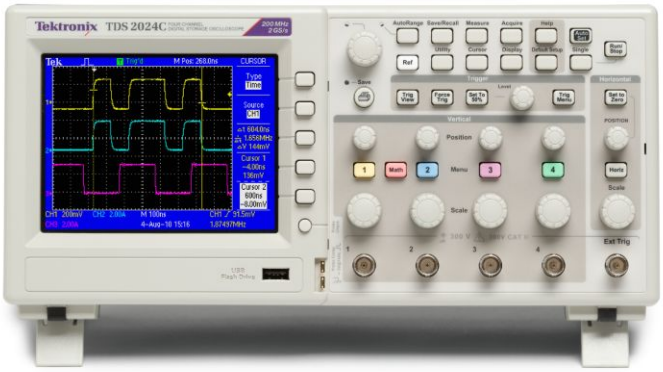
# Digital Storage Oscilloscopes

## TDS2000C Series Datasheet




The TDS2000C Digital Storage Oscilloscope Series provides you with affordable performance in a compact design. Packed with standard features - including USB connectivity, 16 automated measurements, limit testing, data logging, and context-sensitive help - the TDS2000C Series oscilloscopes help you get more done in less time.

### Key performance specifications

- 200 MHz, 100 MHz, 70 MHz, 50 MHz bandwidth models
- 2- and 4-channel models
- Up to 2 GS/s sample rate on all channels
- 2.5k point record length on all channels
- Advanced triggers including pulse width trigger and line-selectable video trigger

### Key features

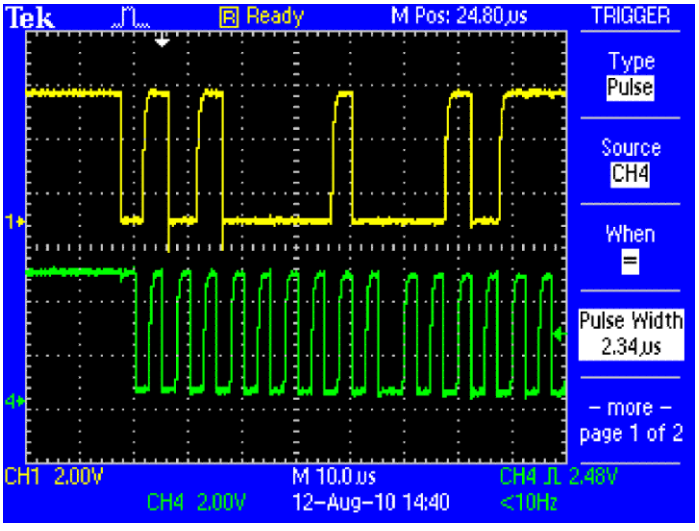
- 16 automated measurements and FFT analysis for simplified waveform analysis
- Built-in waveform limit testing
- Automated, extended data logging feature
- Autoset and signal auto-ranging
- Built-in context-sensitive help
- Probe check wizard
- 11-language user interface
- 144 mm (5.7 inch) active TFT color display
- Small footprint and lightweight - only 124 mm (4.9 inches) deep and 2 kg (4.4 lb)
- USB 2.0 host port on the front panel for quick and easy data storage
- USB 2.0 device port on the rear panel for easy connection to a PC or for direct printing to a PictBridge® -compatible printer
- Includes National Instrument's LabVIEW SignalExpress™ TE Limited Edition and Tektronix OpenChoice® Software for connecting to your bench
- Lifetime warranty. Limitations apply. For terms and conditions, visit www.tektronix.com/lifetimewarranty

### Digital precision for accurate measurements

With up to 200 MHz bandwidth and 2 GS/s maximum sample rate, no other digital storage oscilloscope offers as much bandwidth and sample rate for the price. Tektronix proprietary sampling technology provides real-time sampling with a minimum of 10X oversampling on all channels, all the time to accurately capture your signals. Sampling performance is not reduced when using multiple channels.

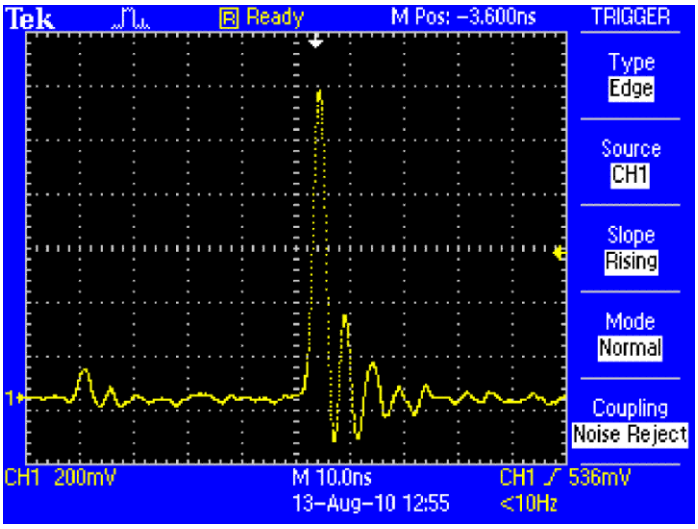
### Critical tools for troubleshooting your device

Advanced triggers - rising/falling edge, pulse width, and video - help you quickly isolate your signals of interest. Once you've captured a signal, advanced math capabilities and automated measurements can speed your analysis. Quickly perform an FFT or add, subtract, or multiply waveforms. Sixteen automated measurements quickly and reliably calculate important signal characteristics such as frequency or rise time, while the built-in Limit Test function enables you to easily identify problems in your signal.

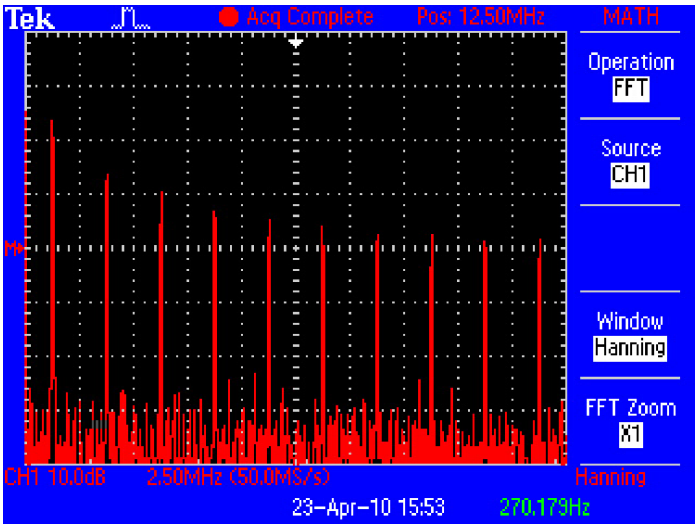



Quickly and easily capture waveforms with advanced triggering.

Tektronix®




See all the details other oscilloscopes might miss with Tektronix proprietary digital real-time sampling.




Quickly perform an FFT with the advanced math functions.

## Designed to make your work easy

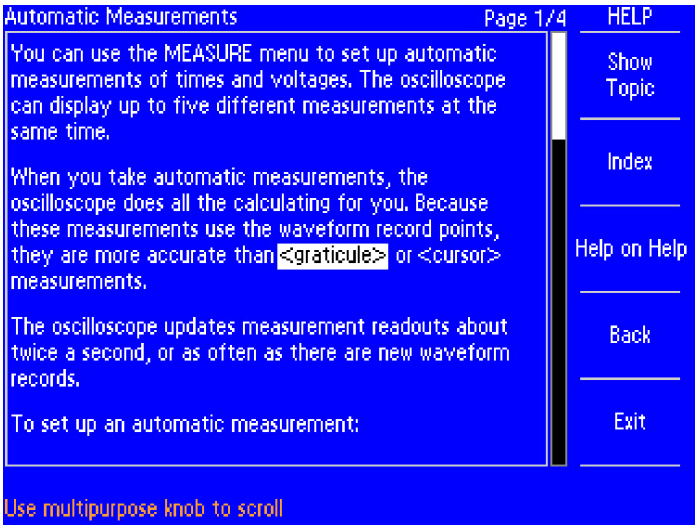
The TDS2000C Series oscilloscopes are designed with the ease of use and familiar operation you have come to expect from Tektronix.

### Intuitive operation

The intuitive user interface with dedicated per-channel vertical controls, auto-setup, and auto-ranging makes these instruments easy to use, reducing learning time and increasing efficiency.

### Help when you need it

The built-in Help menu provides you with important information on your oscilloscope's features and functions. Help is provided in the same languages as the user interface.



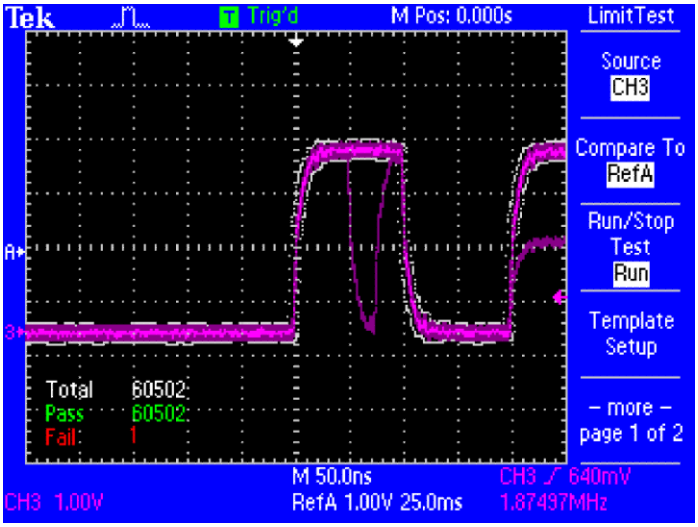

The context-sensitive Help system provides important information specific to the task you are working on.

### Probe check wizard

Check out your probe compensation before making measurements with just one button that starts a fast, easy procedure.

### Limit test

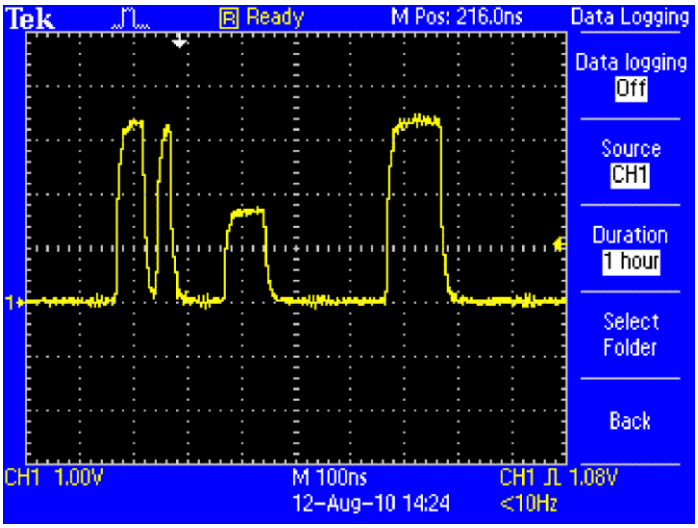
The oscilloscope can automatically monitor source signals and output Pass or Fail results by judging whether the input waveform is within predefined boundaries. Specific actions can be triggered on violation including stopping waveform acquisition, stopping Limit Test functions, saving the failed waveform data or screen image to a USB memory device, or any combination of the above. This is an ideal solution for manufacturing or service applications where you need to make decisions quickly.




Limit Test provides a quick Pass/Fail comparison of any triggered input signal to a user-defined template.

### Flexible data transfer

The USB host port on the front panel enables you to save your instrument settings, screenshots, and waveform data in a flash. The built-in Data Logging feature means you can set up your oscilloscope to save user-specified triggered waveforms to a USB memory device for up to 24 hours. You can also select the "infinite" option for continuous waveform monitoring. With this mode you can save your triggered waveforms to an external USB memory device without a duration limitation until the memory device is full. The oscilloscope will then guide you to insert another USB memory device to continue saving waveforms.




Data Logging enables automatic saving of triggered waveforms.

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

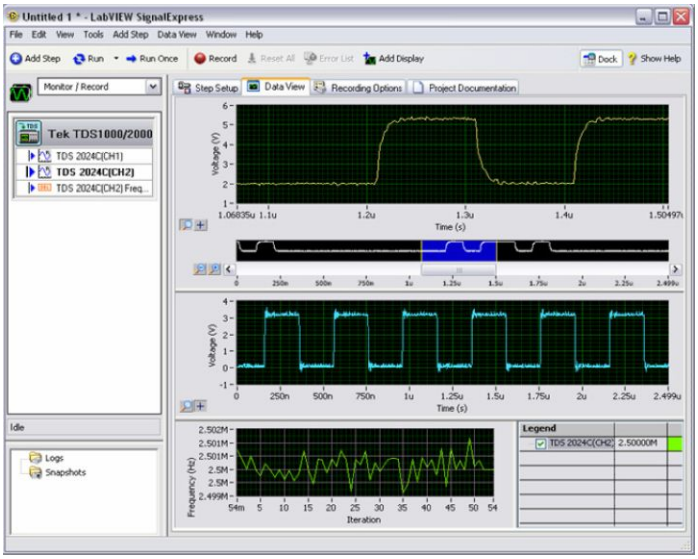
### Easy PC connectivity

Easily capture, save, and analyze measurement results by connecting to your PC with the rear-panel USB device port and the included copy of OpenChoice PC Communications Software. Simply pull screen images and waveform data into the stand-alone desktop application or directly into Microsoft Word and Excel. Alternatively, if you prefer not to use your PC, you can simply print your image directly to any PictBridge-compatible printer.

## Connect to your bench for intelligent debug

Every TDS2000C Series oscilloscope ships with an included copy of the Limited Tektronix Edition of National Instrument's LabView SignalExpress for basic instrument control, data logging, and analysis.

SignalExpress supports the range of Tektronix bench instruments (For a complete listing of Tektronix instruments supported by NI LabView Signal Express, visit: www.tektronix.com/signalexpress) enabling you to connect your entire test bench. You can then access the feature-rich tools packed into each instrument from one intuitive software interface. This allows you to automate complex measurements requiring multiple instruments, log data for an extended period of time, time-correlate data from multiple instruments, and easily capture and analyze your results, all from your PC. Only Tektronix offers a connected test bench of intelligent instruments to simplify and speed debug of your complex design.




Easily capture, save, and analyze measurement results with the included National Instrument's LabVIEW SIgnalExpress, Limited Tektronix Edition software.

## Performance you can count on

In addition to industry-leading service and support, every TDS2000C Series oscilloscope comes backed with a Lifetime Warranty as standard.

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

# Specifications

All specifications apply to all models unless noted otherwise.

## Overview

| | TDS2001C | TDS2002C | TDS2004C | TDS2012C | TDS2014C | TDS2022C | TDS2024C |
|---|---|---|---|---|---|---|---|
| Display (QVGA LCD) | TFT on all models | | | | | | |
| Bandwidth | 50 MHz | 70 MHz | 70 MHz | 100 MHz | 100 MHz | 200 MHz | 200 MHz |
| Channels | 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 | 2.0 GS//s | 2.0 GS/s | 2.0 GS/s | 2.0 GS/s |

## Vertical system

**Record length** 2.5k 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** 300 $V_{RMS}$ CAT II; derated at 20 dB/decade above 100 kHz to 13 $V_{p\text{-}p}$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 impedance** 1 MΩ in parallel with 20 pF

**Input coupling** AC, DC, GND on all models

## Horizontal system

**Time base accuracy** 50 ppm

**Horizontal zoom** Horizontally expand or compress a live or stopped waveform

## 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
- **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**

- **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 the trigger signal while the Trigger View button is depressed

**Trigger signal frequency readout** Provides a frequency readout of the trigger source

## 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 mode** | At acquisition time base settings of >100 ms/div |

## Waveform measurements

| | |
|---|---|
| **Automatic waveform measurements** | Period, Frequency, +Width, -Width, Rise Time, Fall Time, Max, Min, Peak-to-Peak, Mean, RMS, Cycle RMS, Cursor RMS, Duty Cycle, Phase, Delay |
| **Cursors** | |
| **Types** | Amplitude and time |
| **Measurements** | ΔT, 1/ΔT (frequency), ΔV |

## Waveform math

| | |
|---|---|
| **Operators** | Add, Subtract, Multiply, FFT |
| **Sources** | |
| **2-channel models** | CH1 - CH2, CH2 - CH1, CH1 + CH2, CH1 x CH2 |
| **4-channel models** | CH1 - CH2, CH2 - CH1, CH3 - CH4, CH4 - CH3, CH1 + CH2, CH3 + CH4, CH1 x CH2, CH3 x CH4 |
| **FFT** | Windows: Hanning, Flat Top, Rectangular |
| | 2,048 sample points |
| **Autoset menu** | Single-button, automatic setup of all channels for vertical, horizontal, and trigger systems, with undo Autoset. |
| | Autoset-menu signal-type choices are: |
| **Square wave** | Single Cycle, Multicycle, Rising or Falling Edge |
| **Sine Wave** | Single Cycle, Multicycle, FFT Spectrum |
| **Video (NTSC, PAL, SECAM)** | Field: Alt, Odd, or Even |
| | Line: Alt or Selectable Line Number |
| **Autorange** | Automatically adjust vertical and/or horizontal oscilloscope settings when a probe is moved from point to point, or when a signal exhibits large changes |

## Display characteristics

| | |
|---|---|
| **Display** | QVGA Active Color TFT |
| **Interpolation** | Sin(x)/x |
| **Display types** | Dots, vectors |
| **Persistence** | Off, 1 s, 2 s, 5 s, infinite |
| **Format** | YT and XY |

## Input-output interfaces

| | |
|---|---|
| **USB Ports** | The USB host port on the front panel supports USB flash drives |
| | The USB device port on the back of the instrument supports connection to a PC and to all PictBridge-compatible printers |
| **GPIB** | Optional |

## Nonvolatile storage

| | |
|---|---|
| **Reference waveform display** | Two 2.5k point reference waveforms |
| **Waveform storage without USB flash drive** | TDS2001C, TDS2002C, TDS2012C, TDS2022C: Two 2.5k point waveforms |
| | TDS2004C, TDS2014C, TDS2024C: Four 2.5k point waveforms |
| **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** | 4,000 or more front-panel setups per 8 MB |
| **Screen images with USB flash drive** | 128 or more screen images per 8 MB. |
| | The actual number of images depends on the 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) |

## Power source

| | |
|---|---|
| **Power source** | |
| **Source voltage** | Full range: 100 to 240 $V_{AC}$ RMS ±10%, Installation Category II (covers range of 90 to 264 $V_{AC}$) |
| **Power consumption** | Power consumption: Less than 30 W at 85 to 275 $V_{AC}$ input |

## Physical characteristics

| | |
|---|---|
| **Instrument dimensions** | |
| **Height** | 158.0 mm (6.2 inches) |
| **Width** | 326.3 mm (12.8 inches) |
| **Depth** | 124.2 mm (4.9 inches) |
| **Instrument weight** | |
| **Instrument only** | 2.0 kg (4.4 lb) |
| **Instrument with accessories** | 2.2 kg (4.9 lb) |
| **Shipping package dimensions** | |
| **Height** | 266.7 mm (10.5 inches) |
| **Width** | 476.2 mm (18.7 inches) |
| **Depth** | 228.6 mm (9.0 inches) |
| **RM2000B rackmount dimensions** | |
| **Height** | 482.6 mm (19.0 inches) |
| **Width** | 177.8 mm (7.0 inches) |
| **Depth** | 108.0 mm (4.3 inches) |

## EMC, environment and safety

| | |
|---|---|
| **Temperature** | |
| **Operating** | 0 to +50 °C |
| **Non-operating** | -40 to +71 °C |
| **Humidity** | |
| **Operating** | Up to 80% RH at or below +40 °C<br>Up to 45% RH up to +50 °C |
| **Non-operating** | Up to 80% RH at or below +40 °C<br>Up to 45% RH up to +50 °C |
| **Altitude** | |
| **Operating** | Up to 3,000 m |
| **Non-operating** | Up to 3,000 m |
| **Electromagnetic compatibility** | Meets Directive 2004/108/EC, EN 61326-2-1 Class A; Australian EMC Framework |
| **Safety** | UL61010-2004, CSA22.2 No. 61010-1:2004, EN61010-1:2001, IEC61010-1:2001, EU Low Voltage Directive 2006/95/EC |

# Ordering information

## Models

| | |
|---|---|
| **TDS2001C** | 50 MHz, 2 Ch, 500 MS/s, TFT DSO |
| **TDS2002C** | 70 MHz, 2 Ch, 1 GS/s, TFT DSO |
| **TDS2004C** | 70 MHz, 4 Ch, 1 GS/s, TFT DSO |
| **TDS2012C** | 100 MHz, 2 Ch, 2 GS/s, TFT DSO |
| **TDS2014C** | 100 MHz, 4 Ch, 2 GS/s TFT DSO |
| **TDS2022C** | 200 MHz, 2 Ch, 2Gs/s, TFT DSO |
| **TDS2024C** | 200 MHz, 4 Ch, 2 GS/s, TFT DSO |

## Instrument options

### Language options

| | |
|---|---|
| **Opt. L0** | English (front-panel label on instrument) |
| **Opt. L1** | French (front-panel overlay) |
| **Opt. L2** | Italian (front-panel overlay) |
| **Opt. L3** | German (front-panel overlay) |
| **Opt. L4** | Spanish (front-panel overlay) |
| **Opt. L5** | Japanese (front-panel overlay) |
| **Opt. L6** | Portuguese (front-panel overlay) |
| **Opt. L7** | Simplified Chinese (front-panel overlay) |
| **Opt. L8** | Traditional Chinese (front-panel overlay) |
| **Opt. L9** | Korean (front-panel overlay) |
| **Opt. L10** | Russian (front-panel overlay) |

User manual (PDF) in 11 languages are available on the documentation CD and for download from www.tektronix.com/manuals. There are no printed user manuals.

### 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. A4** | North America 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. A12** | Brazil power plug (60 Hz) |
| **Opt. A99** | No power cord |

### Service options

| | |
|---|---|
| **Opt. D1** | Calibration Data Report |

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

| | |
|---|---|
| **TPP0101** | 100 MHz passive probe for TDS2001C, TDS2002C, and TDS2004C (one per channel) |
| **TPP0201** | 200 MHz passive probe for TDS2012C, TDS2014C, TDS2022C, and TDS2024C (one per channel) |

### Accessories

| | |
|---|---|
| **Power cord** | Please specify plug option |
| **NIM/NIST** | Traceable Certificate of Calibration |
| **Documentation** | TDS2000C and TDS1000C-EDU Compliance and Safety Instructions<br>TDS2000C and TDS1000C-EDU Documentation CD |
| **OpenChoice PC Communications Software** | Enables fast and easy communication between a Windows PC and the TDS2000C Series using USB. Transfer and save settings, waveforms, measurements, and screen images |
| **National Instruments SignalExpress Tektronix Edition Interactive Measurement Software - base version** | A fully interactive measurement software environment optimized for the TDS2000C Series. Enables you to instantly acquire, generate, analyze, compare, import, and save measurement data and signals using an intuitive drag-and-drop user interface that does not require any programming. Standard TDS2000C Series support for acquiring, controlling, viewing, and exporting your live signal. A 30-day trial period of the Professional Version provides additional signal processing, advance analysis, mixed signal, sweeping, limit testing, and user-defined step capabilities. Order SIGEXPTE for permanent Professional Version capability. |
| **Limited Lifetime Warranty** | Covers labor and parts for defects in materials and workmanship for a minimum of 10 years, excluding probes and accessories.<br>Lifetime is defined as 5 years after Tektronix discontinues manufacturing the product, but the warranty length shall be at least ten years from date of original purchase. Lifetime warranty is nontransferrable. Proof of original purchase is required. Limitations apply. For terms and conditions visit www.tektronix.com/lifetimewarranty.<br>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. |

# Recommended accessories

## Probes

| | |
|---|---|
| **TPP0101** | 10X passive probe, 100 MHz bandwidth |
| **TPP0201** | 10X passive probe, 200 MHz bandwidth |
| **P2220** | 1X/10X passive probe, 200 MHz bandwidth |
| **P6101B** | 1X passive probe (15 MHz, 300 $V_{RMS}$ CAT II rating) |
| **P6015A** | 1000X high-voltage passive probe (75 MHz) |
| **P5100A** | 100X high-voltage passive probe (500 MHz) |
| **P5200** | High-voltage active differential probe (25 MHz) |
| **P6021** | 15 A, 60 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 Internative Measurement Software - Professional Version |
| **AC2100** | Soft carrying case for instrument |
| **HCTEK4321** | Hard plastic carrying case for instrument |
| **RM2000B** | Rackmount kit |
| **077-0444-xx** | Programmer manual, English only, PDF only, downloadable from www.tektronix.com/manuals |
| **077-0446-xx** | Service manual, English only, PDF only, downloadable from www.tektronix.com/manuals |
| **174-4401-xx** | USB host to device cable, 3 feet long |

CE

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

GPIB IEEE-488

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

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**Norway** 800 16098
**Portugal** 80 08 12370
**South Africa** +41 52 675 3777
**Switzerland** 00800 2255 4835*
**USA** 1 800 833 9200

* European toll-free number. If not accessible, call: +41 52 675 3777

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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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12 Apr 2013

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- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
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- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
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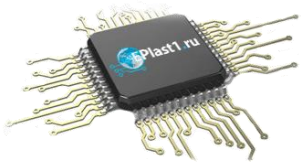
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.




**Как с нами связаться**

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