Increase Accuracy, Insight, and Efficiency for TDS6000, TDS7000, and CSA7000 Series Oscilloscopes

- A suite of debug, verification and compliance testing features for serial bus architectures
- MultiView zoom features to enable detailed examination and comparison within long records
- Screen cursors for flexible and efficient signal integrity analysis
- Measurement annotation providing immediate confidence and completeness in archived results
- Windows 2000 operating system for increased system security and stability
- 5 GHz differential probe provides the signal fidelity required for debugging designs with fast clock speeds and edge rates

Automatic eye diagram mask testing speeds verification of serial architecture internal system buses

Emerging internal bus technologies—including RapidIO™ architecture and System Packet and SERDES Framer Interfaces (SPI and SFI)–present significant interoperability and compliance issues for system designers. In addition, higher speeds and complexity mean that faults and problems become ever more difficult to find and debug.

TDS6000, TDS7000 and CSA7000 Series oscilloscopes provide the full visibility of analog signal characteristics essential for testing, debugging and verifying compliance to standard specifications. And because everything starts from accurate capture of the signals, Tektronix offers a suite of reliable and easy to use probes with very short tip lead and ultra-low input capacitance that bring the signal, aberrations and all, accurately to the oscilloscope and logic analyzer acquisition system. These include the P7350 5 GHz differential and P7260 6 GHz active probes.

Compliance Testing and Verification with Eye Diagrams

Eye diagrams and compliance masks are useful ways to visualize and specify performance, because they reveal the quality of a driver output or receiver input. The TDS6000, TDS7000 and CSA7000 Series real-time oscilloscopes are ideal tools to perform these types of analysis because they combine industry-leading acquisition with eye diagram-focused capabilities. They offer the most extensive list of standard masks available in the industry, including emerging standards such as Rapid IO, OIF standards (SFI-5, SPI-5, TFI-5, VSR-X), PCI Express, and SONET/SDH FEC (2.666 Gb/s). And they have the industry's most advanced user interface for mask set-up and testing. A few simple selections set up the proper amplitude, timebase range, trigger type–including clock recovery if the standard requires. The TDS6000, TDS7000, and CSA7000 offer the most complete package for compliance testing with masks and eye diagrams.

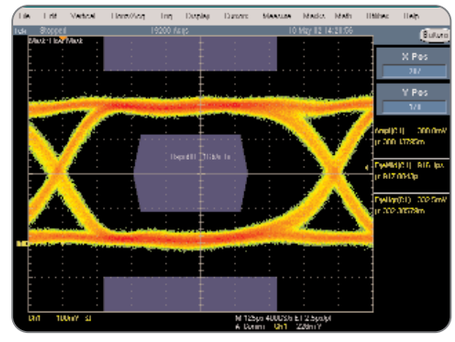


Figure 1. Testing a Rapid IO transmitter at 1 Gb/s. In this example, there is no skew between the signal under test and the associated clock used to trigger the recordings. If skew was present, the eye pattern would be shifted to the left or right relative to the oscilloscope trigger point.

Tektronix
Enabling Innovation

Easily Manage Long Records with MultiView Zoom

Certain design applications–such as magnetic and optical storage peripheral design–depend on the ability to examine and compare long records of information. To identify failure mechanisms, you need to compare read channel information from "good" and "bad" sectors. You also need flexible comparison of servo bursts to evaluate electromechanical control loops. In mainstream digital design applications, troubleshooting often depends on analyzing segments of information leading up to a fault condition. Efficiently navigating through millions of samples of data can be daunting without the proper tools.

MultiView zoom features in TDS6000 and TDS/CSA7000 Series oscilloscopes allow you to quickly examine and compare multiple waveform regions. The unique graphical method makes comparing waveforms and examining long time histories easy and efficient.

Align-Lock-Scroll

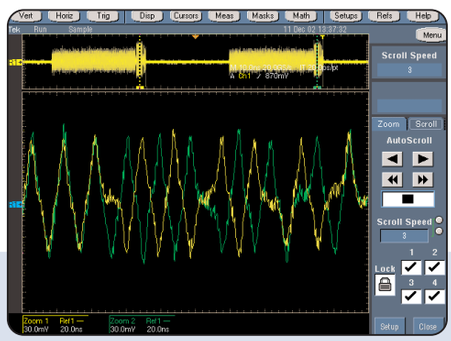
Aligned comparison of waveform data is a critical technique for analyzing periodic systems such as optical and magnetic storage devices and serial communications systems. Create up to four zoom areas on each signal and use them to visually align sections of waveforms. Lock the relative positions together and scroll through deep records manually or automatically while comparing signal behavior.

Rapid Navigation

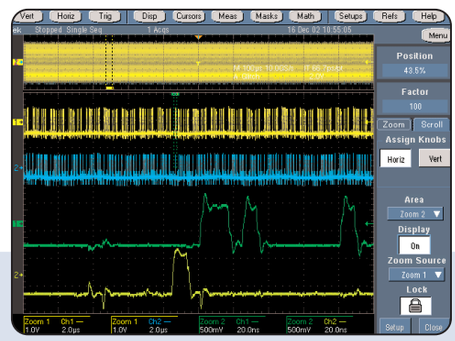
Unique graphical manipulation techniques, only available from Tektronix, provide the most rapid and convenient means of positioning zoom areas. Zoom displays often focus on hundreds of samples out of millions acquired. Manually positioning regions using control knobs is important for fine control but can be tedious and time consuming when traversing long records. With Tektronix MultiView zoom's graphical manipulation you can rapidly select an area to zoom, drag the area to a new position, and finely adjust position using the mouse scroll wheel. Your hand never leaves the mouse and operations are performed quickly and intuitively. Fatigue is reduced in high-use situations because your hand remains comfortably resting on the bench.

Zoom on Zoom

Zoom-on-zoom provides a powerful tool for detailed analysis of data while retaining overviews for reference. Extremely long memory captures often appear as a "band of light" on the display due to the volume of data. Use a zoom region to display a subset of the data with coarse detail. Create additional zoom regions based on the first to provide detailed viewing and comparison of events.



▶ *Figure 2. This figure compares different areas of a waveform by overlaying them and horizontally scrolling through the region of interest. Two zoom areas have been created and positioned to display similar regions of waveform activity. Zoom positions can be rapidly adjusted by dragging the zoom area handles using a mouse or the touch screen. Fine control is available using the mouse scroll wheel or multi-purpose knobs on the instrument. The horizontal positions of the areas can be unlocked for positioning traces relative to one another or locked to achieve simultaneous scrolling for comparison. Automatic scrolling at user-adjustable speed is also provided with tape transport-style controls.*



▶ *Figure 3. Analysis of digital system activity using multiple levels of zoom. The upper display contains a long-record capture (1µs of activity at 67 ps resolution) contained in 15 Million samples. Zoom Area 1 provides enough detail to pick out reference events in the data. Zoom Area 2 is created on Zoom 1 to display waveform details and enable precise measurements.*

Screen Cursors and Measurement Annotation Speed Debugging

Screen Cursors

Verifying signal integrity of a complex digital system, such as a computer motherboard or communication system backplane, is a challenging job. Often, complex programs run automated system tests. But when it comes down to debugging tasks, you need easy tools to help find out what's causing the problems. Screen cursors provide a handy tool for fast, simple verification of voltage and timing parameters. The full screen width and height bars make it easy to ensure the cursors are positioned correctly on your waveforms. You can use the multi-purpose knobs to adjust the position of the cursors or use the mouse to simply drag the cursor to the position you want. The mouse scroll wheel makes fine position adjustments very convenient. With the unique ability to drag both the X and Y cursor simultaneously by clicking their intersection, moving rapidly from one waveform segment to another is simple.

Measurement Annotation

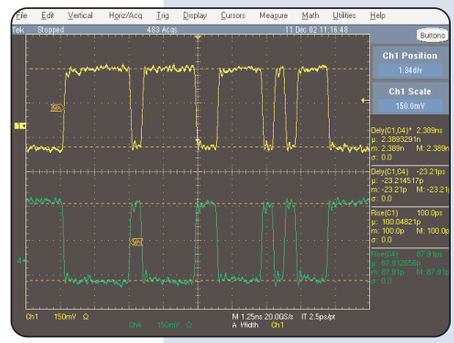
When you're exploring the operating limits of your system design you need to know your measurements are as accurate as possible. Automated measurements are the most consistent way to characterize your signals as you vary operating conditions. Documenting setups and which portion of the waveform is being measured can be vital to duplicating tests and validating results later. Measurement annotation capability offers clear indication of the measurement setup and results. Flags on the waveform indicate the reference position on the waveform where the measurement is made. Reference readings on the flags indicate the levels set for that measurement – rise time measured at 10% to 90% or 20% to 80% for example. Dashed lines show other reference marks required for an individual measurement. An asterisk in the measurement readout indicates which measurement is annotated. Annotations are available for all types of measurements, including Communication measurements.

Measurement annotation gives you confidence that you're making the measurement you want on the correct part of the waveform. And if you're making many similar measurements, such as delays among several lanes in a multi-lane serial bus system, you can clearly see that each measurement is set up correctly.

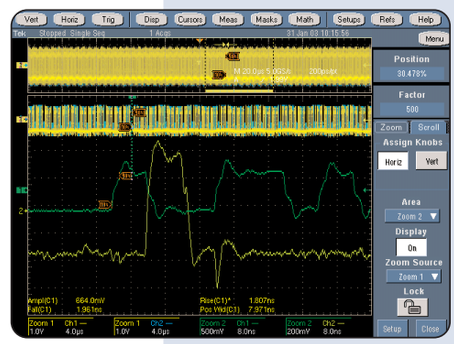
Measurement Gating

Combining MultiView zoom capabilities with Measurement Annotation provides the most comprehensive measurement control available. Easily control where measurements are made on your waveform by defining a zoom area to gate the measurement. Any of the MultiView zoom areas can be used to gate measurements and measurement annotations clearly indicate on the display - in detail and in context - where the measurements are being made.

▶ *Figure 4. Quickly checking rising edge-to-rising edge timing between two signals is easy with the screen-based cursors.*



▶ *Figure 5. Annotation of multi-channel measurements, such as this delay measurement from rising edge on channel 1 to rising edge on channel 4, make it easy to see how the measurement is set up. It also shows calculated baseline (0% reference) and top line (100% reference), 50% reference points on the measured edges, and the asterisk indicates which rise time measured is annotated.*



▶ *Figure 6. MultiView zoom quickly sets a measurement gating region to combine detailed views of long records with full control of measurement set-up.*

Windows 2000 OS

Network security is a growing concern for all enterprises. You need to share your data with your work group in a safe environment that complies with your IT department's guidelines. Windows 2000 operating system provides the security, convenient networking and application stability required by the majority of concerned companies. The Multi-lingual User Interface of Windows 2000 offers more flexibility for non-English applications.

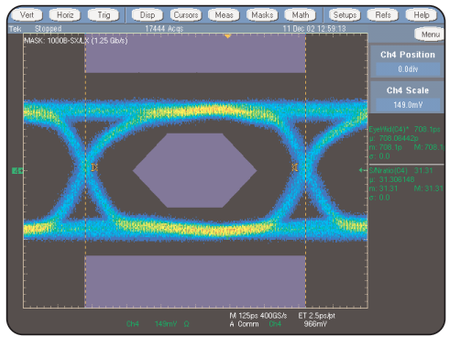


Figure 7. Annotations are available for all types of measurements, including communication measurements such as this eye width measurement on channel 4.

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