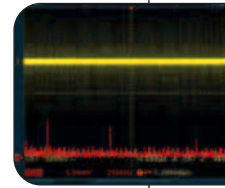
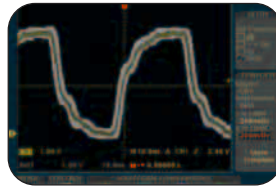
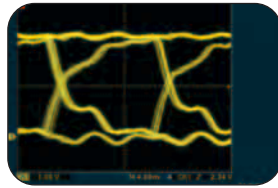
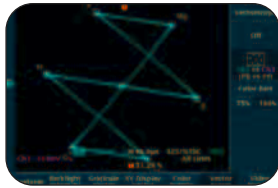


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# Troubleshooting Your Design

with the TDS3000B Series Oscilloscope

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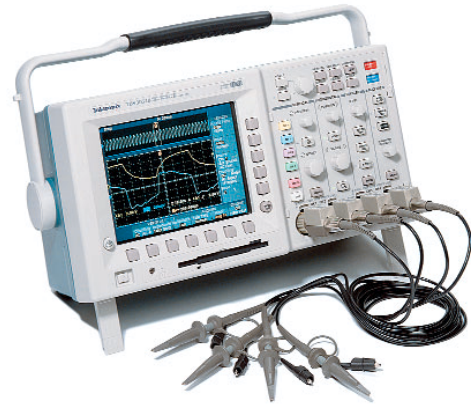
## ▶ Troubleshooting Your Design with the TDS3000B Series Oscilloscope

Today's engineers and technicians face increasingly complex and critical troubleshooting tasks. New digital designs often confront designers with new problems to find: race conditions, transients, signal aberrations, bus contention problems, etc. And, of course, competitive time-to-market pressures dictate that troubleshooting must be completed quickly and accurately.

The TDS3000B Series delivers the power, affordability and portability that enable engineers and technicians to tackle these challenges – quickly and easily. More than just a matter of basic bandwidth, these oscilloscopes enable engineers to solve problems quickly, helping them to establish that a problem exists, allowing them to capture the problem accurately, and enabling them to analyze it to determine the root cause.

The tips on the following pages are designed to further simplify your troubleshooting tasks. But if you need more help, there is plenty available. Simply contact your local Tektronix representative, or visit [www.tektronix.com/oscilloscopes](http://www.tektronix.com/oscilloscopes).

- 100, 300 and 500 MHz models
- Up to 5 GS/s sample rate on all channels
- World's fastest battery-operated oscilloscope
- Built-in Ethernet standard
- e\*Scope™ Web-based instrument control for remote operation
- WaveAlert™ automatic waveform anomaly detection for simple, automated pinpointing of deviant waveforms
- Application-specific modules transform the oscilloscope into a highly specialized analysis tool

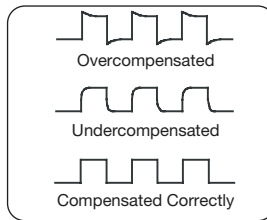
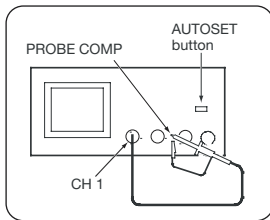


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## ► Getting Started

To optimize your troubleshooting task at hand, it is important to start at the beginning – with proper probe compensation and attenuation, and factory initialization settings.

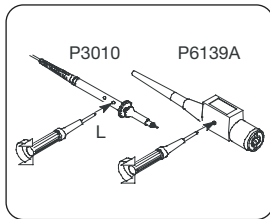


To properly compensate and attenuate your probe, follow these simple steps:

1. Connect the probe to channel 1.
2. Attach the probe tip and reference lead to the **PROBE COMP** connectors. If using the probe hook-tip, ensure a proper connection by firmly twisting the tip onto the probe.
3. Push **AUTOSET**.
4. Check the shape of the displayed waveform to determine if your probe is compensated correctly.
5. If necessary, adjust your probe. Repeat as needed.

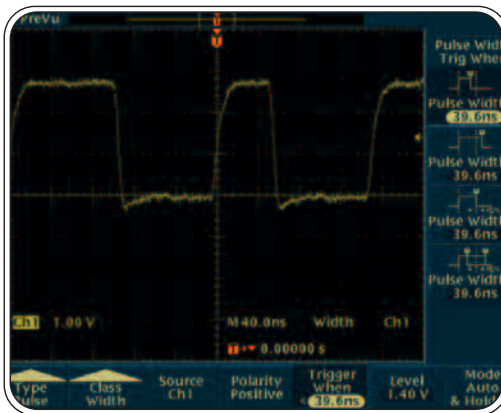
To ensure that you begin with factory initialization settings, follow these simple steps:

1. Press the front panel **SAVE/RECALL** menu button.
2. Press the **RECALL FACTORY SETUP** bottom screen menu button.
3. Press the **OK CONFIRM FACTORY INIT** side screen menu button.
4. Press the front panel **AUTOSET** button.



## ► Debug Digital Timing Problems

Digital designers need to quickly find and analyze a wide range of circuit timing problems. For example, race conditions and transients can cause circuits to perform inaccurately. The TDS3000B Series' pulse width trigger can help troubleshoot such situations by triggering when a signal pulse width is less than, greater than, equal to or not equal to a specified pulse width.

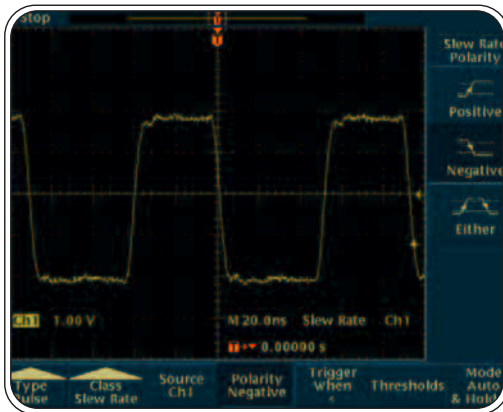


To use the pulse width trigger:

1. In the **TRIGGER** section, press the **MENU** button.
2. In the bottom menu, press **TYPE** until **PULSE** is selected.
3. In the bottom menu, press **CLASS** to select **WIDTH**.
4. Select, as desired, **SOURCE**, **POLARITY**, **TRIGGER WHEN**, **LEVEL** and **MODE & HOLDOFF**.

## ► Debug Rise Time and Fall Time Problems

Both analog and digital electronics designers face problems related to slow edges (the rate of change of volts over time), as measured by the rise or fall time. Slow edges, known as the slew rate, can affect the operation of digital bus transceivers, transmission lines and op-amp circuits. The TDS3000B Series' slew rate trigger can help troubleshoot such situations by capturing waveforms where the slew rate is less than, greater than, equal to, or not equal to a specified rate. Automatic measurements can supply supporting data.



To use the slew rate triggers:

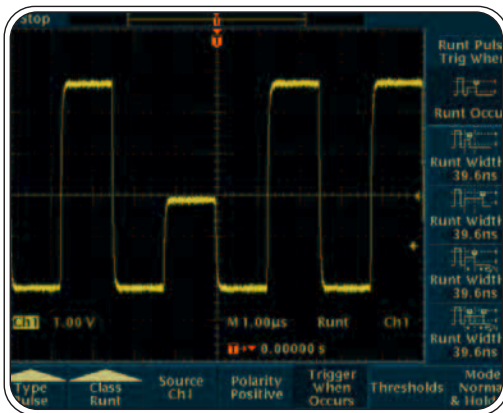
1. In the **TRIGGER** section, press the **MENU** button.
2. In the bottom menu, press **TYPE** until **PULSE** is selected.
3. In the bottom menu, press **CLASS** to select **SLEW RATE**.
4. Select, as desired, **SOURCE**, **POLARITY**, **TRIGGER WHEN**, **THRESHOLDS**, and **MODE & HOLDOFF**.

To run automatic measurements:

1. Press the front panel **MEASURE** button.
2. Press the **SELECT MEASUREMENT** bottom menu button.
3. Select the desired measurements from the side menu.

## ► Debug Threshold Problems

Digital designers must quickly find and analyze bus contention and other threshold problems. The runt pulse trigger is useful to troubleshoot such situations. A runt pulse is a signal that re-crosses a first threshold level before crossing a second threshold level. A positive runt pulse is a signal that first re-crosses the low threshold level; a negative runt pulse is a signal that first re-crosses the high threshold level.

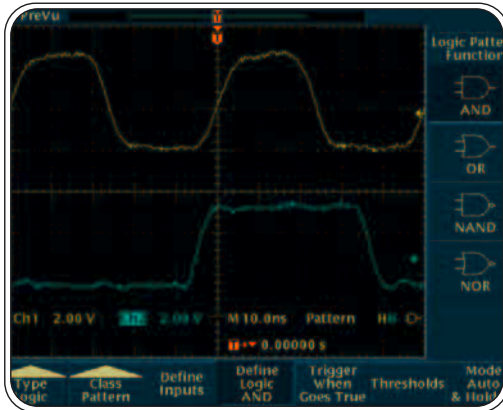


To use the runt pulse triggers:

1. In the **TRIGGER** section, press the **MENU** button.
2. In the bottom menu, press **TYPE** until **PULSE** is selected.
3. In the bottom menu, press **CLASS** to select **RUNT**.
4. Select, as desired, **SOURCE**, **POLARITY**, **TRIGGER WHEN**, **THRESHOLDS**, and **MODE & HOLDOFF**.

## ► Debug Digital Logic Problems

Digital designers must troubleshoot logic conditions on digital circuits. They may need to determine what happens when, or if, two signals meet a Boolean trigger condition. They may want to evaluate conditions when two signals become logically true or false, such as from the output of a two-input AND, OR, NAND, or NOR logic gate. When troubleshooting digital logic synchronous state machines, designers may want to determine if a state signal is true or false at the time a clock signal transition is true. The TDS3000B Series' logic triggers, such as its pattern and state triggers, can be used to tackle these problems.



To use these logic triggers:

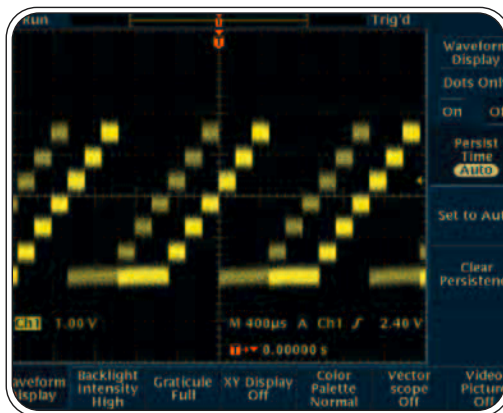
1. In the **TRIGGER** section, press the **MENU** button.
2. In the bottom menu, press **TYPE** until **LOGIC** is selected.
3. In the bottom menu, press **CLASS** to select either **PATTERN** or **STATE**.
4. Select, as desired, **INPUTS**, **TRIGGER WHEN**, **THRESHOLDS**, and **MODE & HOLDOFF**.
5. For pattern triggers, also define whether to trigger on **AND**, **OR**, **NAND**, or **NOR** conditions.



## ▶ Capture Elusive Glitches and Waveform Anomalies

In today's high-speed digital designs, elusive glitches and random anomalies can cause circuits to fail. While finding these glitches has never been easy, the TDS3000B Series speeds and simplifies this task with its digital phosphor technology and patented WaveAlert waveform anomaly detection feature.

The TDS3000B Series employs digital phosphor technology to expose intermittent faults by displaying, storing, and analyzing three dimensions of signal information in real time – amplitude, time and distribution of amplitude over time. Its fast waveform capture rate makes it easier to capture and display infrequent waveforms or waveform variations. Its real-time intensity-grading provides you with information about the frequency of occurrence of signal amplitudes and widths, making it easier to understand the characteristics of the transients you've captured.

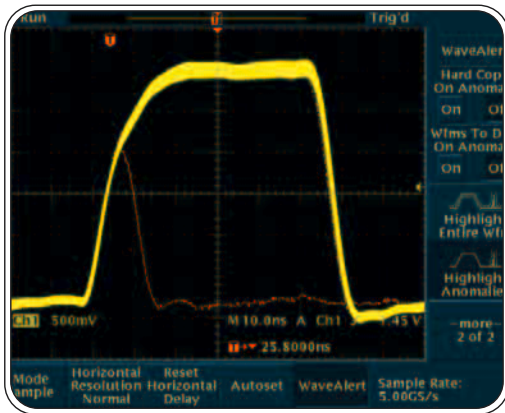


To fully utilize the TDS3000B Series' digital phosphor technology:

1. Press the **DISPLAY** button to show the display menu.
2. Press **WAVEFORM DISPLAY** on the bottom menu.
3. Confirm that **PERSIST TIME** on the side menu is set to **AUTO**.
4. Press the **CLEAR PERSISTENCE** side menu button.
5. As desired, select the **BACKLIGHT INTENSITY** and **GRATICULE** settings.
6. As desired, rotate the **WAVEFORM INTENSITY** front panel knob to adjust the persistence of the anomalous waveform.

## ► Capture Elusive Glitches and Waveform Anomalies (continued)

The TDS3000B Series' WaveAlert waveform anomaly detection feature speeds your troubleshooting task by helping you find elusive problems faster. WaveAlert monitors the incoming signals on all channels and will detect and highlight any waveform that deviates from the "normal" waveform being acquired. You have full control over how sensitive WaveAlert is to changes, and you can select from several actions for the oscilloscope to take when it finds a problem – stop the acquisition, sound a beep, print the problem waveform and/or save the problem waveform to disk.

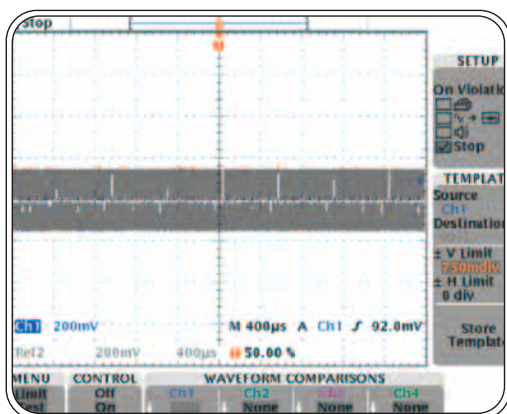


To use the WaveAlert waveform anomaly detection feature:

1. Display the waveform on the screen.
2. Press the **ACQUIRE** front panel menu button.
3. Press the **WAVEALERT** menu button.
4. Press the **WFM ANOMALY DETECTION** side menu button to select **ON**.
5. Press the **HIGHLIGHT ANOMALIES** button to select **ON**.
6. Rotate the general-purpose knob to set the comparison sensitivity value.
7. Use the **WAVEFORM INTENSITY** front panel button to adjust the persistence of the anomalous waveform.

## ▶ Test for Power Supply Glitches

Power supply system designers need to validate that their designs are robust enough to suppress glitches induced by the active circuits that they supply. Fast edges in digital circuits are easily propagated through power supply connections, and designs need to accommodate this tendency. The TDS3000B Series' peak detect mode, high sample rate, and template testing, automate power supply glitch detection.

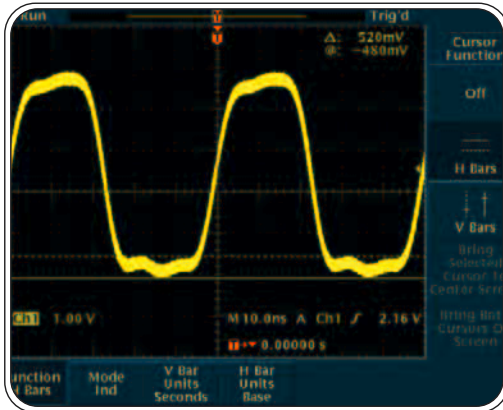


To perform automated power supply glitch detection with the TDS3000B Series:

1. Average the power supply voltage (in this particular case, the ground return) in channel 1.
2. Store the trace in Reference 2, with a  $\frac{3}{4}$  division plus and minus limit, as a waveform template.
3. Turn off **AVERAGING**.
4. Turn on the **PEAK DETECT MODE**.
5. Compare the power supply voltage to Reference 2 in a limit test.
6. The oscilloscope will capture any spike over 150 mV, plus or minus.

## ► Check Signal Integrity

Electronics engineers may discover that a wide array of unintentional electrical events will make a difference in how circuits function in the real world. To characterize these events, engineers can measure criteria such as overshoot, ringing, ground bounce, cross talk, and other signal integrity issues. The TDS3000B Series' cursors and automatic measurements can be used to take such measurements.



To make signal integrity measurements using cursors:

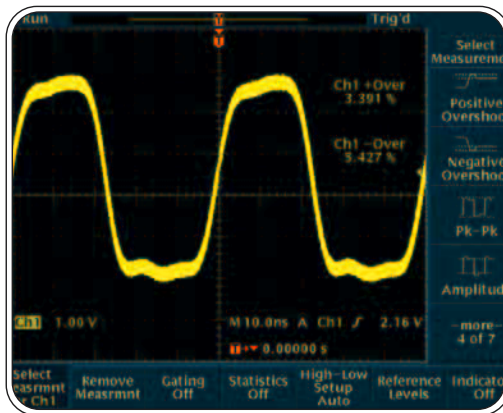
1. Press the **CURSOR** button.
2. Press the **FUNCTION** menu button.
3. Press the **H BAR UNITS** (or **V BAR UNITS**) menu button to select **H BAR** (or **V BAR**) cursors.
4. Place one cursor, as desired, using the general-purpose knob.
5. Press the **SELECT** button.
6. Place the other cursor, as desired, using the general-purpose knob.
7. View the measurement (between cursors, or absolute) on the upper right corner of the display.

$\Delta$  readouts indicate the difference between the cursor positions.

For H Bar cursors,  $@$  readouts indicate the location of the active cursor relative to zero volts.

For V Bar cursors,  $@$  readouts indicate the location of the active cursor relative to the trigger point.

## ► Check Signal Integrity (continued)

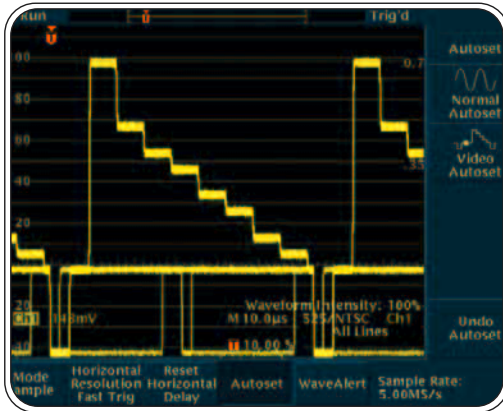


To make signal integrity measurements using automatic measurements:

1. Press the **MEASURE** front panel button.
2. Press the **SELECT MEASUREMENT** bottom menu button.
3. Press the **MORE** side menu button until you find the desired measurements. In this example, look for the positive and negative overshoot measurements.
4. Select **POSITIVE OVERSHOOT** and **NEGATIVE OVERSHOOT** from the side menu buttons.
5. View the measurements selected on the right side of the display.

## ► Test For The Presence of Video Signals

Video technicians must perform a quick check for the presence of a video signal at different test points. If the site is in the field, technicians will need lightweight, portable test equipment gear that they can easily carry to each location. The TDS3000B Series, with its optional battery-powered operation and video trigger features, make this oscilloscope a valuable tool for these technicians.



To use the TDS3000B Series' video trigger to quickly check for the presence of a video signal:

1. Connect the oscilloscope to the video signal using proper adapters and a 75  $\Omega$  terminator, if necessary.
2. Press the **ACQUIRE** menu button.
3. Press the **AUTOSET** bottom button.
4. Press the **VIDEO AUTOSET\*** side button. If a broadcast-standard video waveform is present, the oscilloscope will display a stable video waveform that is triggered on all lines.
5. Adjust vertical position and scale as desired.
6. If desired, reconnect the oscilloscope to other test points. You do not need to change any oscilloscope settings.

\*TDS3VID and/or TDS3SDI video application modules required. Otherwise, video triggering must be set up manually.

## ► Test Each Line of a Video Signal

Video technicians may need to check one or more video lines. They may need to search for defective pixels in a Charge-Coupled Device (CCD) video camera. The TDS3000B Series' video triggers enable technicians to test each line of a video signal.



To use the TDS3000B Series' video trigger to check each line of a video signal:

1. Connect the oscilloscope to the video signal using proper adapters and a 75  $\Omega$  terminator, if necessary.
2. Press the **QUICKMENU** button.
3. If needed, press the **MENU** bottom button to display **VIDEO**.
4. Press the **VIDEO AUTOSET\*** bottom button until **LINES** is displayed.
5. Press the **FIELD/LINE** side button to select the proper line type. **EVEN** and **ODD** signify even and odd lines/fields, respectively. When viewing lines, **AUTOSET** will select **FAST TRIG** for you.
6. If you have selected **LINE** in **FIELD/LINE** section, you can now rotate the general-purpose knob to examine each video line.
7. Adjust vertical position and scale as desired.

\*Requires TDS3VID and/or TDS3SDI video application modules. Otherwise, video triggering must be set up manually.

## ► Determine if this Video Signal is the Desired Video Signal

Video technicians want to determine if the displayed signal is the desired signal. Is it the news program or the sports program? With the TDS3000B Series, these technicians can make this determination by simply viewing a picture image of the video source.



To apply the TDS3000B Series' video trigger to determine whether or not the video signal is the desired signal by using the video picture mode:

1. Press the **DISPLAY** menu button.
2. Press the **VIDEO PICTURE** menu button.
3. Press the **PICTURE** menu button to select **ON**.

Requires TDS3VID and/or TDS3SDI video application module.



## ► Check Video Color Signals

Video technicians need to check for chroma (color) level problems and to adjust video equipment to solve any such problems. The TDS3000B Series can function as a vectorscope with built-in graticules for 100% or 75% color bars to enable these technicians to measure chroma levels and view color signal phase and amplitude problems.



To use the TDS3000B Series' vectorscope mode:

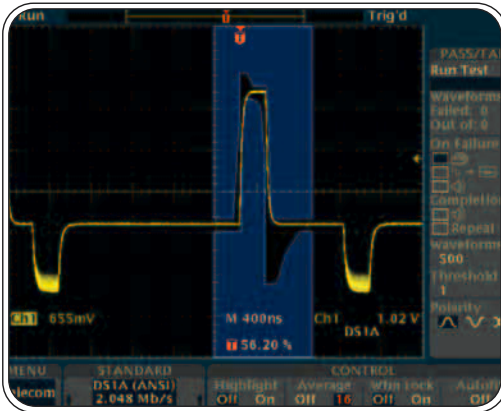
1. Hook up the Y' signal to Ch1, the P'b signal to Ch2, and the P'r signal to Ch3.
2. Press the **DISPLAY** front panel button to show the display menu.
3. Press the **VECTOR SCOPE** bottom menu button.
4. Press the Ch2 vs. Ch3 (P'b vs. P'r) side menu button.
5. To scale and place the image, adjust the front panel **VERTICAL SCALE** and **VERTICAL POSITION** knobs as desired with Ch2 (horizontal) and Ch3 (vertical) selected.
6. To more finely scale and place the image, press the **VERTICAL MENU** front panel button and the **FINE SCALE** bottom button, and rotate the general-purpose knob.

Requires TDS3VID and/or TDS3SDI video module.

## ► Check the Quality of a Communications Signal

Communications engineers and technicians must test the quality, or performance, of a communications signal. Intense time-to-market pressures require that they do so quickly and efficiently. The TDS3000B Series, with its mask testing capability, constellation diagrams and eye diagrams, is an ideal tool for these developers.

Manufacturing engineers in a telecommunications environment may need to compare the actual performance of equipment on the production line with “masks” of telecommunications standards. The TDS3000B Series’ mask testing capabilities make this oscilloscope an ideal test tool for these manufacturing engineers.



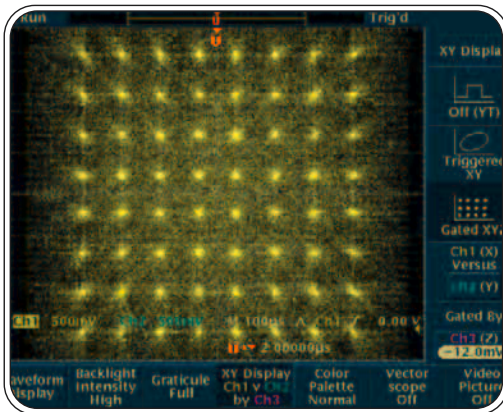
To use the TDS3000B Series’ pass/fail mask testing capabilities:

1. Press the **QUICKMENU** front panel button.
2. Press the **MENU** bottom menu button to display **TELECOM**.
3. Press the two **STANDARD** buttons to select and display a mask.
4. Press **AUTOSET** to position the waveform in the mask and adjust the gain and position settings as necessary.
5. Press the bottom and side menu buttons to set test and pass/fail parameters.
6. Press the **RUN TEST** side button to run pass/fail testing.

Requires TDS3TMT telecommunications mask testing module.

## ► Check the Quality of a Communications Signal (continued)

Some communications signals are encoded in a Quadrature Amplitude Modulation (QAM) format. To test the distortion of such a signal, engineers can use the TDS3000B Series to generate a constellation diagram and analyze the clarity of the signal's amplitude and phase at discrete times in the diagram.

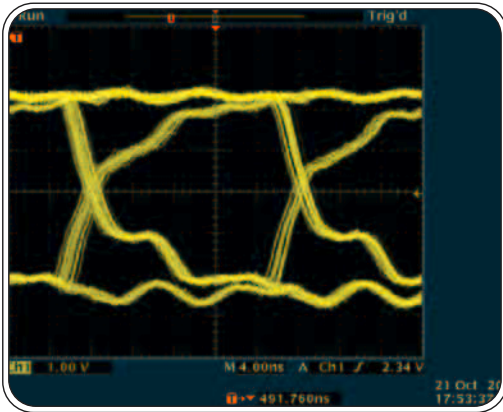


To obtain a constellation diagram using the TDS3000B Series oscilloscope:

1. Connect the three signals to the oscilloscope using proper probe techniques.
2. Press the front panel **DISPLAY** button.
3. Press the bottom **XY DISPLAY** menu button.
4. Press the side **GATED XYZ** menu button to select the Z (gate) source channel.
5. If needed, press the side Ch1 (x) Versus menu button to select the Y signal (Ch2 is the default).
6. Press the side **GATED BY** menu button to select the Z (gate) source channel.
7. Rotate the general-purpose knob to enter a value.
8. To properly place and scale the image, adjust the **VERTICAL SCALE** and **VERTICAL POSITION** with Ch1 (horizontal) and Ch2 (vertical) selected.

## ► Check the Quality of a Communications Signal (continued)

Communications technicians must characterize how well a communications signal complies with international standards by determining if the signal's bits are accurately crossing the communications channel. The TDS3000B Series allows these technicians to check the quality of a communications signal using eye diagrams.

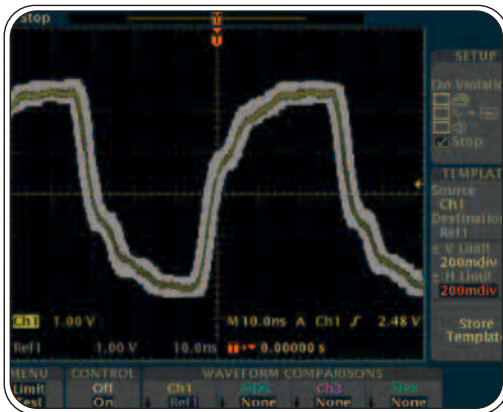


To use an eye diagram to check the quality of a communications signal:

1. Press the front-panel **AUTOSET** button.
2. As desired, adjust the **HORIZONTAL SCALE** to adjust the width of the eye.
3. Adjust the front-panel **HORIZONTAL DELAY** to view both the positive and negative transitions at the same time.

## ► Make a Quick Pass/Fail Test of a Device-under-test (DUT)

Manufacturing engineers often perform repetitive tests in which they desire quick pass/fail decisions on a DUT. The TDS3000B Series offers quick pass/fail, or limit, tests by comparing active signals of a DUT with template envelope waveforms of a known good device. The oscilloscope can be set up to stop the acquisition, sound a beep, print a hard copy or save the waveform to disk if any part of the active waveform strays outside the reference limits.



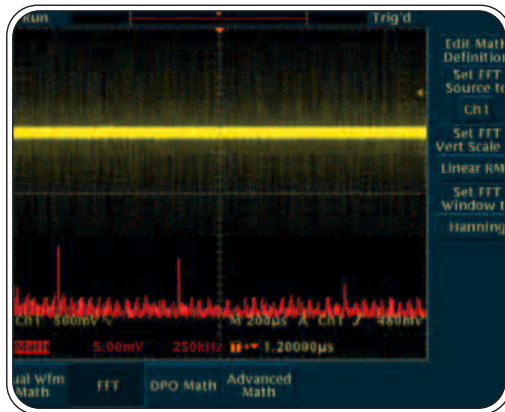
To create a template for limit testing and perform a limit test:

1. Press the **QUICKMENU** front panel button.
2. Press the **MENU** bottom button to select Limit Test.
3. Press the top two side menu buttons to select the **SETUP ON VIOLATION** options.
4. Press the template **SOURCE/DESTINATION** side button.
5. Enter the **SOURCE** field with the general-purpose knob.
6. Press the **SOURCE/DESTINATION** side button to select the **DESTINATION** field and enter with the general-purpose knob.
7. Press **±V LIMIT** side button and use the general-purpose knob to set the vertical limits of the template waveform.
8. Press **±H LIMIT** side button and use the general-purpose knob to set the horizontal limits of the template waveform.
9. Press **STORE TEMPLATE** to create the limit test waveform and save it in the specified ref memory.
10. To display the template, press **REF** and select the specified reference memory to display the template.
11. To perform a limit test, press **CONTROL** to select **ON** and start the test.

Requires TDS3LIM limit testing module.

## ► Look for Unintentional Circuit Noise

Developers need to check for unintended noise in their prototypes. To do so, developers can use advanced math, such as Fast Fourier Transform (FFT) displays. The FFT feature breaks down signals into component frequencies, which the oscilloscope uses to display a graph of the frequency domain of a signal, as opposed to the oscilloscope's standard time domain graph. Developers can then associate those frequencies with known system frequencies, such as system clocks, oscillators, read/write strobes, display signals, or switching power supplies. For example, switching power supplies can generate odd-order harmonics, which can enter the power grid and degrade designs. The TDS3000B Series offers a standard FFT feature, making it an ideal tool for these developers.

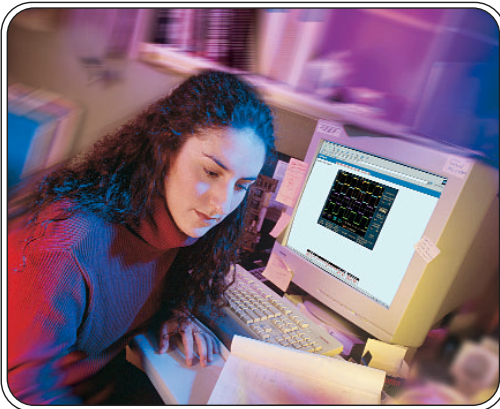


To create and run an FFT measurement:

1. Press the vertical **MATH** button.
2. Press the **FFT** button.
3. Select the signal source, vertical scale, and FFT window.
4. If desired, use the **ZOOM** button along with the horizontal **POSITION** and **SCALE** controls to magnify and position the FFT waveform.

## ▶ Remote Troubleshooting Using Your Computer's Browser

A development team on one continent may need to troubleshoot a problem with a circuit board on the production line on another continent. A factory expert may need to personally supervise measurements by a field technician to troubleshoot a customer's problem. Or a team may need to remotely monitor equipment at off-site locations. The TDS3000B Series' unique e\*Scope web-based remote control feature enables these users to access any Internet-connected TDS3000B Series oscilloscope from a browser on workstations or PCs.



To connect your oscilloscope to the network from your PC or work station using the TDS3000B Series' e\*Scope feature, simply:

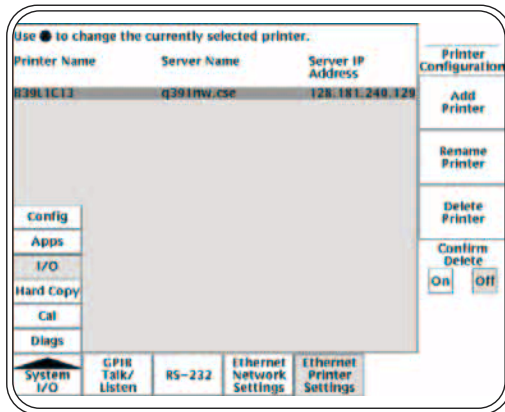
1. Open your **BROWSER**.
2. In the browser field, enter the **IP ADDRESS** of the TDS3000B Series oscilloscope to which you wish to connect.
3. Press **RETURN**.
4. The browser program will load the oscilloscope's home page and will include an image of the screen's contents.

For more detail about the operation of the TDS3000B Series' e\*Scope feature, please refer to the application note, *e\*Scope Remote Control Puts Network-Connected Oscilloscope on Your PC Desktop*, located at [www.tektronix.com](http://www.tektronix.com).



## ► Print Measurement Results on a Network Printer

Engineers may need to send screenshots to a network printer for documentation, presentations or archive of successful design characterizations. e\*Scope delivers TDS3000B measurements to your network-connected PC. Once the results are in your PC, it is easy to store them on an engineering drive, print them or embed them in a report.



To print to a network printer using the TDS3000B Series' e\*Scope feature, simply:

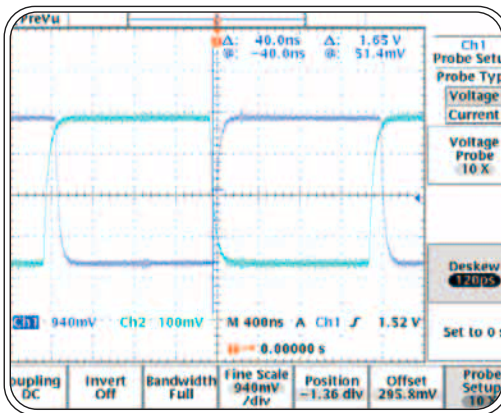
1. Press the **UTILITY** front panel button.
2. Press the **SYSTEM** bottom button to select I/O.
3. Press the **ETHERNET PRINTER SETTINGS** bottom button to display the Printer Configuration screen, which lists all loaded network printers.
4. Press the **ADD PRINTER** side button to display the Add Printer screen.

For more detail about the operation of the TDS3000B Series' e\*Scope feature, please refer to the application note, *e\*Scope Remote Control Puts Network-Connected Oscilloscope on Your PC Desktop*, located at [www.tektronix.com](http://www.tektronix.com).



## ► Measure Propagation Delay and Deskew Probes

Circuit designers often need to measure propagation delay through their designs and cable connections. The TDS3000B Series simplifies this measurement by combining propagation delay, phase change, amplitude change, and offset measurements between the input and the output of an amplifier in one measurement.



To measure propagation delay using the TDS3000B Series:

1. Connect the channel 1 and 2 probes to the same fast edge.
2. Adjust the **PROBE DESKEW** to match the propagation delay through the probes by overlaying the edges.
3. Adjust the **FINE SCALE** and **OFFSET** on channel 1 to match the amplitude and offset value in the amplifier output to the amplitude and offset (set to zero) in channel 2, the amplifier input. This amplifier has a gain of 9.4, and an offset at the output of 295.8 mV.
4. As this is an inverting amplifier, use the **CURSORS** to measure the propagation delay between the input (the falling edge) and the output (the rising edge). The result is 40 ns delay.

## ► TDS3000B Series Application Modules

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

**TDS3LIM 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, autoset, holdoff, line count trigger, video picture mode, vectorscope mode, HDTV format triggering graticules and more.

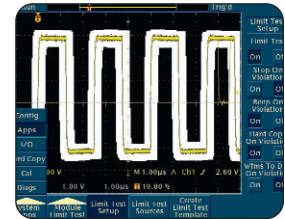
**TDS3SDI 601 Serial/Digital Video Module** – Identify and analyze ITU-R BT.601 video signals, video picture mode with bright line select, vectorscope mode, HDTV format triggering and more.

**TDS3GV Communications Module** – GPIB, VGA output and RS-232 communications module.

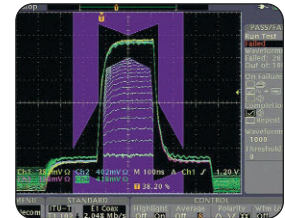
**TDS3AAM** –  
Advanced Analysis  
Module



**TDS3LIM** –  
Limit Testing Module



**TDS3TMT** –  
Telecommunications  
Mask Testing Module



## ▶ TDS3000B Recommended Accessories

### AFG300 Series

The AFG300 Series is a space-saving, budget-saving solution that packs three instruments into one box – a function generator and arbitrary waveform generator with outstanding pulse capabilities. As a 16 MHz function generator, the AFG300 Series supports standard waveforms (such as sine, square, triangle, ramp, pulse, DC and noise) with a frequency sweep function and three operating modes (continuous, triggered and burst). As an arbitrary waveform generator with 16 MS/s sample rate, 12-bit vertical resolution and nonvolatile memory that holds four 16,384-point waveforms, the AFG300 Series is an ideal tool to simulate complex waveforms.

**TDS3PRT** – Plug-in thermal printer.

**TDS3BAT** – Rechargeable NiCd battery pack.

**TDS3CHG** – Fast charger for battery pack.

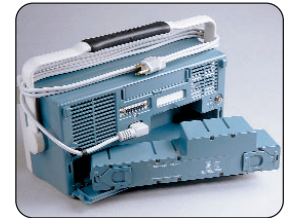
**VCLNKB/VCLNKP** – VocalLink™ voice control software.

**TNGTDS01** – Operator Training Kit

**AFG300 Series** –  
Arbitrary Function  
Generator



**TDS3BAT** –  
Rechargeable  
Battery Pack



**TNGTDS01** –  
Operator Training Kit



## ► Complete Probing Solutions for the TDS3000B Series

### Passive Probes

P3010 10X, 100 MHz passive probe  
P6101B 1X, 15 MHz passive probe  
P6139A 10X, 500 MHz passive probe

### Low-capacitance Probes

P6158 20X, 3 GHz low-capacitance probe

### Active Probes

P6205 10X, 750 MHz active probe  
P6243 10X, 1 GHz active probe

### Differential Probes

P6246 1X/10X, 400 MHz differential probe\*<sup>1</sup>  
ADA400A 100X/10X/1X/0.1X, 1 MHz\*<sup>2</sup> differential preamplifier

### Current Probes

A621 1,000 A<sub>RMS</sub>, 50 kHz current probe  
A622 70 A<sub>RMS</sub>, 100 kHz current probe  
AM503S 500 A DC, 100 MHz current probe system  
AM5030S 500 A DC, 100 MHz current probe system  
CT2 3.5 A<sub>RMS</sub>, 200 MHz current probe  
P6021 7 A<sub>RMS</sub>, 60 MHz current probe  
P6022 3 A<sub>RMS</sub>, 120 MHz current probe  
TCP202 15 A DC, 50 MHz current probe

### High-voltage Probes

P5100, 250 MHz, high-voltage single-ended probe  
P6015A, 75 MHz, high-voltage single-ended probe  
P5205 50X/500X, 100 MHz, high-voltage differential probe  
P5210 100X/1,000X, 50 MHz, high-voltage differential probe

\*<sup>1</sup> Requires 1103 TEKPROBE® power supply when used with TDS3000B Series.

\*<sup>2</sup> Bandwidth limits: 100 Hz, 3 kHz, 100 kHz.

**P6139A –**  
Passive Probe



**P6243 –**  
Active Probe



**P5210 –**  
High-voltage  
Differential Probe



## ▶ World-class Technical Support

The Tektronix Technical Support team offers unsurpassed technical expertise and experience, and can assist you with a multitude of tasks to keep your product working at peak performance and efficiency. Their expertise is accessible around the globe. Simply contact your local Support Center\* to reach the Tektronix Support professionals in your area.

\*Visit [www.tektronix.com](http://www.tektronix.com) and select "contact us" to find your local Support Center's e-mail address and telephone number.



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