Digital Storage Oscilloscopes

▶ **TDS1000 Series • TDS2000 Series**

TDS1000 and TDS2000 Series Oscilloscopes. Brilliantly Engineered. Irresistibly Priced.

The TDS1000 Series and TDS2000 Series digital storage oscilloscopes deliver an unbeatable combination of superior performance, unmatched ease-of-use and affordability in an ultra lightweight, portable package.

Affordable Digital Precision

With up to 200 MHz bandwidth and 2 GS/s maximum sample rate, no other color digital storage oscilloscope offers as much bandwidth and sample rate for the price. The TDS1000 and TDS2000 Series oscilloscopes provide accurate real-time acquisition up to their full bandwidth, advanced triggers to isolate signals of interest and 11 standard automatic measurements on all models. Their Fast Fourier Transform (FFT) math function allows the user to analyze, characterize, and troubleshoot circuits by viewing frequency and signal strength (standard on all models).

▶ Features & Benefits

40 MHz, 60 MHz, 100 MHz and 200 MHz Bandwidths

Sample Rates up to 2 GS/s

2 or 4 Channels

Color or Monochrome LCD Display

CompactFlash Mass Storage Option with TDS2MEM Module

Autoset Menu with Waveform Selection

Probe Check Wizard To Ensure Correct Probe Usage

Context-sensitive Help

Dual Time Base

Advanced Triggers, Including Pulse Width Trigger and Line-Selectable Video Trigger

11 Automatic Measurements

Multi-language User Interface

Waveform and Setup Memories

FFT Standard on All Models

OpenChoice® Solutions Speed Documentation and Analysis of Measurement Results
- TDS2CMAX Communication Module
- TDS2MEM Storage Memory and Communication Module
- TDSPCS1 OpenChoice PC Communication Software
- WaveStar™ Software
- Integration with Third-party Software

▶ Applications

Design and Debug

Education and Training

Manufacturing Test and Quality Control

Service and Repair

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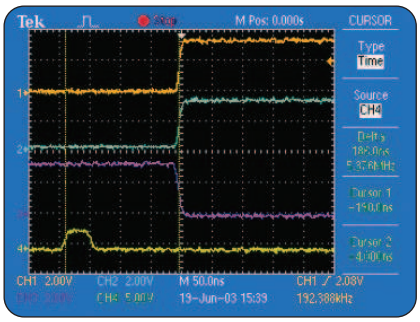
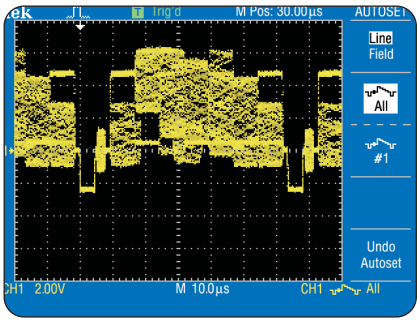
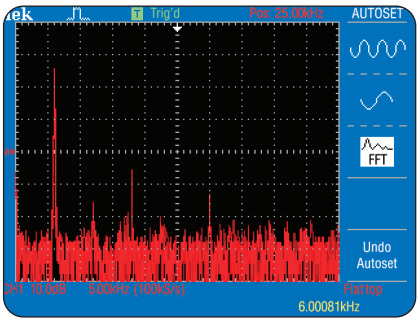
Tektronix
Enabling Innovation



► Unparalleled measurement accuracy with up to 200 MHz bandwidth and 2 GS/s maximum sample rate.



► Pulse-width and field- and line-selectable video triggers make the oscilloscope ideal for a wide range of applications.



► Precisely analyze, characterize and troubleshoot circuits – at the push of a button with the autoset menu.

Ultra-fast Setup and Use

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, context-sensitive help menu and color LCD display (TDS2000 Series) optimize instrument setup and operation.

Simple, Speedy Documentation and Analysis

OpenChoice® solutions deliver simple, seamless integration between the oscilloscope and the personal computer, providing you with multiple choices to easily document and analyze your measurement results.

Choose from optional communication modules, CompactFlash mass storage capability, OpenChoice software or integration with third-party software.

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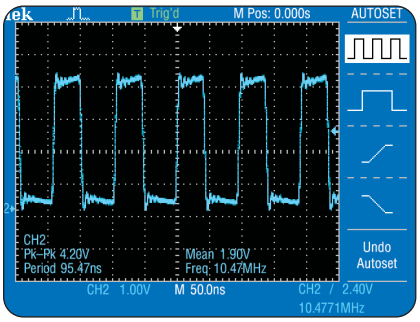
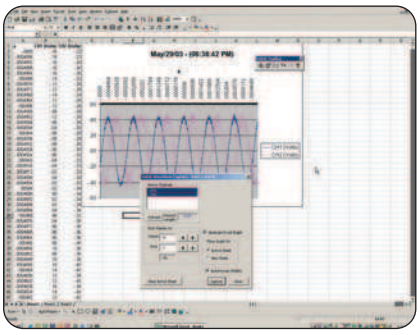


▶ Automatically detects sine waves, square waves and video signals, with readouts of relevant measurements and additional user-selectable views of the signal.



▶ Easily document and analyze measurement results using OpenChoice® software.

▶ Quickly transfer waveforms and measurement data to an external PC or between oscilloscopes.

▸ Characteristics

▸ TDS1000 and TDS2000 Series Electrical Characteristics

	TDS1001	TDS1002	TDS1012	TDS2002	TDS2004	TDS2012	TDS2014	TDS2022	TDS2024
Display (1/4 VGA LCD)	Mono	Mono	Mono	Color	Color	Color	Color	Color	Color
Bandwidth[*1]	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	Present on all models								
Sample Rate on Each Channel	1.0 GS/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 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								
Max Input Voltage	300 V_{RMS} CAT II; derated at 20 dB/decade above 100 kHz to 13 V_{pk-pk} AC at 3 MHz and above								
Position Range	2 mV to 200 mV/div ±2 V; >200 mV to 5 V/div ±50 V								
BW Limit	20 MHz for all models								
Input Coupling	AC, DC, GND on all models								
Input Impedance	1 MΩ in parallel with 20 pF								
Time Base Range	5 ns to 50 s/div	5 ns to 50 s/div	5 ns to 50 s/div	5 ns to 50 s/div	5 ns to 50 s/div	5 ns to 50 s/div	5 ns to 50 s/div	2.5 ns to 50 s/div	2.5 ns to 50 s/div
Time Base Accuracy	50 ppm								
Horizontal Zoom	Horizontally expand or compress a live or stopped waveform								

[*1] Bandwidth is 20 MHz at 2 mV/div, all models.

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Acquisition Modes
Peak Detect –
High frequency and random glitch capture. Captures glitches as narrow as 12 ns (typical) using acquisition hardware at all time/div 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 at a time.

Trigger System (Main Only)
Trigger Modes – Auto, Normal, Single Sequence.

Trigger Types
Edge (rising or 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 line, 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
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 – Voltage, Time.
Measurements –
[Δ]T, 1/[Δ]T (frequency), [Δ]V.

Measurement System
Automatic Waveform Measurements –
Period, Frequency, +Width, –Width, Rise Time, Fall Time, Max, Min, Peak-to-Peak, Mean, Cycle RMS.

Waveform Processing
Operators – Add, Subtract, FFT.
FFT –
Windows: Hanning, Flat Top, Rectangular; 2048 sample points.
Sources –
2-channel models: CH1 – CH2, CH2 – CH1, CH1 + CH2.
4-channel models: CH1 – CH2, CH2 – CH1, CH3 – CH4, CH4 – CH3, CH1 + CH2, CH3 + CH4.
Autoset Menu –
Single-button, automatic setup of all channels for vertical, horizontal and trigger systems with undo autoset.

Autoset Menu for Multiple Signal Types

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

Display Characteristics
Display –
Monochrome models: 1/4 VGA, backlit passive LCD with adjustable multi-level contrast and inverse video selectable from front panel.
Color models: 1/4 VGA, passive color LCD with color on black background with adjustable multi-level contrast.
Interpolation – Sin(x)/x.
Display Types – Dots, vectors.
Persistence – Off, 1 sec, 2 sec, 5 sec, infinite.
Format – YT and XY.

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▶ I/O Interface

I/O interface	TDS2CMAX Communications Module	TDS2MEM Storage Memory and Communication Module
Compatibility	TDS200, TDS1000, TDS2000 Series Oscilloscopes	TDS1002, TDS1012, TDS2002, TDS2012, TDS2014, TDS2022, TDS2024 Oscilloscopes[*1]
Printer Port	Centronics-type parallel	
Printer Capability (Requires Module)	**Graphics File Formats –** TIFF, PCX (PC Paint Brush), BMP (Microsoft Windows), EPS (Encapsulated Postscript) and RLE	
	Printer Formats – Bubble Jet, DPU-411, DPU-412, DPU-3445, Thinkjet, Deskjet, Laser Jet, Epson Dot (9- or 24-Pin)[*2]; Epson C60[*2]; Epson C80	
	Layout – Landscape and portrait	
RS-232 Programmability	Full talk/listen modes. Control of all modes, settings and measurements. Baud rate up to 19,200. 9-Pin DTE RS-232 Cable (012-1651-00) included	
GPIB (IEEE std. 488-1987) Programmability	Full talk/listen modes. Control of all modes, settings and measurements	Not available
Mass Storage CompactFlash Memory	Not available	• Type 1 CompactFlash memory card supplied with Module[*3]. • Accepts any Type 1 CompactFlash card, up to and including 1 GB • Built-in Clock/Calendar • Includes CompactFlash to USB Memory Card Reader for use with personal computer
OpenChoice® PC Communications Software	• TDSPCS1 OpenChoice PC Communications Software included with each module • Seamless connection from oscilloscope to PC through GPIB and RS-232 • Transfer and save settings, waveforms, measurements and screen images • Includes a Windows desktop data transfer application in addition to convenient Microsoft Word and Excel toolbar add-ins	

[*1] Not compatible with TDS1001 or TDS2004.

[*2] Requires instrument firmware version 2.12/4.12 or higher to support Epson C60/C80 printer formats.

[*3] Supplied Type 1 CompactFlash memory card storage capacity 8 MB or greater.

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▸ Nonvolatile Storage

Nonvolatile Storage	Standard		Optional TDS2MEM Storage Memory and Communication Module[*1]
Reference Waveform Display	Two 2500 point reference waveforms		Same as instrument
Waveform Storage	**2 Channel Models** Two 2500 point reference waveforms	**4 Channel Models** Four 2500 point reference waveforms	96 or more reference waveforms per 8 MB
Setups	10 front panel setups		4000 or more front panel setups per 8 MB
Screen Images	N/A		128 or more screen images per 8 MB (the number of images depends on file format selected)
Save All	N/A		12 or more Save All operations per 8 MB. A single Save All operation creates 2 to 9 files (setup, image, plus one file for each displayed waveform)

[*1] Supplied with Type 1 CompactFlash memory card, storage capacity 8 MB or greater.

Environmental and Safety

Temperature –
Operating: 0 ºC to +50 ºC.
Nonoperating: –40 ºC to +71 ºC.
Humidity –
Operating and Nonoperating: Up to 90% RH at or below +30 ºC.
Operating: Up to 60% RH up to 50 ºC.
Nonoperating: Up to 60% RH up to 55 ºC.
Altitude –
Operating and Nonoperating: Up to 3,000 m.
Electromagnetic Compatibility –
Meets Directive 89/336/EEC, amended by 93/68/EEC, meets or exceeds 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 –
UL61010-1, CSA61010-1, IEC61010-1, EN61010-1.

Physical Characteristics

INSTRUMENT		
Dimensions	**mm**	**in.**
Width	323.8	12.75
Height	151.4	5.96
Depth	124.5	4.90
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	10.50
Depth	228.6	9.00
RM2000 RACKMOUNT		
Dimensions	**mm**	**in.**
Width	482.6	19.00
Height	177.8	7.00
Depth	108.0	4.25

▸ Ordering Information

TDS1001, TDS1002, TDS1012, TDS2002, TDS2004, TDS2012, TDS2014, TDS2022, TDS2024

Standard Accessories

Probes – P2220 200 MHz 10X to 1X Switchable Passive Probes (one per channel).

Documentation – User manual.

NIM/NIST Traceable Certificate of Calibration.

Power cord.

Please specify the power plug and language options when ordering.

Recommended Accessories

TDS2CMAX – Communication Module (GPIB, RS-232, Centronics-type Printer Port) includes: TDSPCS1 OpenChoice® PC Communication Software, RS-232 cable (012-1651-00), Programmers manual.

TDS2MEM[*2] – Storage Memory and Communication Module (RS-232, Centronics-type Printer Port) includes: Type 1 CompactFlash memory card (156-9413-00), CompactFlash to USB Memory Card Reader (119-6827-00), TDSPCS1 OpenChoice PC Communication Software, RS-232 cable (012-1651-00), Programmers manual.

[*2] Not compatible with TDS1001 or TDS2004.

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CompactFlash to USB Memory Card Reader – (119-6827-00).

TDSPCS1 OpenChoice® PC Communication Software – A collection of programs that enable fast and easy transfer communication between MS Windows PCs and TDS3000B, TDS2000, TDS1000 and TDS200 Series oscilloscopes; included with TDS2CMAX and TDS2MEM communication modules.

Minimum System Requirements:

- 500 MHz Pentium equivalent or greater
- 128 MB RAM
- Microsoft Windows 98SE, XP Professional, ME or 2000
- Microsoft Office 2000 or XP (for TDS toolbars only) – Excel 2000 or 2002; Word 2000 or 2002
- Keyboard and mouse
- LAN, GPIB or serial connector

WaveStar™ Software for Oscilloscopes (WSTRO) – Windows 98/2000/ME/NT 4.0 application for waveform capture, analysis, documentation and control from your PC. Provides enhanced oscilloscope data measurement, analysis, remote-setup and charting features. Connects to a wide variety of Tektronix oscilloscopes over GPIB, RS-232 and Ethernet connections.

AD007 – LAN/WAN GPIB converter.

AC2100 – Soft case for carrying instrument.

HCTEK321 – Hard plastic case for carrying instrument (requires AC2100).

RM2000 – Rackmount kit.

Service Manual (TDS1000 and TDS2000 Series Digital Storage Oscilloscopes) – English only (071-1076-xx).

Programmer Manual (TDS200, TDS1000 and TDS2000 Series Digital Storage Oscilloscopes) – English only (071-1075-xx).

Operator Training Kit – Extensive instructions and step-by-step lab exercises provide education about the operation of the TDS1000 and TDS2000 Series oscilloscopes. Kit includes a self-paced CD-ROM-based manual and signal source board (TNGTDS01). Optional hard copy manual is available for order separately.

Recommended Probes

P2220 – 200 MHz, 10X to 1X switchable passive probe (200 MHz when 10X is selected).

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 – 60 MHz AC current probe.

P6022 – 120 MHz AC current probe.

A621 – 2000 A AC current probe/BNC.

A622 – 100 A AC/DC current probe/BNC.

AM503S – AC/DC current probe system.

Power Plug Options

Opt. A0 – North America power.

Opt. A1 – Universal EURO power.

Opt. A2 – United Kingdom power.

Opt. A3 – Australia power.

Opt. A5 – Switzerland power.

Opt. A99 – No power cord or AC adapter.

Opt. AC – China power.

Accessory Cables

GPIB, 1 m (3.3 ft.) – Order 012-0991-01.

GPIB, 2 m (6.6 ft.) – Order 012-0991-00.

RS-232, 9-Pin female to 25-Pin male, 4.6 m (15 ft.), for Modems – Order 012-1241-00.

RS-232, 9-Pin female to 9-Pin female, null modem, for computers – Order 012-1651-00.

RS-232, 9-Pin female to 25-Pin female, null modem, for computers – Order 012-1380-00.

RS-232, 9-Pin female to 25-Pin male, null modem, for printers – Order 012-1298-00.

Centronics, 25-Pin male to 36-Pin Centronics, 2.4 m (8 ft.), for Parallel Printer Interfaces – Order 012-1214-00.

International User Manual (TDS1000 and TDS2000 Series Digital Storage Oscilloscopes, includes TDS2CMAX[*1] user information)

Opt. L0 – English (071-1064-xx).

Opt. L1 – French (071-1065-xx).

Opt. L2 – Italian (071-1066-xx).

Opt. L3 – German (071-1067-xx).

Opt. L4 – Spanish (071-1068-xx).

Opt. L5 – Japanese (071-1069-xx).

Opt. L6 – Portuguese (071-1070-xx).

Opt. L7 – Simplified Chinese (071-1071-xx).

Opt. L8 – Traditional Chinese (071-1072-xx).

Opt. L9 – Korean (071-1073-xx).

Opt. LR – Russian (071-1074-xx).

Translated front panel overlays included with their respective user manuals.

Warranty Information

Three-year warranty covering all labor and parts, excluding probes and accessories.

[*1] The user information for the TDS2CMA communication module that appears in this manual also applies to the TDS2CMAX communication module.

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