Digital Storage Oscilloscope

TDS6000B/C Series

Uncompromised Performance Oscilloscope Solution — Probing, Acquisition, Analysis, Compliance, and Debug

TDS6000B/C Series digital storage oscilloscopes provide unprecedented performance along with a complete feature set designed to address design validation, debug and compliance challenges of next generation computer, datacom and communications equipment. High bandwidth, high sample rate and deep memory also provide the ideal solution for data acquisition applications.

Uncompromised Acquisition

You won’t need to trade off bandwidth, record length and sample rate for your serial data measurement and analysis needs. The TDS6000C DSOs provide acquisition architecture with 40 GS/s maximum sample rate and 64 Msamples record length on two channels (20 GS/s and 32 Msamples on each of the four channels simultaneously), for the acquisition power you need. They provide the ultimate combination of bandwidth, sample rate and record length for the fastest signals. The TDS6154C provides matched 15 GHz performance across any two channels using advanced, Tektronix-proprietary DSP enhancement, important for high-speed, channel-to-channel measurements. The user-selectable DSP filter on each channel provides magnitude and phase correction, plus extension of the analog bandwidth to 15 GHz for more accurate signal fidelity on high speed measurements — easily capturing the fifth harmonic of 3.0 GHz embedded clocks used in next generation 6.0 Gb/s serial data standards, and even the third harmonic of 5 GHz clocks being developed for future systems. The DSP filter on each channel can also be switched off to take advantage of true 12 GHz analog bandwidth for applications needing the highest available raw data capture.

Features & Benefits

Bandwidths of 15 GHz (TDS6154C), 12 GHz (TDS6124C), 8 GHz (TDS6804B) and 6 GHz (TDS6604B)

Rise Times to 19 ps 20 to 80% (28 ps 10 to 90%) on TDS6154C

Typical Rise Time, with Channel-matched, User-selectable DSP

40 GS/s Real-time Sample Rate on Two Channels*1; 20 GS/s Real-time Sample Rate on All Four Channels with 500 fs/sample Interpolated Points

Up to 64 Msamples on Two Channels*1; up to 32 Msamples Record Length on All Four Channels with MultiView Zoom™ Function for Quick Navigation

MyScope® Custom Control

Windows Enhance Productivity

Right Mouse Click Menus for Exceptional Efficiency

Pinpoint™ Triggering Provides the Most Flexible and Highest Performance Triggering, with Over 1400 Combinations to Address Virtually Any Triggering Situation

Serial Pattern Triggering up to 3.125 Gb/s with 8b/10b Protocol Triggering

Serial Data Analysis and Compliance at Rates of 6.25 Gb/s and Above

OpenChoice® Software with Microsoft Windows XP OS Delivers Built-in Networking and Analysis

Technology Specific Software Solutions Provide Built-in Domain Expertise for Serial Data, Jitter, Ethernet, DVI, USB 2.0, Communications and Power Measurements

System Includes: Dual Processor System (2.8 GHz Pentium 4 and 583 MHz PowerPC), High Resolution XGA Display, Front Panel CD-R/W, Front Panel USB 2.0 Port and 1000Base-T Network Connection

Applications

Signal Integrity, Jitter and Timing Analysis

Validation, Debug, Characterization and Compliance of Next Generation Digital Designs

Computer, Datacom, Storage Area Network Equipment Designs and High-speed Backplanes

High Energy Physics Measurements and Data Acquisition

*1 For C Model versions only.
MyScope® Custom Control Windows

MyScope control windows allow you to build your own control windows with only the controls, features and capabilities that you care about and are important in your job. For the first time you can create your own personalized “toolbox” of oscilloscope features. No longer do you need to search through menus for features or re-learn how to drive the oscilloscope after a break from the lab. MyScope control windows are easily created in a matter of minutes using a simple, visual, drag-and-drop process. Once created, these customized windows are easily accessed through a dedicated MyScope button and menu selection on the oscilloscope button/menu bar, just like any other control window. You can make an unlimited number of custom control windows, enabling each person who uses the oscilloscope, in a shared environment, to have their own unique control window. Since the control windows are stored as files on the hard drive, they can easily be transferred to other TDS6000B or TDS/CSA7000B Series oscilloscopes, or they can even be e-mailed to a co-worker around the world when the need arises.

MyScope control windows will benefit all oscilloscope users, from eliminating the ramp-up time that many face when returning to the lab after not using an oscilloscope for a while, to the power user who can now operate far more efficiently. Everything you need is found in one control window rather than having to constantly navigate through menu after menu to repeat similar tasks.

Right Clicks

Right mouse click menus make simple things as they should be – simple. Right click menus are context sensitive, meaning the choices presented in the menu depend on where you right clicked the mouse. This makes right click menus extremely intuitive. Want to change the cursor type? Right click on a cursor or the cursor readouts. Want to change the reference levels of an automatic measurement? Right click on the measurement. Want to change trigger parameters? Right click on the trigger readouts. Want to change a waveform’s color? Right click on the waveform handle. Virtually all objects on the oscilloscope display have right click menus associated with them that include all the appropriate actions or features relative to those objects. There are also right click menus for regions of the display in addition to just objects. For example, right clicking in the main gratricule brings up a menu with choices such as Clear Data, Default Setup, Autoset, Screen Captures, Save All Waveforms and Add Screen Text, providing single-click access to many of your most commonly performed tasks.

Pinpoint™ Triggering

The ability to trigger an oscilloscope on events of interest is paramount in high-speed debug and validation. Whether you’re trying to find a system error or need to isolate a section of a complex signal for further analysis, Tektronix’ Pinpoint triggering provides the solution. The Pinpoint trigger system uses Silicon Germanium (SiGe) technology to provide trigger sensitivity of up to 9 GHz (TDS6000C models), and allows selection of all trigger types on both A and B trigger circuits. It can capture glitches down to 100 ps wide with 1 psRMS trigger jitter typical (TDS6000C models). Other trigger systems offer multiple trigger types only on a single event (A Event), with delayed trigger (B Event) selection limited to edge type triggering and often does not provide a way to reset the trigger sequence if the B-event doesn’t occur. But Pinpoint triggering provides the full suite of advance trigger types on both A and B triggers with Reset triggering to begin the trigger sequence again after a specified time, state or transition so that even events in the most complex signals can be captured. Other oscilloscopes typically offer less than 20 trigger combinations; Pinpoint triggering offers over 1400 combinations, all at full performance.
Decode 8b/10b data streams and set up to 4 data words (40 bits) to trigger on.

Protocol Triggering and Decoding Software (Opt. PTD)
Easily decode 8b/10b and other encoded serial data streams, and set desired encoded words for the serial pattern trigger to capture. 8b/10b decoding on data rates over 10 GB/s is possible on the TDS6000C models. Option PTD recovers the clock signal, identifies the transitions, decodes the characters and other protocol data. The TDS6000C models can trigger on up to four consecutive 10-bit words or specified error conditions at data rates up to 3.125 Gb/s. And you can see the captured bit sequences decoded into their words for convenient analysis.

Unparalleled Analysis
Waveform data analysis can take many forms. Whether it’s a simple math expression, waveform mask testing, a pass/fail compliance test, or a custom application that you develop, the TDS6000B/C Series offer the industry’s most comprehensive set of analysis and compliance tools.

Built-in Analysis Tools
Standard tools built into the TDS6000 offer a wide range of analysis capabilities including Cursors, Measurements, Math Equation Editor, Serial Data Communications Mask Testing (with Opt. SM), and Spectrum Analysis.

Measurement System. Enables over 50 parametric measurements in the amplitude, time and statistical domain.

8.5 Gb/s TDSRT-Eye™ diagram on the TDS6154C.

Waveform Math Equation Editor. Enables boundless analysis on waveform data.
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Technology-specific Software Solutions
Validation, debug and compliance testing often require automated test tools that quickly analyze waveform data and provide the answers you need. The TDS6000B/C models provide complete "turn-key" solutions for the most demanding technologies. Software options are also available for performing validation and compliance measurements on emerging industry standards.

OpenChoice® Analysis
Designing your own custom solution? The analysis and networking features of OpenChoice software adds more flexibility to Tektronix open Windows XP oscilloscopes:

- Fast, PCI bus speed communication between the data acquisition processor and the Microsoft Windows desktop.
- ActiveX controls to connect the oscilloscope to popular Windows applications – WITHOUT leaving the application.
- PnP drivers to control the scope from LabVIEW and Lab Windows/CVI running directly on the oscilloscope, or running on external PCs.
- Support for application development environments includes Visual BASIC, .NET, C, C++, MATLAB, LabVIEW and LabWindows/CVI.

Differential Probing with Performance to >12 GHz
Most high-speed signals today are differential. The P7313 12.5 GHz Differential Probing System provides true differential connection to the device under test for a variety of connection requirements: solder-in, hand held and fixtured. Typical system performance with the TDS6154C exceeds 12.5 GHz bandwidth. The P7313 offers the lowest loading, highest signal fidelity and lowest cost per connection in the industry. Versatile, inexpensive Tip-Clip™ adapters provide the optimum solution for virtually any connection need. The P7380SMA Differential Probing System provides a 50 Ω per side termination network with a termination voltage. The termination voltage can be applied externally or through the TekConnect® interface from the TDS6000B/C probe menu, or not used at all. A gain switch provides two different sensitivity settings of the probe and an Aux Out provides an inverted version of the signal for driving other equipment. The P7380SMA probing system used with the TDS6000B/C oscilloscopes provides an ideal solution for validation and compliance testing of high speed serial data links.

- P7313 12.5 GHz and P7380 8 GHz Differential Probes.
# Characteristics

## Vertical System

<table>
<thead>
<tr>
<th></th>
<th>TDS6604B</th>
<th>TDS6804B</th>
<th>TDS6124C</th>
<th>TDS6154C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Channels</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bandwidth, Rise Time (DSP)</td>
<td>N/A</td>
<td>8 GHz</td>
<td>12 GHz</td>
<td>15 GHz</td>
</tr>
<tr>
<td></td>
<td>50 ps (10 to 90%) (typical)</td>
<td>35 ps (10 to 90%) (typical)</td>
<td>28 ps (10 to 90%) (typical)</td>
<td>19 ps (10 to 90%) (typical)</td>
</tr>
<tr>
<td>True Analog Bandwidth (−3 dB), Typical Rise Time</td>
<td>6 GHz</td>
<td>7 GHz</td>
<td>7 GHz</td>
<td>12 GHz</td>
</tr>
<tr>
<td></td>
<td>50 ps (10 to 90%) (typical)</td>
<td>62 ps (10 to 90%) (typical)</td>
<td>35 ps (10 to 90%) (typical)</td>
<td>35 ps (10 to 90%) (typical)</td>
</tr>
<tr>
<td></td>
<td>55 ps (20 to 80%) (typical)</td>
<td>43 ps (20 to 80%) (typical)</td>
<td>24 ps (20 to 80%) (typical)</td>
<td>24 ps (20 to 80%) (typical)</td>
</tr>
<tr>
<td>Hardware Bandwidth Limits</td>
<td>Full, 250 MHz or 20 MHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Coupling</td>
<td>DC, GND</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Impedance</td>
<td>50 Ω ±2.5%</td>
<td>50 Ω ±2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Sensitivity, 50 Ω</td>
<td>Full-scale 50 mV to 10 V (5 mV/div(^1) to 1 V/div). Full-scale is the peak-to-peak digitizer range at a given sensitivity. Volts/div = Full-scale ÷ 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical Resolution</td>
<td>8-Bit (&gt;11-Bit with averaging)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max Input Voltage, 50 Ω (also determined by TekConnect(^\text{\textregistered}) accessory)</td>
<td>&lt;1 V(<em>{\text{max}}) for &lt;100 mV/div, &lt;7 V(</em>{\text{max}}) for ≥100 mV/div settings</td>
<td>&lt;1 V(_{\text{max}}) for &lt;1 V full-scale, &lt;5 V for ≥1 V full-scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC Gain Accuracy</td>
<td>±(2.5% + (2% x offset))</td>
<td>±2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Position Range</td>
<td>±5 divisions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offset Range*(^2)</td>
<td>Fullscale settings: 100 mV to 500 mV: ±0.5 V 505 mV to 995 mV: ±0.25 V 1 V to 5 V: ±0.5 V 5.05 V to 10 V: ±2.5 V</td>
<td>Fullscale settings: 100 mV: ±0.45 V 200 mV: ±0.4 V 500 mV: ±0.25 V 1 V: ±4.5 V 2 V: ±4.0 V 5 V: ±2.5 V 10 V: 0 General Formula for offset range 100 mV to 995 mV: ±(0.5 V – Fullscale/2) 1 V to 10 V: ±(5 V – Fullscale/2)</td>
<td>Fullscale settings: 100 mV: ±0.45 V 200 mV: ±0.4 V 500 mV: ±0.25 V 1 V: ±4.5 V 2 V: ±4.0 V 5 V: ±2.5 V 10 V: 0 General Formula for offset range 100 mV to 995 mV: ±(0.5 V – Fullscale/2) 1 V to 10 V: ±(5 V – Fullscale/2)</td>
<td>Fullscale settings: 100 mV: ±0.45 V 200 mV: ±0.4 V 500 mV: ±0.25 V 1 V: ±4.5 V 2 V: ±4.0 V 5 V: ±2.5 V 10 V: 0 General Formula for offset range 100 mV to 995 mV: ±(0.5 V – Fullscale/2) 1 V to 10 V: ±(5 V – Fullscale/2)</td>
</tr>
<tr>
<td>Offset Accuracy</td>
<td>±(0.7% x offset + 1.5 mV + 0.1 x V/div setting) for ranges &lt;100 mV/div ±(0.8% x offset + 15 mV + 0.1 x V/div setting) for ranges ≥100 mV/div</td>
<td>±(0.35% x offset + 1.5 mV + 0.1 x V/div setting) for ranges &lt;100 mV/div ±(0.35% x offset + 15 mV + 0.1 x V/div setting) for ranges ≥100 mV/div</td>
<td>±(0.35% x offset + 1.5 mV + 0.1 x V/div setting) for ranges &lt;100 mV/div ±(0.35% x offset + 15 mV + 0.1 x V/div setting) for ranges ≥100 mV/div</td>
<td></td>
</tr>
<tr>
<td>Channel-to-Channel Isolation for Any Two Channels at Equal Vertical Scale</td>
<td>≥80:1 at 1.5 GHz ≥15:1 at rated bandwidth</td>
<td>≥150:1 at 0 to 10 GHz ≥80:1 at 10 GHz to 12 GHz ≥50:1 at 12 GHz to 15 GHz</td>
<td>≥80:1 at 10 GHz to 12 GHz ≥50:1 at 12 GHz to 15 GHz</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Full mode is a software zoom with 7 bits digitizer resolution at 50 mV full scale.

\(^2\) Offset range in addition to ±5 division position range.
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- Vertical System (Continued)

<table>
<thead>
<tr>
<th>Full Scale Gain Setting</th>
<th>TDS6000B DSP OFF</th>
<th>TDS6154C DSP ON</th>
<th>TDS6124C DSP ON</th>
<th>BOTH DSP OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise, typical</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 mV</td>
<td>950 µV</td>
<td>680 µV</td>
<td>570 µV</td>
<td>670 µV</td>
</tr>
<tr>
<td>160 mV</td>
<td>—</td>
<td>950 µV</td>
<td>840 µV</td>
<td>950 µV</td>
</tr>
<tr>
<td>200 mV</td>
<td>1.6 mV</td>
<td>1.1 mV</td>
<td>940 µV</td>
<td>1.0 mV</td>
</tr>
<tr>
<td>300 mV</td>
<td>—</td>
<td>1.6 mV</td>
<td>1.45 mV</td>
<td>1.6 mV</td>
</tr>
<tr>
<td>400 mV</td>
<td>—</td>
<td>2.1 mV</td>
<td>1.85 mV</td>
<td>2.1 mV</td>
</tr>
<tr>
<td>500 mV</td>
<td>3.55 mV</td>
<td>2.5 mV</td>
<td>2.3 mV</td>
<td>2.4 mV</td>
</tr>
<tr>
<td>800 mV</td>
<td>—</td>
<td>4.4 mV</td>
<td>3.8 mV</td>
<td>4.1 mV</td>
</tr>
<tr>
<td>900 mV</td>
<td>—</td>
<td>4.8 mV</td>
<td>4.3 mV</td>
<td>4.6 mV</td>
</tr>
<tr>
<td>1 V</td>
<td>9.5 mV</td>
<td>6.9 mV</td>
<td>5.7 mV</td>
<td>6.8 mV</td>
</tr>
<tr>
<td>2 V</td>
<td>16 mV</td>
<td>10.5 mV</td>
<td>9.5 mV</td>
<td>10.0 mV</td>
</tr>
<tr>
<td>5 V</td>
<td>35.5 mV</td>
<td>25 mV</td>
<td>23 mV</td>
<td>24 mV</td>
</tr>
<tr>
<td>10 V</td>
<td>68 mV</td>
<td>56 mV</td>
<td>46 mV</td>
<td>50 mV</td>
</tr>
</tbody>
</table>

- Timebase System

<table>
<thead>
<tr>
<th>TDS6000B Models</th>
<th>TDS6000C Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timebase Range</td>
<td>25 ps to 40 s/div; Interpolation down to 500 fs/pt.</td>
</tr>
<tr>
<td>Timebase Delay Time Range</td>
<td>5 ns to 250 s</td>
</tr>
<tr>
<td>Channel-to-Channel Deskew Range</td>
<td>±75 ns</td>
</tr>
<tr>
<td>Trigger Jitter (RMS)</td>
<td>&lt;1.5 ps&lt;sub&gt;typ&lt;/sub&gt; (typical)</td>
</tr>
<tr>
<td>Long-term Sample Rate and Delay Time Accuracy</td>
<td>&lt;2 ppm over any ≥100 ms interval</td>
</tr>
<tr>
<td>Clock Stability</td>
<td>&lt;1 ppm (typical)</td>
</tr>
<tr>
<td>Jitter Noise Floor</td>
<td>420 fs&lt;sub&gt;typ&lt;/sub&gt; (typical) over 10 µs duration or less</td>
</tr>
<tr>
<td>Delta Time Accuracy</td>
<td>([0.06/sample rate] + (2.5 ppm x [Reading])/1000, typical&lt;sup&gt;3&lt;/sup&gt;)</td>
</tr>
</tbody>
</table>

<sup>*</sup> Test conditions: Sample mode, at 20 GS/s.
<sup>**</sup> Test conditions: Sample mode, 500 mV full scale (50 mV/div) setting, input signal 350 mV with rise time (10% to 90%) <50 ps.

- Acquisition System

<table>
<thead>
<tr>
<th>TDS6000B Models</th>
<th>TDS6000C Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Sample Rate</td>
<td>20 GS/s on 4 channels</td>
</tr>
<tr>
<td>Equivalent Time Sample Rate (max)</td>
<td>2 T/s</td>
</tr>
<tr>
<td>Maximum Record Length per Channel</td>
<td>32 Mb (requires Opt. 4M)</td>
</tr>
<tr>
<td>Standard</td>
<td>2 Mb on all 4 Channels</td>
</tr>
<tr>
<td>with Memory Opt. 2M</td>
<td>8 Mb on all 4 Channels</td>
</tr>
<tr>
<td>with Memory Opt. 3M</td>
<td>16 Mb on all 4 Channels</td>
</tr>
<tr>
<td>with Memory Opt. 4M</td>
<td>32 Mb on all 4 Channels</td>
</tr>
</tbody>
</table>

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Maximum Time Duration Captured at Highest Real-time Resolution (All Channels)

<table>
<thead>
<tr>
<th></th>
<th>TDS6000B Models</th>
<th>TDS6000C Models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(All Channels)</td>
<td>(Two Channels)</td>
</tr>
<tr>
<td>Max Duration with Standard Memory</td>
<td>100 µs</td>
<td>100 µs</td>
</tr>
<tr>
<td>Max Duration with Opt. 2M</td>
<td>400 µs</td>
<td>400 µs</td>
</tr>
<tr>
<td>Max Duration with Opt. 3M</td>
<td>800 µs</td>
<td>800 µs</td>
</tr>
<tr>
<td>Max Duration with Opt. 4M</td>
<td>1.6 ms</td>
<td>1.6 ms</td>
</tr>
</tbody>
</table>

Acquisition Modes

<table>
<thead>
<tr>
<th></th>
<th>All Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waveform Database</td>
<td>Accumulate Waveform Database providing three-dimensional array of amplitude, time and counts</td>
</tr>
<tr>
<td>Sample</td>
<td>Acquire sampled values</td>
</tr>
<tr>
<td>Peak Detect</td>
<td>Captures narrow glitches at all real-time sampling rates</td>
</tr>
<tr>
<td>Minimum Peak Detect Pulse Width</td>
<td>50 ps</td>
</tr>
<tr>
<td>Averaging</td>
<td>From 2 to 10,000 waveforms included in average</td>
</tr>
<tr>
<td>Hi-Res</td>
<td>Real-time boxcar averaging reduces random noise and increases resolution</td>
</tr>
<tr>
<td>FastFrame™ Acquisition</td>
<td>Acquisition memory divided into segments; maximum trigger rate &gt;310,000 waveforms per second. Time of arrival recorded with each event</td>
</tr>
<tr>
<td>Roll Mode</td>
<td>200 ks/s at 8 Mb Record length and 500 ks/s at 4 Mb Record Length on all channels</td>
</tr>
</tbody>
</table>

Pinpoint™ Trigger System

<table>
<thead>
<tr>
<th></th>
<th>All Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity Internal DC Coupled</td>
<td>0.5 div DC to 50 MHz increasing to 2.5 div at 7 GHz (TDS6000B models, typical)</td>
</tr>
<tr>
<td>External (auxiliary input)</td>
<td>250 mV DC to 50 MHz, increasing to 350 mV at 1 GHz, increasing to 500 mV at 2 GHz (typical)</td>
</tr>
<tr>
<td>Trigger Characteristics</td>
<td>Auto, Normal and Single</td>
</tr>
<tr>
<td>A Event and Delayed B Event Trigger Types</td>
<td>Edge, Glitch, Runt, Width, Transition Time, Timeout, Pattern, State, Setup/Hold, Window – all except Edge, Pattern and State can be Logic State qualified by up to two channels</td>
</tr>
<tr>
<td>Trigger Sequences</td>
<td>Main, Delayed by Time, Delayed by Events, Reset by Time, Reset by State, Reset by Transition. All sequences can include separate horizontal delay after the trigger event to position the acquisition window in time</td>
</tr>
<tr>
<td>Communications-related Triggers (requires Option SM)</td>
<td>Support for AMI, HDB3, BnZS, CMI, MLT3 and NRZ encoded communications signals up to 3.125 Gb/s. Select among isolated positive or negative one, zero pulse form or eye patterns as applicable to standard</td>
</tr>
</tbody>
</table>
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Pinpoint™ Trigger System (continued)

Trigger Characteristics (continued)

Serial Pattern Trigger (requires Option ST) 64-Bit serial word recognizer, bits specified in binary (high, low, don’t care) or hex format. Trigger on NRZ-encoded data up to 1.25 Gbaud. TDS6000C models only: trigger on 8b/10b encoded data up to 3.125 Gbaud (40 bits)

Trigger Level Range

Internal ±12 divisions from center of screen

External (auxiliary in) ±5 V

Line Fixed at 0 V

Trigger Coupling DC, AC (attenuate <60 Hz), HF reject (attenuate >30 kHz). Internal ±12 divisions from center of screen

Trigger Holdoff Range 250 ns minimum to 12 s maximum

Trigger Types

Edge — Positive and/or negative slope on any channel or front panel auxiliary input. Coupling includes DC, AC, noise reject, HF reject and LF reject.

Glitch — Trigger on or reject glitches of positive, negative or either polarity. Minimum glitch width is down to 100 ps with re-arm time of 250 ps.

Width — Trigger on width of positive or negative pulse (down to 100 ps) either within or out of selectable time limits.

Runt — Trigger on a pulse that crosses one threshold but fails to cross a second threshold before crossing the first again. Optional time qualification.

Timeout — Trigger when pattern goes false or stays true for a specified time period, selectable from 5 ns to 250 seconds.

Transition — Trigger on pulse edge rates that are faster or slower than specified, slope may be positive, negative or either.

Setup/ Hold — Trigger on violations of both setup time and hold time between clock and data present on any two input channels.

Pattern — Trigger when pattern goes false or stays true for specified period of time, Pattern (AND, OR, NAND, NOR) specified for four input channels defined as HIGH, LOW or Don’t Care.

Rate — Any logical pattern of channels (1, 2, 3) clocked by edge on channel 4. Trigger on rising or falling clock edge.

Window — Trigger on an event that enters or exits a window defined by two user-adjustable thresholds. Event can be time or logic qualified.

Trigger Delay by Time — 5 ns to 250 seconds.

Trigger Delay by Events — 1 to 10,000,000 events.
Recovered Clock –
SMA connector, ≤1.25 Gb/s, Output swing ≥130 mVpk- pk into 50 Ω. Requires Opt. SM or Opt. ST to enable.

Recovered Data –
SMA connector, ≤1.25 Gb/s, Output swing of 1010 repeating pattern 200 mV into 50 Ω. Requires Opt. SM or Opt. ST to enable.

DC Probe Calibration Output –
BNC connector, ±10 V DC for DC probe calibration. (Signal available only during probe calibration.)

AUX Trigger Output –
BNC connector, provides a TTL-compatible, polarrly switchable pulse when the oscilloscope triggers.

Power Source

Power

100 to 240 Vapp ±10%, 50/60 Hz; 115 Vapp ±10%, 400 Hz; CAT II, <500 W typical (650 VA).

Option SM

156 Standards Masks Supported –
ITU-T (1.544 Mb/s to 155 Mb/s),
ANSI T1.102 (1.544 Mb/s to 155 Mb/s),
Ethernet IEEE Std 802.3, ANSI X3.263 (1.544 Mb/s to 3.125 Gb/s XAU)),
SonetSDH (51.84 Mb/s to 2.4883 Gb/s),
InfiniBand (2.5 Gb/s),
USB (12 Mb/s to 480 Mb/s),
Serial ATA (1.5 Gb/s, 3.0 Gb/s),
Serial Attached SSI (1.5 Gb/s, 3.0 Gb/s),
IEEE 1394b (491.5 Mb/s to 1.966 Gb/s),
RapidIO (1.25 Gb/s to 3.125 Gb/s),
OIF Standards (2.488 Gb/s to 3.11 Gb/s),
PCI Express (2.5 Gb/s).

Physical Characteristics

Benchtop Configuration

Dimensions mm in.
Height 282 11.1
Width 457 18.0
Depth 540 21.25

Weight kg lb.
Net 21 47
Shipping 22.3 50

Rackmount Configuration

Dimensions mm in.
Height 267 10.5
Width 491 19.3
Depth 638 25.1

Weight kg lb.
Net 22 49
Kit 5.6 12.25

*1 4.25 Gb/s mask supported using glitch trigger.

Environmental

Temperature

Operating –
Excluding CD-R/W drive: TDS6000B models: +5 ºC to +40 ºC, TDS6000C models: +10 ºC to +45 ºC.
Including CD-R/W drive: +10 ºC to +40 ºC.
Nonoperating –
-22 ºC to +60 ºC.

Humidity

Operating –
20% to 80% relative humidity with a maximum wet bulb temperature of +29 ºC at or below +50 ºC, noncondensing. Upper limit derated to 25% relative humidity at +50 ºC.
Nonoperating –
5% to 90% relative humidity with a maximum wet bulb temperature of +29 ºC at or below +60 ºC, noncondensing. Upper limit derated to 20% relative humidity at +60 ºC.

Altitude

Operating –
10,000 ft. (3,048 m).
Nonoperating – 40,000 ft. (12,190 m).

Random Vibration

Operating –
0.00125 g²/Hz from 5 to 350 Hz, –3 dB/octave from 350 to 500 Hz, 0.00000875 g²/Hz at 500 Hz.
Overall level of 0.24 g. Nonoperating –
0.0175 g²/Hz from 5 to 100 Hz, –3 dB/octave from 100 to 200 Hz, 0.00875 g²/Hz from 200 to 350 Hz, –3 dB/octave from 350 to 500 Hz, 0.006132 g²/Hz at 500 Hz. Overall level of 2.28 g. Nonoperating –

Certifications

Electromagnetic Compatibility – 89/336/EEC.
Safety –
UL 3111-1, CSA1010.1, EN61010-1, IEC 61010-1.
Digital Storage Oscilloscope

► TDS6000B/C Series

► Ordering Information

TDS6154C
15 GHz Digital Storage Oscilloscope.

TDS6124C
12 GHz Digital Storage Oscilloscope.

TDS6804B
8 GHz Digital Storage Oscilloscope.

TDS6604B
6 GHz Digital Storage Oscilloscope.

TDS6000B and TDS6000C Models Include:

Instrument Options

Power Plug Options
Opt. A0 – North America power.
Opt. A2 – United Kingdom power.
Opt. A3 – Australia power.
Opt. A5 – Switzerland power.
Opt. A10 – China power.
Opt. A99 – No power cord or AC adapter.

Manual Language Options

Disk Drive Options
Opt. F01 – Front-panel 40 GB removable hard disk drive, replaces front panel CD-RW which is moved to the back.

Cables
GPIB Cable (1 m) – Order 012-0091-01.
GPIB Cable (2 m) – Order 012-0091-00.
RS-232 Cable – Order 012-1296-00.
Centronics Cable – Order 012-1214-00.

Mounting Options
IK – K4000 Oscilloscope Cart.
IR – Rackmount Kit.

Service Options
Opt. C5 – Calibration Service 5 Years.
Opt. D3 – Calibration Data Report 3 Years (requires Option C3).
Opt. D5 – Calibration Data Report 5 Years (with Option C5).

Acquisition Memory Options
TDS6000B Models:
2M – 8 M samples on all channels.
3M – 16 M samples on all channels.
4M – 32 M samples on all channels.
TDS6000C Models:
2M – 16 M samples on two channels; 8 M samples on all channels.
3M – 32 M samples on two channels; 16 M samples on all channels.
4M – 64 M samples on two channels; 32 M samples on all channels.

Software Options
CP2 – TDSXPM2 ANSI/ITU Telecom pulse compliance testing software (requires Option SM).
CVI – TDSXVI CVI compliance test solution.
ET3 – TDSET3 Ethernet compliance test software.
HT3 – HDMI compliance test software.
J43 – TDSJ43 v2.0 Advanced jitter analysis software.
JE3 – TDSJE3 v2.0 Essentials jitter analysis software.
J2 – TDSJOM2 Disk drive analysis software.
PW3 – TDSPW3 Power measurement and analysis software.

Recommended Accessories
P7313 – 12.5 GHz Differential Probe.
P7380 – 8 GHz Differential Probe.
P7380SMA – 8 GHz Differential Probing System.
AFTDS – Telecom differential electrical interface adapter (for line rates <8 MB/sec; requires TCA-BNC adapter).
Keyboard (USB interface) Full-size Keyboard with 4-port USB Hub – Order 119-6297-00.
Transit Case – Order 016-1942-00.

TekConnect Adapters –
TCA-1MEG: TekConnect high-impedance buffer amplifier. Includes P6139A passive probe.
TCA-SMA: TekConnect-to-SMA Adapter.
TCA-N: TekConnect-to-N Adapter.
TCA-BNC: TekConnect-to-BNC Adapter.
TCA75: 4 GHz precision TekConnect® 75 Ω to 50 Ω adapter with 75 Ω BNC input connector.
Oscilloscope Cart – Order K4000.

Software – WSTRO: WaveStar™ waveform capture and documentation software.
Test Fixtures – TDSUSB: TDSUSB test fixture for use with Opt. USB.

Cables
GPIB Cable (1 m) – Order 012-0091-01.
GPIB Cable (2 m) – Order 012-0091-00.
RS-232 Cable – Order 012-1296-00.
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Opt. C5 – Calibration Service 5 Years.
Opt. D3 – Calibration Data Report 3 Years (requires Option C3).
Opt. D5 – Calibration Data Report 5 Years (with Option C5).

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Oscilloscope Cart – Order K4000.

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Test Fixtures – TDSUSB: TDSUSB test fixture for use with Opt. USB.

Cables
GPIB Cable (1 m) – Order 012-0091-01.
GPIB Cable (2 m) – Order 012-0091-00.
RS-232 Cable – Order 012-1296-00.
Centronics Cable – Order 012-1214-00.
After Purchase Upgrades of TDS6000B and TDS6000C Series Oscilloscopes

To upgrade your oscilloscope, order option as noted.

### Acquisition Record Length:

<table>
<thead>
<tr>
<th>Current Record Length</th>
<th>Desired Record Length</th>
<th>Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>8 Msamples (16 Msamples TDS6000C)</td>
<td>TDS6BUP Opt. M02</td>
</tr>
<tr>
<td></td>
<td>16 Msamples (32 Msamples TDS6000C)</td>
<td>TDS6BUP Opt. M03</td>
</tr>
<tr>
<td></td>
<td>32 Msamples (64 Msamples TDS6000C)</td>
<td>TDS6BUP Opt. M04</td>
</tr>
<tr>
<td>8 Msamples</td>
<td>16 Msamples (32 Msamples TDS6000C)</td>
<td>TDS6BUP Opt. M23</td>
</tr>
<tr>
<td></td>
<td>32 Msamples (64 Msamples TDS6000C)</td>
<td>TDS6BUP Opt. M24</td>
</tr>
<tr>
<td></td>
<td>16 Msamples</td>
<td>TDS6BUP Opt. M34</td>
</tr>
<tr>
<td></td>
<td>32 Msamples (64 Msamples TDS6000C)</td>
<td>TDS6BUP Opt. M34</td>
</tr>
</tbody>
</table>

### Desired Option

- **Serial Comm Mask Testing**: TDS6BUP Opt. SM
- **Serial Pattern Trigger**: TDS6BUP Opt. ST
- **Hardware Clock Recovery for Serial Data Stream**: Included in Opt. SM and ST

### Analysis and Compliance Software:

- **DVI Compliance Test**: TDS6BUP Opt. DVI
- **Ethernet Compliance**: TDS6BUP Opt. ET3
- **JIT3 V2.0 Advanced Jitter Analysis Software**: TDS6BUP Opt. JA3
- **JIT3 V2.0 Essentials Jitter Analysis Software**: TDS6BUP Opt. JE3
- **DDM2 Disk Drive Analysis Software**: TDS6BUP Opt. J2
- **Power Measurement/Analysis**: TDS6BUP Opt. PW3
- **Protocol Trigger and Decode (trigger capability for TDS6000C only, requires Opt. ST)**: TDS6BUP Opt. PTD
- **RT-Eye Serial Data Compliance and Analysis Software**: TDS6BUP Opt. RTE
- **PCI Express® Compliance Module for Option RTE**: TDS6BUP Opt. PCE (Requires Opt. RTE or RJA or RSA)
- **InfiniBand® Compliance Module for Option RTE**: TDS6BUP Opt. IBA (Requires Opt. RTE or RJA or RSA)
- **USB2.0 Compliance, software only**: TDS6BUP Opt. USB (Requires TDSUSBF test fixture)
- **RT-Eye Serial Data Analysis Software, TDSJIT3 v2.0 Advanced Jitter Analysis, PTD Protocol Trigger and Decode Software Bundle**: TDS6BUP Opt. RJA
Digital Storage Oscilloscope
> TDS6000B/C Series

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Contact Tektronix:
ASEAN / Australasia  (65) 6356 3900
Austria  +43 52 675 3777
Belgium  07 81 60166
Brazil & South America  +55 (11) 3741-8660
Canada  1 (800) 661-5625
Central Europe & the Baltics  +41 52 675 3777
Central Europe & Greece  +41 52 675 3777
Denmark  +45 80 88 1401
Finland  +358 (0) 10 603 000
France  +33 (0) 1 47 44 00 00
Germany  +49 (0) 62 09 77 80
Hong Kong  +852 2985-6688
India  (91) 80-22275577
Italy  +39 (02) 25086 1
Japan  +81 (3) 6714-3010
Luxembourg  +352 26 02 1400
Mexico, Central America & Caribbean  +52 (55) 5424700
Middle East, Asia and North Africa  +41 52 675 3777
The Netherlands  (0900) 2217977
Norway  800 16098
People’s Republic of China  86 (10) 6235 9930
Poland  +48 52 675 3777
Portugal  80 08 12370
Republic of Korea  +82 2 528-5299
Russia & CIS  +7 (495) 7494600
South Africa  +27 11 254 8360
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Sweden  020 08 80371
Switzerland  +41 52 675 3777
Taiwan  886 (2) 2722-9622
The United Kingdom & Eire  +44 (0) 1344 392400
United States of America  1 (800) 426-2200

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