Digital Phosphor Oscilloscopes

TDS3000B Series

The TDS3000B Series of Digital Phosphor Oscilloscopes Provides Unmatched Performance and Portability at an Affordable Price

The TDS3000B Series packs the power of a DPO, digital real-time (DRT) sampling technology, WaveAlert waveform anomaly detection, OpenChoice documentation and analysis solutions and five application-specific modules into a lightweight, battery-capable design.

A DPO Provides a Greater Level of Insight into Complex Signals

The TDS3000B Series DPO delivers 3,600 wfms/s continuous waveform capture rate to capture glitches and infrequent events three times faster than comparable oscilloscopes. Some oscilloscope vendors claim high waveform capture rates for short bursts of time, but your oscilloscope needs to deliver these fast waveform capture rates on a continuous basis – saving minutes, hours or even days by quickly revealing the nature of faults so advanced triggers can be applied to isolate them. In addition, the TDS3000B DPO’s real-time intensity grading highlights the details about the “history” of a signal’s activity, making it easier to understand the characteristics of the waveforms you’ve captured.

Features & Benefits

- 100 to 500 MHz Bandwidths
- 5 GS/s Maximum Real-time Sample Rate, with sin(x)/x Interpolation
- 3,600 wfms/s Continuous Waveform Capture Rate
- 2 or 4 Channels
- Full VGA Color LCD
- 25 Automatic Measurements
- FFT Standard
- Multi-language User Interface
- QuickMenu Graphical User Interface for Easy Operation
- WaveAlert® Automatic Waveform Anomaly Detection
- OpenChoice® Solutions
  - Simplify Instrument Control, Documentation and Analysis
    - e*Scope® Web-based Remote Control
    - Built-in Ethernet Port
    - GPIB, RS232, VGA
    - TDSPCS1 OpenChoice Software
    - WaveStar® Software
    - Integration with Third-party Software
- Application Modules for Specialized Analysis
  - Advanced Analysis Module
  - Limit Testing Module
  - Telecommunications Mask Testing Module
  - Extended Video Module
  - 601 Serial Digital Video Module
- Optional Internal Battery Operation Up to 3 Hours Without Line Power
- Plug-in Printer for Portable Documentation of Results
- TekProbe® Interface Supports Active, Differential and Current Probes for Automatic Scaling and Units

Applications

- Digital Design and Debug
- Video Installation and Service
- Power Supply Design
- Education and Training
- Telecommunications
- Mask Testing
- Manufacturing Test
- General Bench Test
Higher Speeds Demand Greater Bandwidth
You face faster clock rates and edge speeds, increasingly complex signals and mounting time-to-market pressures. The higher the bandwidth of your oscilloscope, the more accurate the reproduction of your signal. The TDS3000B Series offers a wide range of bandwidths from 100 MHz to 500 MHz to best suit the needs of your most demanding projects, so that you can complete your tasks on time and with confidence.

Quickly Debug and Characterize Signals with DRT Sampling Technology and \(\sin(x)/x\) Interpolation
The TDS3000B Series combines unique digital real-time (DRT) sampling technology with \(\sin(x)/x\) interpolation to allow you to accurately characterize a wide range of signal types on all channels simultaneously. This sampling technology makes it possible to capture high-frequency information, such as glitches and edge anomalies, that eludes other oscilloscopes in its class, while \(\sin(x)/x\) interpolation ensures precise reconstruction of each waveform. The result – a complete view of your signal to speed debug and characterization.

Enhanced Troubleshooting Ability
WaveAlert® waveform anomaly detection speeds your troubleshooting tasks by helping you find those elusive problems faster. WaveAlert detection monitors the incoming signals on all channels and will detect and highlight any waveform that deviates from the normal waveform being acquired. Because the TDS3000B oscilloscope can stop acquisition, sound a beep, make a hard copy or save the waveform when it detects an anomaly, you can run tests over long time periods – even unattended – to find those challenging, very infrequent failures.
Simple, Speedy Documentation and Analysis

OpenChoice® solutions deliver simple, seamless integration between the oscilloscope and the PC. Using a standard built-in Ethernet port, e*Scope web-based remote control allows you to control your TDS3000B oscilloscope from anywhere, using the Internet and your PC. With the TDS3GV optional communication module, floppy disk, TDSPCS1 OpenChoice software and integration with third-party software, the TDS3000B Series provides you with multiple choices to easily capture, transfer, document and analyze your measurement results. This seamless integration extends the power and value of these brilliantly engineered, affordable oscilloscopes.

Flexible Features for Every Application

Optional application modules enable you to transform your oscilloscope into a specialized tool for limit testing, telecommunications mask testing, and video troubleshooting.

And, with its lightweight, compact size and battery pack, the TDS3000B Series oscilloscope can go wherever it is needed. It weighs only 4.5 kg (9.8 lbs.), with battery installed. Use the optional plug-in thermal printer to instantly document your work, even in the field.

TDS3AAM Advanced Analysis Module – Adds extended math capability, arbitrary math expressions, measurement statistics and additional automated measurements.

TDS3LM Limit Testing Module – Offers fast, accurate Go/No-Go verification that tested circuits are operating within intended parameters.

TDS3TMT Telecommunications Mask Testing Module – Pass/Fail compliance of ITU-T G.703 and ANSI T1.102 standards, custom mask testing and more.

TDS3VID Extended Video Editing Module – Adds Video QuickMenu, autorset, holdoff, line count trigger, video picture mode, vectorscope mode,*1 HDTV format triggering graticules and more.

TDS3SDI 601 Serial/Digital Video Module – Identify and analyze ITU-R BT.601 video signals, video picture mode with bright line select, vectorscope mode,*1 HDTV format triggering and more.

*1 Vectorscope does not support composite video.

Look for unintentional circuit noise with the TDS3000B Series’ FFT capability.

The TDS3000B DPO with the TDS3LIM limit testing module is ideal for manufacturing test applications where fast Go/No-Go decisions are required.
Digital Phosphor Oscilloscopes  
> TDS3000B Series

> Characteristics

> TDS3000B Series Electrical Characteristics

<table>
<thead>
<tr>
<th></th>
<th>TDS3012B</th>
<th>TDS3014B</th>
<th>TDS3024B</th>
<th>TDS3032B</th>
<th>TDS3034B</th>
<th>TDS3044B</th>
<th>TDS3052B</th>
<th>TDS3054B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandwidth</td>
<td>100 MHz</td>
<td>100 MHz</td>
<td>200 MHz</td>
<td>300 MHz</td>
<td>300 MHz</td>
<td>400 MHz</td>
<td>500 MHz</td>
<td>500 MHz</td>
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<tr>
<td>Channels</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
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<tr>
<td>Sample rate on Each Channel</td>
<td>1.25 GS/s</td>
<td>1.25 GS/s</td>
<td>2.5 GS/s</td>
<td>2.5 GS/s</td>
<td>2.5 GS/s</td>
<td>5 GS/s</td>
<td>5 GS/s</td>
<td>5 GS/s</td>
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<tr>
<td>Maximum Record Length</td>
<td>10 K points on all models</td>
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<tr>
<td>Vertical Resolution</td>
<td>9-Bits on all models</td>
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<tr>
<td>Vertical Sensitivity (V/div)</td>
<td>1 mV to 10 V on all models</td>
<td></td>
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<tr>
<td>Vertical Accuracy</td>
<td>±2% on all models</td>
<td></td>
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<tr>
<td>Max Input Voltage (1 MΩ)</td>
<td>150 Vrms CAT I on all models (300 V CAT II with standard 10X probe)</td>
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<tr>
<td>Position Range</td>
<td>± 5 div on all models</td>
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<tr>
<td>BW Limit</td>
<td>20 MHz</td>
<td>20 MHz</td>
<td>20, 150 MHz</td>
<td>20, 150 MHz</td>
<td>20, 150 MHz</td>
<td>20, 150 MHz</td>
<td>20, 150 MHz</td>
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<tr>
<td>Input Impedance</td>
<td>AC, DC, GND on all models</td>
<td></td>
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<tr>
<td>Input Impedance Selections</td>
<td>1 MΩ in parallel with 13 pF or 50 Ω on all models</td>
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<tr>
<td>Time Base Range</td>
<td>4 ns to 10 s/div</td>
<td>4 ns to 10 s/div</td>
<td>2 ns to 10 s/div</td>
<td>2 ns to 10 s/div</td>
<td>2 ns to 10 s/div</td>
<td>1 ns to 10 s/div</td>
<td>1 ns to 10 s/div</td>
<td>1 ns to 10 s/div</td>
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<tr>
<td>Time Base Accuracy</td>
<td>20 ppm on all models</td>
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<tr>
<td>Display (VGA)</td>
<td>Color active matrix LCD on all models</td>
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</table>
Acquisition Modes

DPO – Captures and displays complex waveforms, random events and subtle patterns in actual signal behavior. DPOs are able to provide 3 dimensions of signal information in real time: Amplitude, time and the distribution of amplitude over time.

Peak Detect – High frequency and random glitch capture. Captures glitches as narrow as 1 ns.

WaveAlert® – Monitors the incoming signals on all channels and alerts the user to any waveform that deviates from the normal waveform being acquired.

Sample – Sample data only.

Envelope – Max/Min values acquired over one or more acquisitions.

Average – Waveform data from 2 to 512 (selectable) acquisitions is averaged.

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

Trigger System

Main Trigger Modes – Auto (supports Roll Mode for 40 ms/div and slower), Normal.

B Trigger – Trigger after time or events. Trigger After Time Range – 13.2 ns to 50 s. Trigger After Events Range – 1 to 9,999,999 events.

External Trigger Input – >1 MΩ in parallel with 17 pF; Max input voltage is 150 VRMS.

Trigger Types

Edge – Conventional level-driven trigger. Positive or negative slope on any channel. Coupling selections: DC, noise reject, HF reject, LF reject.

Video – Trigger on all lines, odd, even or all fields. With TDS3VID or TDS3SDI, trigger on individual lines and on analog HDTV formats (1080i, 1080p, 720p, 480p).

Logic –

PATTERN: Specifies AND, OR, NAND, NOR when true or false for a specific time.

STATE: Any logic state. Triggerable on rising or falling edge of a clock. Logic triggers can be used on combinations of 2 inputs (not 4).

Pulse –

WIDTH (or GLITCH): Trigger on pulse width less than, greater than, equal to or not equal to a selectable time limit ranging from 39.6 ns to 50 s.

RUNT: Trigger on a pulse that crosses one threshold but fails to cross a second threshold before crossing the first again.

SLEW RATE: Trigger on pulse edge rates that are either faster or slower than a set rate. Edges can be rising, falling or either.

Comm (requires TDS3TMT) – Provides isolated pulse triggering required to perform DS1/DS3 telecommunications mask testing per ANSI T1.102 standard.

Alternate – Sequentially uses each active channel as a trigger source.

Measurement System

Automatic Waveform Measurements – Period, Frequency, +Width, –Width, Rise Time, Fall Time, +Duty Cycle, –Duty Cycle, +Overshoot, –Overshoot, High, Low, Max, Min, Peak-to-Peak, Amplitude, Mean, Cycle Mean, RMS, Cycle RMS, Burst Width, Delay, Phase, Area,*1 Cycle Area.*1 Display any four measurements from any combination of waveforms. Or display all measurements with measurement snapshot feature. Measurement statistics.*1

Thresholds – Settable in percentage or voltage. Gating – Measurements can be gated using the screen or vertical cursors.

*1 Requires TDS3AAM module.
Waveform Processing
Deskew – Channel-to-channel deskew ±10 ns may be manually entered for better timing measurements and more accurate math waveforms.

Arithmetic Operators – Add, subtract, multiply, divide, arbitrary math expressions.†

Autoset – Single-button, automatic setup on selected input signal for vertical, horizontal and trigger systems.

Display Characteristics
Waveform Style – Dots, vectors and variable persistence.

Graticules – Full, grid, cross-hair and frame. NTSC, PAL, SECAM and vectorscope (100% and 75% color bars) with optional TDS3VID and TDS3SDI video application modules.

Format – YT, XY and Gated XYZ (XY with Z-axis blanking available on TDS30X4B only).

I/O Interface
Hard Copy Port (Standard) – Centronics-type parallel.

Ethernet Port (Standard) – 10Base-T LAN, RJ-45 female.

TDS3GV Communications Module – GPIB (IEEE 488.2) programmability: Full talk/listen modes; control of all modes, settings and measurements.


*1 Requires TDS3AAM module.

Hard Copy Capability
Graphics File Formats – Interleaf (.img), TIF, PCX (PC Paintbrush), BMP (Microsoft Windows) and Encapsulated Postscript (EPS).

Printer Formats – Bubblejet, DPU-3445, Thinkjet, Deskjet, Laserjet, Epson (9- and 24-Pin).

Environmental and Safety
Temperature – +5 ºC to +50 ºC (operating), -20 ºC to +60 ºC (nonoperating).

Humidity – 20% to 80% RH below 32 ºC, derate to 30% RH at 45 ºC (operating), 5% to 90% RH below 41 ºC, derate to 30% RH at 60 ºC (nonoperating).

Altitude – To 3,000 m (operating), 15,000 m (nonoperating).

Electromagnetic Compatibility – Meets or exceeds EN55011 Class A radiated and conducted emissions; EN50082-1; FCC 47 CFR, Part 15, Subpart B, Class A; Australian EMC framework; Russian GOST EMC regulations.

Safety – UL3111-1, CSA1010.1, EN61010-1, IEC61010-1.

Physical Characteristics
Instrument Dimensions Width 375.0 in. 14.8 in.

Height 176.0 in. 6.9 in.

Depth 149.0 in. 5.9 in.

Weight instrument only 149.0 lbs. 66.6 kg

with battery installed 145.0 lbs. 65.8 kg

Instrument Shipping Package Dimensions Width 502.0 in. 19.8 in.

Height 375.0 in. 14.8 in.

Depth 369.0 in. 14.5 in.

Rackmount Dimensions Width 484.0 in. 19.0 in.

Height 174.0 in. 7.0 in.

Depth 152.0 in. 6.0 in.

Ordering Information
TDS3012B, TDS3014B, TDS3024B, TDS3032B, TDS3034B, TDS3052B, TDS3054B

TDS3000B Digital Phosphor Oscilloscopes.

Standard Accessories
Probes: 2 each P3010 10X passive probes (TDS3012B), 4 each P3010 10X passive probes (TDS3014B), 2 each P6139A 10X passive probes (TDS3032B and TDS3052B), 4 each P6139A 10X passive probes (TDS3024B, TDS3034B, TDS3044B and TDS3054B).


Power Cord.

Accessory Tray.

Protective Front Cover: Has holder for user manual and/or 3.5 in. floppy disks.

NIST-Traceable Certificate of Calibration.

Please specify power plug and manual version when ordering.

Recommended Accessories
TDS3TMT – Telecom mask testing application module.

TDS3AAM – Advanced analysis module.

TDS3LIM – Limit test module.

TDS3VID – Extended video application module.


TDS3GV – GPIB, VGA, RS-232 interfaces and TDSPCS1 OpenChoice® PC Communication Software.

WaveStar™ Software for Oscilloscopes – Microsoft Windows 98/ME/2000/NT 4.0 Application.

- TDS3BATB – Lithium ion battery pack for up to 3 hours continuous operation without line power.
- TDS3CHG – Fast charger for battery pack.
- TDS3PRT – Plug-in printer adds easy, portable documentation capability to your TDS3000B oscilloscope.
- 016-1907-00 – 5-roll pack of paper for TDS3PRT plug-in thermal printer.
- AC3000 – Soft case for carrying instrument.
- HCTEK4321 – Hard plastic case for carrying instrument (requires AC3000).
- RM3000 – Rackmount kit.
- Service Manual (TDS3000B Series) – English only (071-0972-00).
- TNGTDS01 – Self-paced self-study operator training kit.
- For customer training on this product outside the U.S. call 1-503-627-7510, inside the U.S. call 1-800-833-9200 ext. 77510.

**Recommended Probes**
- ADA400A – 10X, 10X, 1X, 0.1X high gain differential amplifier.
- P6243 – 1 GHz, ≤1 pF input C 10X active probe.

**International Power Plugs**
- Opt. A0 – North America power.
- Opt. A3 – Australia power.
- Opt. A5 – Switzerland power.

**Language Options**

**Service**
- Opt. C5 – Calibration Service 5 years.

**Warranty**
- Three year warranty covering all labor and parts, excluding probes.
AA  Critical Component of the Complete Measurement Solution. The AFG3000 Series arbitrary function generator pairs with the TDS3000B, TPS2000, TDS2000 and TDS1000 Series digital oscilloscopes to deliver the two elements of a complete measurement solution – stimulus and acquisition. When combined with the TDS3000B Series oscilloscopes, it provides you with a common look and feel between both instruments to increase your productivity; high performance in a small footprint; and stackability, saving valuable workbench space – all at a price you can afford.

Tektronix Support Completes the Solution. We know you depend on Tektronix instrument solutions when you make and meet critical commitments. So we make and meet a support commitment you can depend on. Anytime you need support, anywhere in the world, Tektronix Support gives you the lowest possible exposure to inconvenience, delay or disruption of operations.

Unsurpassed technical expertise and experience with 24-hour response to technical questions
Interactive, online support to request assistance, check service status or arrange for training
Industry-leading service turn-around time
Credible, reliable support with demonstrated on-time delivery
90-day unconditional service warranty
No fine print, no exclusions, no surprises
Global support in more than 50 countries

Depend on Tektronix. Visit www.tektronix.com/support