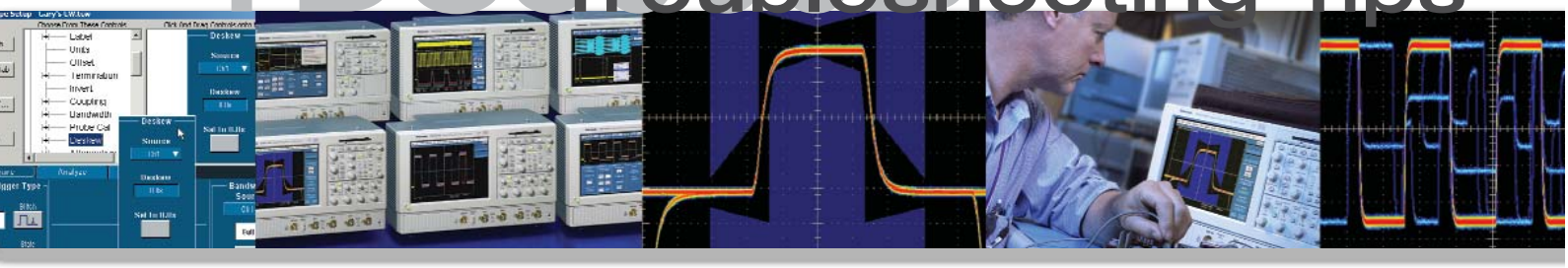
TDS5000B Troubleshooting Tips



Tektronix
Enabling Innovation

▶ Table of Contents

Personalize Your Oscilloscope with MyScope 4

Speed Up Your Work with Right Mouse Clicks 5

Capture Elusive Glitches and Waveform Anomalies 6

Search for High-speed Glitches in Slow Signals with Peak Detect Mode 7

Search for Low-level Variations in Slow Signals with HiRes Mode 8

Speed Up Your Work with OpenChoice® Waveform Analysis 9

Increase Troubleshooting Efficiency with Advanced Triggers 10

Pinpoint Problems with Runt and Transition Triggers 11

Speed Video Design and Development with Video Triggers 12

Use Advanced Math to Improve Productivity 13

Quickly Examine the Frequency Spectrum of your Signal 14

Easily Make Power Measurements with Power Software 15

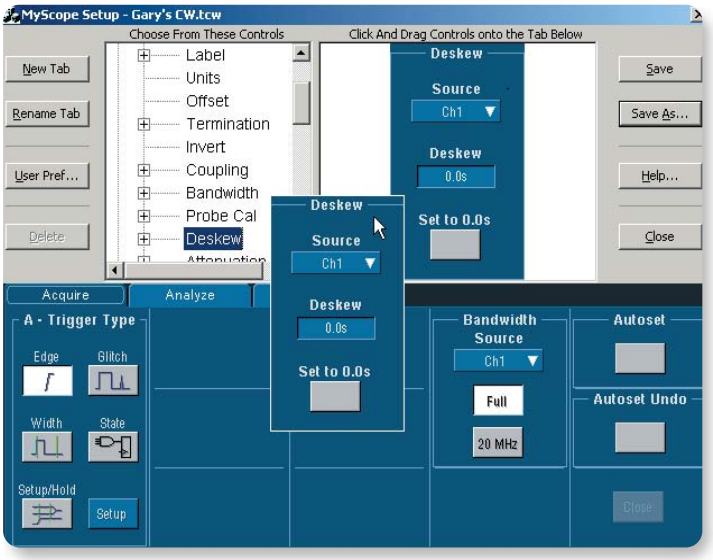
Quickly Analyze Jitter with Jitter Analysis Software 16

Speed Compliance Tests with Limit Testing 17

Verify Compliance to Serial Communications
Standards with Communications Mask Testing 18

▶ Personalize Your Oscilloscope with MyScope™

MyScope greatly accelerates routine scope operations by consolidating your most frequently-used menu controls into one or two control windows. MyScope allows you to construct your own personal control windows using just those features that you use most often. This can greatly speed up repetitive measurement tasks.

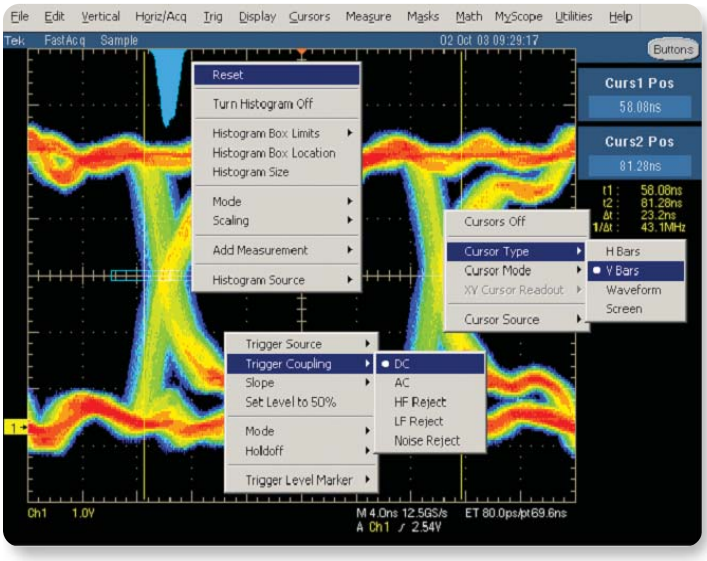


To use MyScope:

1. Select the MyScope menu.
2. Select New Control window.
3. Choose the controls needed.
4. Drag them to the Tab window.
5. Name the tab or tabs as needed.
6. Name and Save the completed window.
7. To use, simply select the MyScope menu and select the named MyScope file.

▶ Speed Up Your Work with Right Mouse Clicks

Using right-clicks is an intuitive method to drive the scope, making it fast and easy to complete acquisitions just using the mouse. Right-clicks are context-sensitive; the choices presented depend on where you clicked the mouse. For instance, clicking on the trigger readout brings up a menu of trigger controls. Clicking on a waveform handle brings up a menu of items associated with that waveform, including the vertical controls, measurements, color, and a quick way to save the waveform.

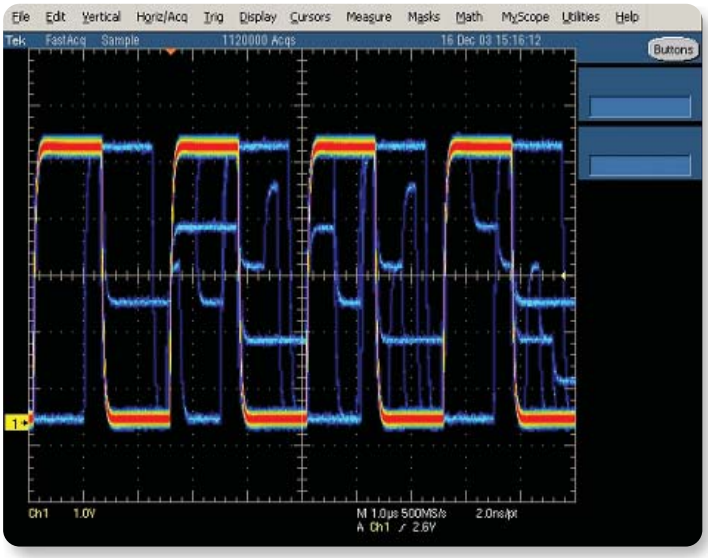


To use Right-Clicks:

1. Simply right-click on the item you want to change.
2. Select the change from the resulting menu.

▶ Capture Elusive Glitches and Waveform Anomalies

With a high continuous waveform capture rate – up to 100,000 wfms/s with the TDS5000B Series – a DPO is the industry's most efficient tool to capture elusive signal glitches and infrequent events. The TDS5000B Series' high continuous waveform capture rate, coupled with histogram capability, will quickly give you a picture of circuit performance. The TDS5000B Series quickly reveals the nature of faults that other digital oscilloscopes would miss.

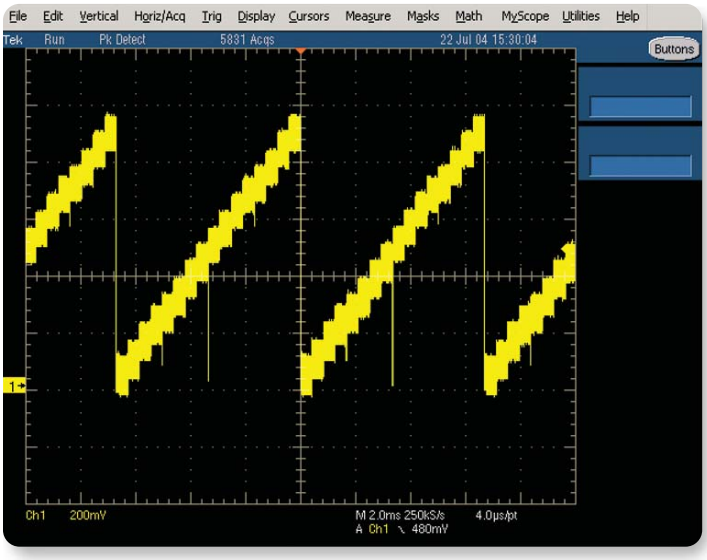


To use FastAcq/DPO:

1. Press the purple FastAcq button.
2. View what is really happening with your waveform.

▶ Search for High-speed Glitches in Slow Signals with Peak Detect Mode

The peak detect acquisition mode provides an immediate solution to finding high-speed pulses or glitches in comparatively slow signal waveforms. This mode uses the instrument's maximum sample rate to reveal narrow glitches, even those less than 1 ns in width, at all sweep speeds.



To use the Peak Detect Mode:

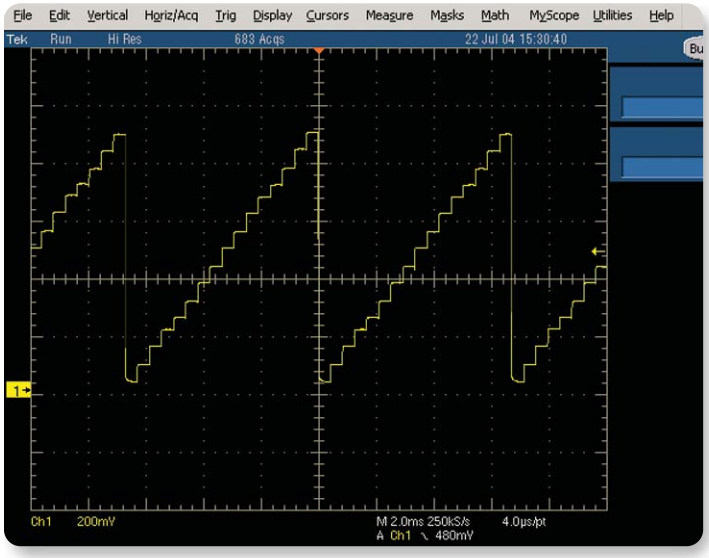
1. Right-click on the acquisition mode readout just below the menu bar.
2. Select Peak Detect.

OR

1. Select the Horiz/Acq menu.
2. Pull down to Acquisition mode.
3. Select Peak Detect.

▶ Search for Low-level Variations in Slow Signals with HiRes Mode

The HiRes acquisition mode improves productivity, extending vertical resolution and filtering noise from low-frequency signals. The low-pass filter frequency cut-off is half the sample rate displayed on-screen. The resulting vertical resolution varies with sample rate, but can be as high as 12 bits.



To use the HiRes Mode:

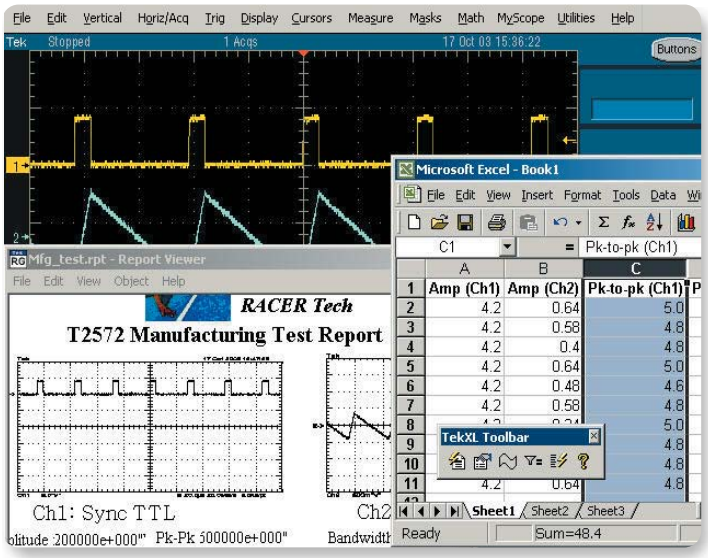
1. Right-click on the acquisition mode readout just below the menu bar.
2. Select HiRes.

OR

1. Select the Horiz/Acq menu.
2. Pull down to Acquisition mode
3. Select HiRes.

▶ Speed Up Your Work with OpenChoice® Waveform Analysis

The TDS5000B Series offers open access to the Microsoft Windows operating system. This ability to access the Windows desktop is a powerful tool. WordPad, Paint, and a Web browser are built in, letting you build lab notes while working with the scope. Microsoft Word, Excel, MATLAB or LabView applications can be installed for documentation or extended analysis. Email exchange, LAN printing and file sharing are also possible.

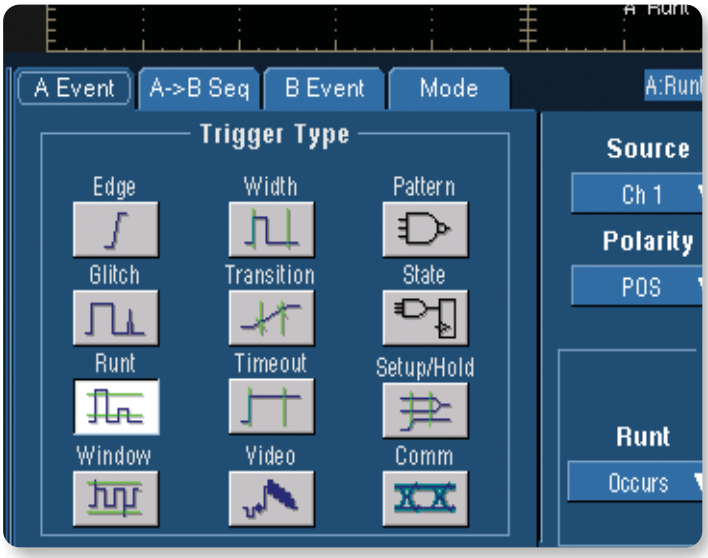


For example, to use OpenChoice with Excel:

1. Use the Excel Toolbar to transfer waveform data directly to an Excel spreadsheet.
2. Analyze and chart the data.
3. Cut and paste the Excel data into documents and reports as necessary.

▶ Increase Troubleshooting Efficiency with Advanced Triggers

TDS5000B Series users increase their troubleshooting efficiency by more quickly and easily capturing waveform events with the widest selection of advanced triggers among mid-range oscilloscopes.



To use Advanced Triggering:

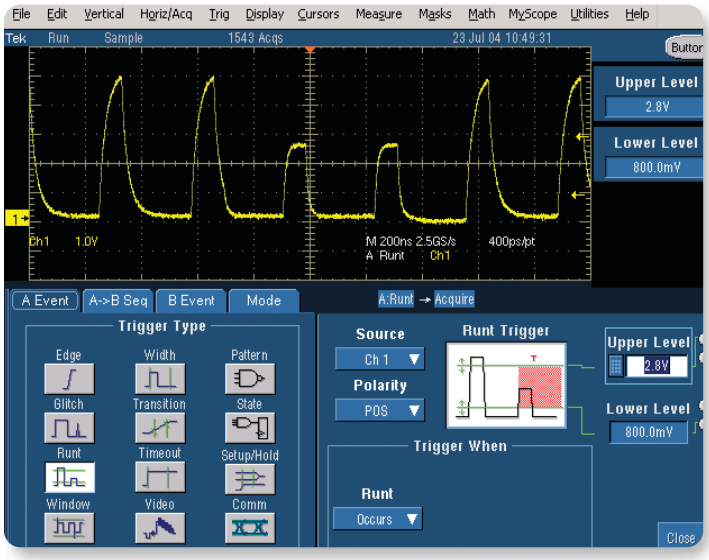
1. Touch Trig menu button.
2. Pull down to the trigger function setup desired, or select Trigger Setup to see the whole setup menu.
3. Complete the details of the trigger setup.

OR

1. Right-click on the trigger readout to select new trigger parameters from a simplified trigger menu.

▶ Pinpoint Problems with Runt and Transition Triggers

Runt or Transition Trigger allows you to find the pulses in a pulse train that do not cross a desired logic level, or rise or fall too slowly. This allows triggering directly on the faults that are causing problems.

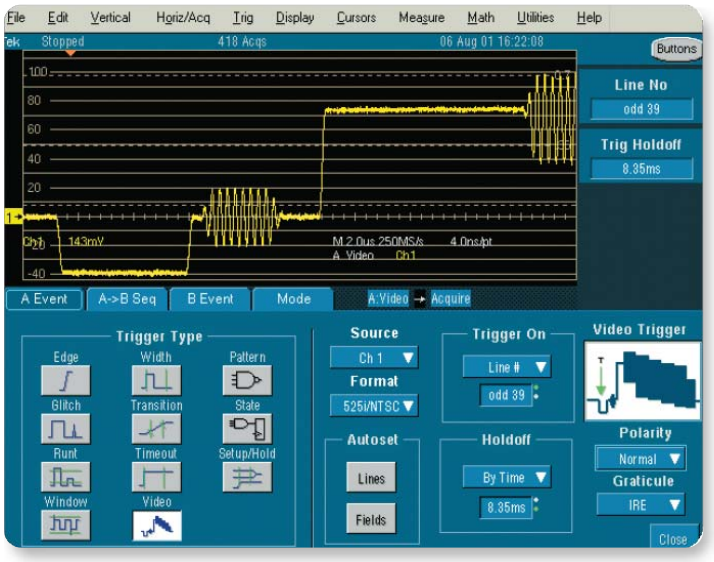


To use Runt or Transition Triggering:

1. Select the Trig menu button.
2. Pull down to Runt or Transition trigger.
3. Complete the setup details.

▶ Speed Video Design and Development with Video Triggers

The TDS5000B Series supports a wide variety of video standards with dedicated triggers including NTSC, PAL, SECAM and analog HDTV. IRE and mV graticules can be selected for easier measurements and visual inspection. This makes the TDS5000B Series an ideal tool for video design and development.

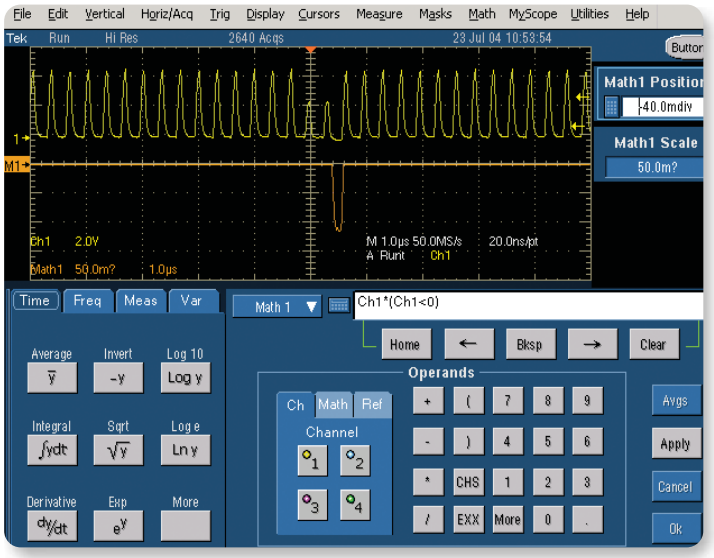


To use Video Trigger:

1. Select Trig menu.
2. Select Video setup.
3. Select the Source and Format.
4. Press the desired Autoset menu button.

▶ Use Advanced Math to Improve Productivity

Advanced math and measurements are not extra-cost items on oscilloscopes that provide the highest productivity for their users. The TDS5000B Series includes math-on-math, an equation editor, and a greater number of standard advanced math functions than available with other oscilloscopes in its class.



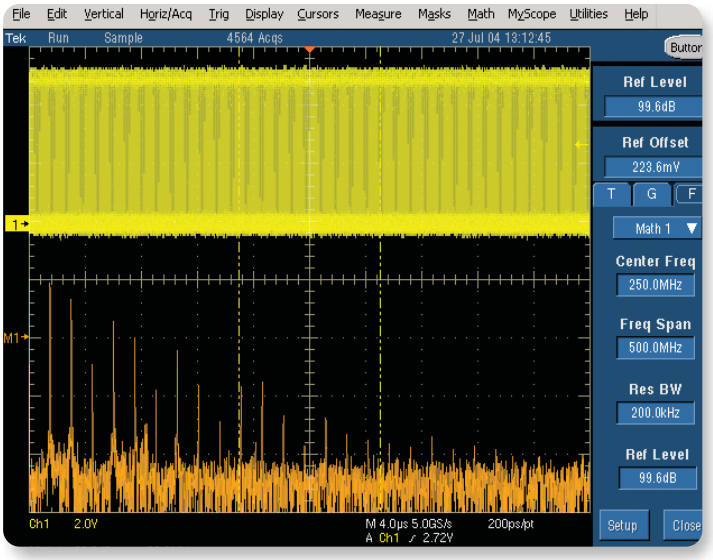
To use Advanced Math:

1. Touch the Math menu button.
2. Choose the Math function desired, including the equation editor (if needed).
3. Enter your equation.
4. Press Apply.

In this example, an equation is used to highlight and measure only those parts of a waveform that go below ground potential.

▶ Quickly Examine the Frequency Spectrum of Your Signal

The TDS5000B Series' Fast Fourier Transform (FFT) math function converts the amplitude-versus-time waveform data into an amplitude-versus-frequency plot, quickly revealing the frequency content of your signal. This function can assist in finding noise sources, characterizing filters, locating cross-talk, and many other problems.

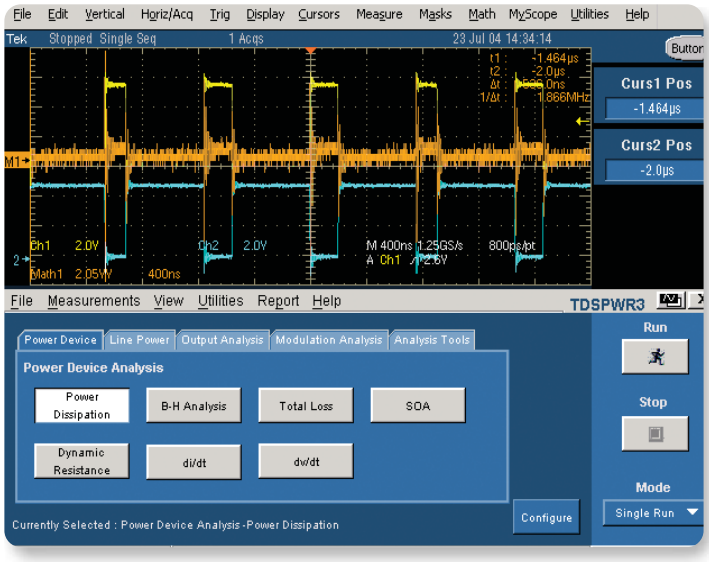


To use the FFT Function:

1. Select the Math menu.
2. Select Magnitude Spectrum.
3. View the result.

▶ Easily Make Power Measurements with Power Software

The TDS5000B Series' powerful and flexible measurements, math, and math-on-math capabilities make it an ideal solution for making power measurements, such as voltage, current, instantaneous power, and energy for power device designers. In addition, the optional TDSPWR3 Power Measurement and Analysis software is available for extensive power-related measurements.

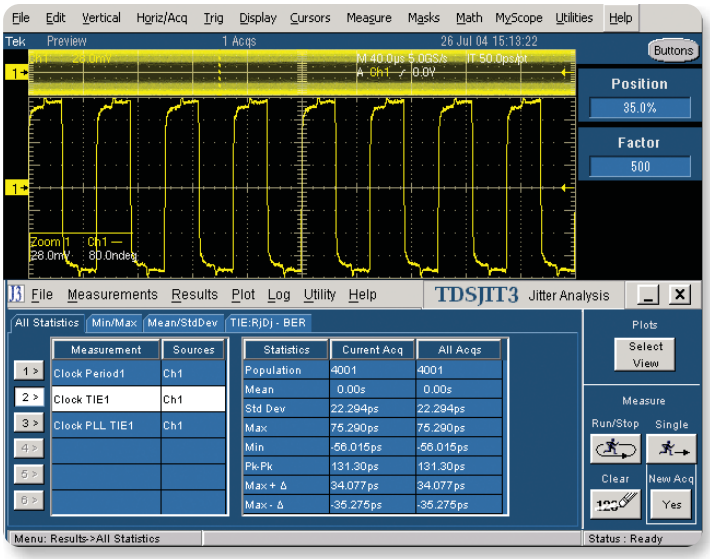


To use the Power Software:

1. Select the File menu.
2. Select Run Application and Power Measurements 3.
3. After the application loads and the control screen appears, select the desired Power Device Analysis, and press Run.

▶ Quickly Analyze Jitter with Jitter Analysis Software

The TDS5000B Series, equipped with TDSJIT3 Jitter Analysis software, can perform essential jitter and timing measurements. Analyze jitter completely within the oscilloscope, without changing connections to the device under test—a convenient, cost-effective expansion of your test resources. This optional software equips the TDS5000B Series with the industry's most comprehensive and accurate jitter measurements. It provides the full complement of basic jitter measurements plus advanced analysis algorithms to decompose jitter into its random and deterministic components to help you isolate their causes.

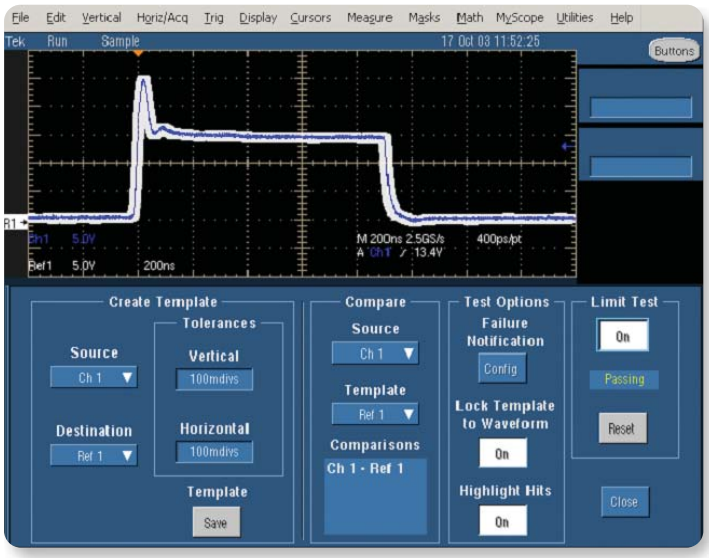


To use the Jitter Measurement Software:

1. Select the File menu.
2. Select Run Application and Jitter Measurements 3.
3. Select the desired Jitter Analysis, and press Run.

▶ Speed Compliance Tests with Limit Testing

Limit testing compares live waveforms against a known “golden” reference waveform with user-defined vertical and horizontal tolerances. This capability can be used for long-term signal monitoring, saving failures to memory or a printer, or simply sounding a “beep” and freezing the display.

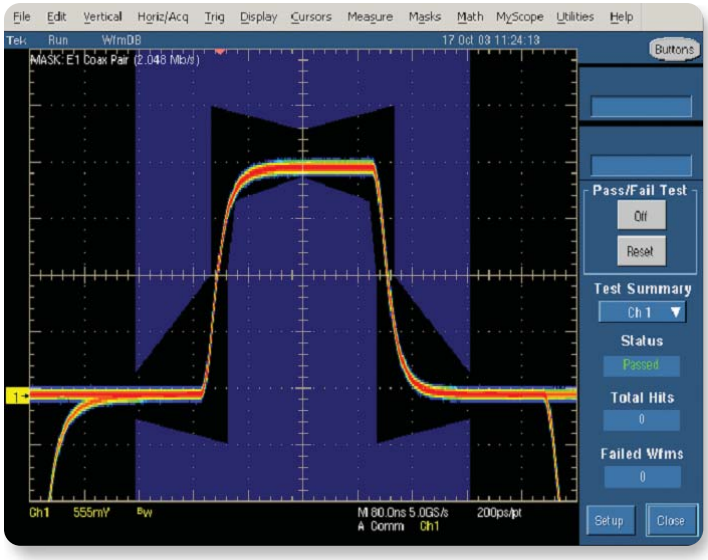


To use Limit Testing:

1. Select the Masks menu.
2. Select Limit Test Setup.
3. Create the template from a known “good” waveform and save it to a Reference memory.
4. Set up the Compare and Test options.
5. Turn on Limit Test.
6. The oscilloscope will carry out the actions you specify when it finds a signal that falls outside the template.

▶ Verify Compliance to Serial Communications Standards with Communications Mask Testing

The TDS5000B Series offers the capability to create your own custom mask patterns, and Option SM provides complete mask portfolio to verify compliance to serial communications standards. Masks are provided for electrical standards up to 555 Mb/s and optical standards up to 1.25 Gb/s. Easily tailor mask testing to your specific requirements using features such as one-button mask autoset, autofit, user-adjustable mask margin tolerance, hit counting, failure notifications, and built-in mask editing.



To use Mask Testing:

1. Select the Masks menu and select Mask setup.
2. Select the desired mask type.
3. Select the Source and Tolerance.
4. Complete the Pass/Fail setup, selecting what to do when a failure occurs.
5. Turn on the Pass/Fail test.
6. Read the results under Pass/ Fail Results.

Contact Tektronix:

ASEAN / Australasia / Pakistan (65) 6356 3900
Austria +43 2236 8092 262
Belgium +32 (2) 715 89 70
Brazil & South America 55 (11) 3741-8360
Canada 1 (800) 661-5625
Central Europe & Greece +43 2236 8092 301
Denmark +45 44 850 700
Finland +358 (9) 4783 400
France & North Africa +33 (0) 1 69 86 80 34
Germany +49 (221) 94 77 400
Hong Kong (852) 2585-6688
India (91) 80-22275577
Italy +39 (02) 25086 1
Japan 81 (3) 6714-3010
Mexico, Central America & Caribbean 52 (55) 56666-333
The Netherlands +31 (0) 23 569 5555
Norway +47 22 07 07 00
People's Republic of China 86 (10) 6235 1230
Poland +48 (0) 22 521 53 40
Republic of Korea 82 (2) 528-5299
Russia, CIS & The Baltics +358 (9) 4783 400
South Africa +27 11 254 8360
Spain +34 (901) 988 054
Sweden +46 8 477 6503/4
Taiwan 886 (2) 2722-9622
United Kingdom & Eire +44 (0) 1344 392400
USA 1 (800) 426-2200
USA (Export Sales) 1 (503) 627-1916
For other areas, contact Tektronix, Inc. at (503) 627-7111
Last Update March 01, 2004

Copyright © 2004, Tektronix, Inc. All rights reserved. Tektronix products are covered by U.S. and foreign patents, issued and pending. Information in this publication supersedes that in all previously published material. Specification and price change privileges reserved. TEKTRONIX and TEK are registered trademarks of Tektronix, Inc. All other trade names referenced are the service marks, trademarks or registered trademarks of their respective companies.

08/04 opus 3GW-18004-0

Tektronix
Enabling Innovation