchase. Lifetime warranty is nontransferable, proof of original purchase is required. Limitations apply. For terms and conditions visit www.tektronix.com/lifetimewarranty.

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Tektronix is registered to ISO 9001 and ISO 14001 by SRI Quality System Registrar.

Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.

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For Further Information. Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit www.tektronix.com.

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