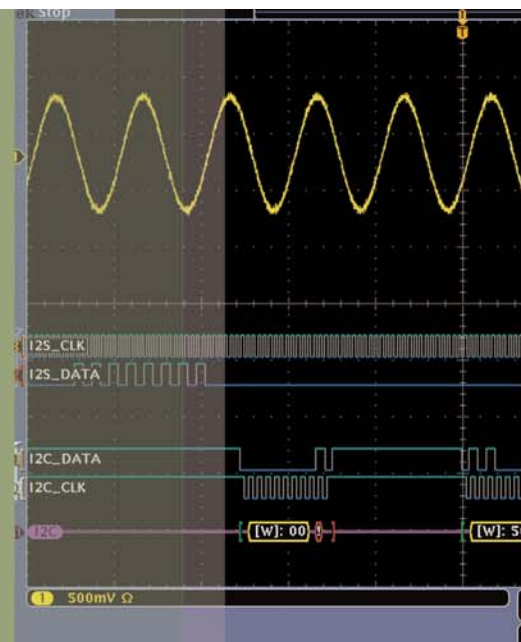


# The Power To Solve Problems Quickly

Your Guide to Selecting the Right Bench Oscilloscope

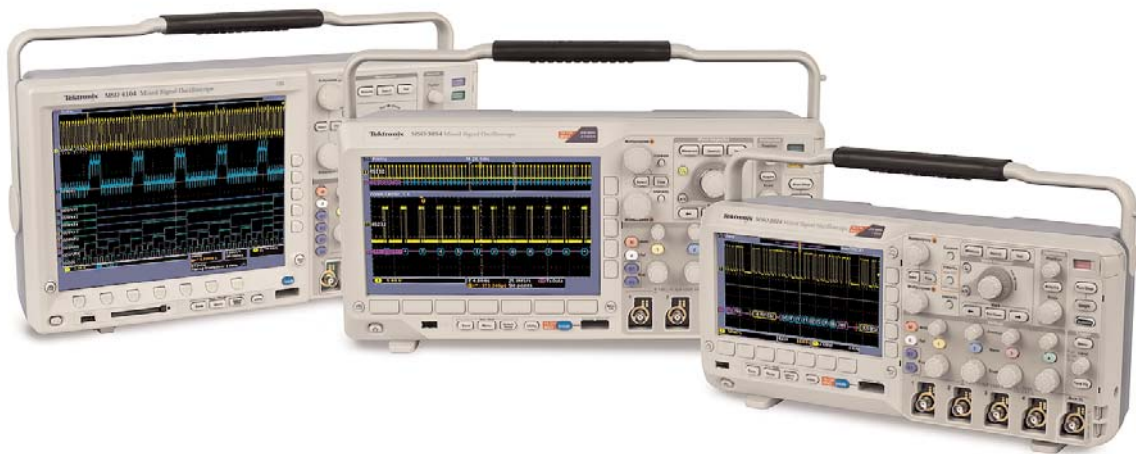


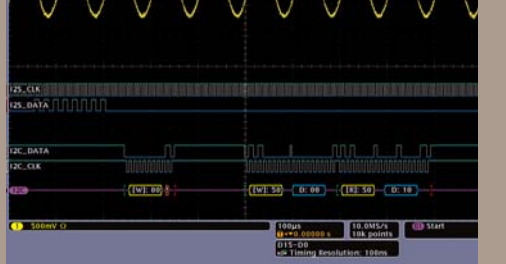


# Feature-rich Tools for Debugging Mixed Signal Designs

Today's embedded systems often integrate many elements into a single design including microcontrollers, FPGAs, serial and parallel buses, ADCs, DACs, and power supplies, complicating debug. Now, you must monitor a variety of signals at the system-level to troubleshoot your design.

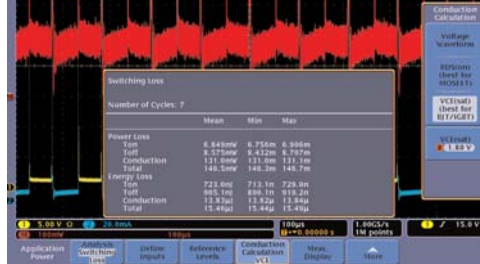
With Tektronix' Bench Oscilloscopes, you can analyze up to 20 analog and digital signals with a single instrument. And with automated serial and parallel bus analysis, innovative Wave Inspector® controls for rapid waveform navigation, and automated power measurements, the MSO/DPO Series provides the feature-rich tools you need to simplify and speed debug of your complex design.



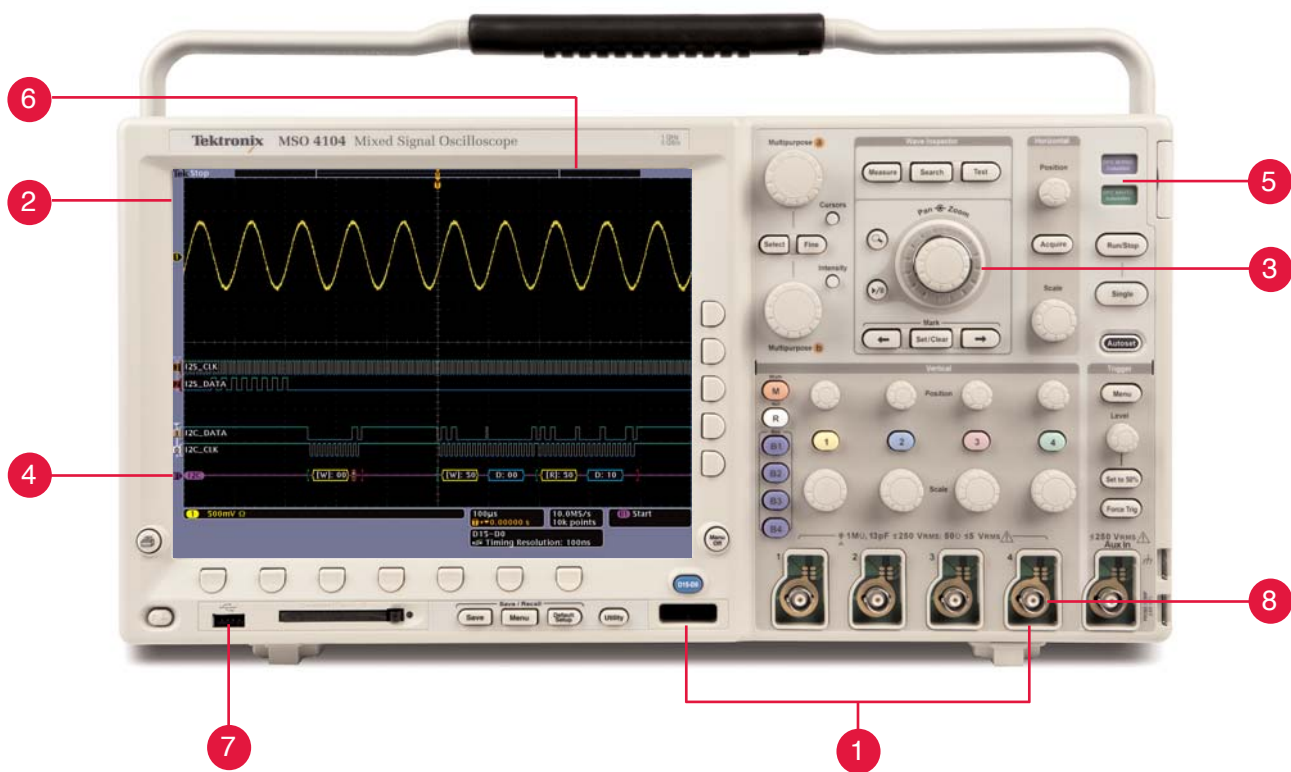


## MSO/DPO Oscilloscope Series Product Selection

	4000 Series	3000 Series	2000 Series
<b>Bandwidth</b>	1 GHz, 500 MHz, 350 MHz	500 MHz, 300 MHz, 100 MHz	200 MHz, 100 MHz
<b>Channels</b>	4 analog 16 digital (MSO Series)	2 or 4 analog 16 digital (MSO Series)	2 or 4 analog 16 digital (MSO Series)
<b>Record Length</b>	10 M points	5 M points	1 M points
<b>Analog Sample Rate</b>	5 GS/s (1 GHz models) 2.5 GS/s	2.5 GS/s	1 GS/s
<b>Digital Sample Rate (MSO Series)</b>	500 MS/s main, 16 ch 16.5 GS/s MagniVu, 16 ch	500 MS/s main, 16 ch 8.25 GS/s MagniVu, 16 ch	1 GS/s main, 8 ch 500 MS/s main, 16 ch
<b>Parallel Bus Analysis (MSO Series)</b>	Yes	Yes	Yes
<b>Optional Serial Bus Analysis</b>	<ul style="list-style-type: none"> <li>■ I<sup>2</sup>C, SPI</li> <li>■ USB</li> <li>■ CAN, LIN, FlexRay</li> <li>■ RS-232/422/485/UART</li> <li>■ I<sup>2</sup>S/LJ/RJ/TDM</li> </ul>	<ul style="list-style-type: none"> <li>■ I<sup>2</sup>C, SPI</li> <li>■ CAN, LIN</li> <li>■ RS-232/422/485/UART</li> <li>■ I<sup>2</sup>S/LJ/RJ/TDM</li> </ul>	<ul style="list-style-type: none"> <li>■ I<sup>2</sup>C, SPI</li> <li>■ CAN, LIN</li> <li>■ RS-232/422/485/UART</li> </ul>
<b>Optional Analysis Packages</b>	<ul style="list-style-type: none"> <li>■ Power Analysis</li> <li>■ HDTV and Custom Video</li> </ul>	<ul style="list-style-type: none"> <li>■ Power Analysis</li> <li>■ HDTV and Custom Video</li> </ul>	
<b>Display Size</b>	10.4" (264 mm)	9" (229 mm)	7" (180 mm)



# The Power to Solve Problems Quickly





## 1 2 or 4 Analog Channels and 16 Digital Channels

Visualize and analyze up to 20 time-correlated analog and digital signals on one instrument. Up to 4 decoded serial and/or parallel buses can also be seen on the same display.

## 2 Digital Phosphor Technology

Discover and troubleshoot glitches and other infrequent events faster with greater than 50,000\* waveforms/second continuous waveform capture rate and real-time intensity grading.

## 3 Wave Inspector® Controls

Quickly navigate your waveform record with dedicated front panel controls.

- **Zoom and Pan** – Pan through your entire record in seconds and easily zoom in to see more signal detail.
- **Mark** – Mark your waveform for future reference and quickly move between the marked events with the Previous (←) and Next (→) buttons.
- **Search** – Automatically search your entire record to find and mark all occurrences of an event based on criteria you specify.

## 4 Parallel and Serial Bus Analysis

Automatically trigger, decode and search on parallel data or serial packet content. Optional serial analysis modules are available for I<sup>2</sup>C, SPI, USB, CAN, LIN, FlexRay, RS-232 and audio buses.\*

## 5 Optional Power Analysis

Simplify and speed power analysis with automated measurements for power quality, current harmonics, switching loss, safe operating area and more.\*

## 6 Stunning Display

See important signal details on all 20 channels with the large, high-resolution display.

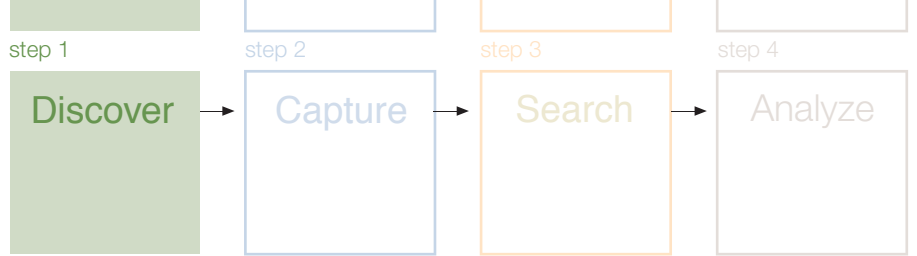
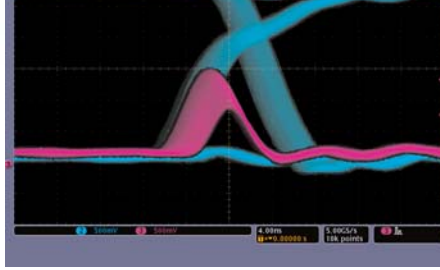
## 7 USB Port

Conveniently use your USB flash drive to store oscilloscope setups, screenshots, and waveform data.

## 8 TekVPI® Probe Interface

Direct-connect\* your current probes. Automatically see the right measurement units on the oscilloscope's display to match the type of probe –voltage or current.

\*Varies by Series

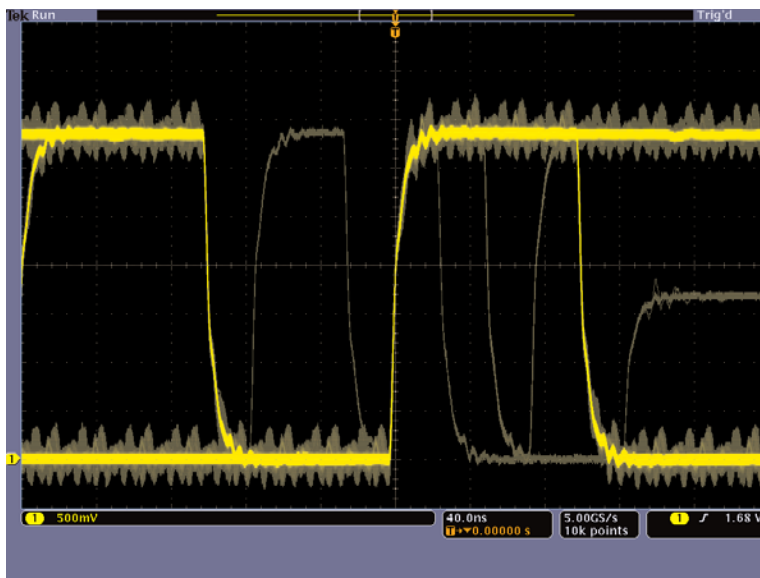


# Discover Problems in Seconds

To debug a design problem, first you must know it exists. Every design engineer spends time looking for problems in their design, a time consuming and frustrating task without the right debug tools.

Tektronix' patented Digital Phosphor technology, standard in the MSO/DPO Series, reveals signal details that are completely missed by other oscilloscopes. The lively, intensity-graded display shows anomalies never seen before, providing fast insight into the real operation of your device and greatly accelerating discovery and diagnosis of problems.

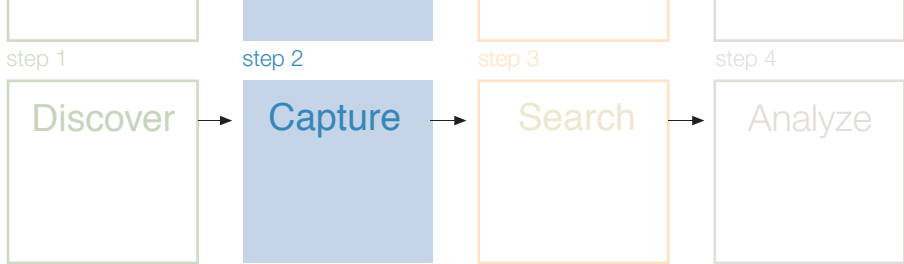
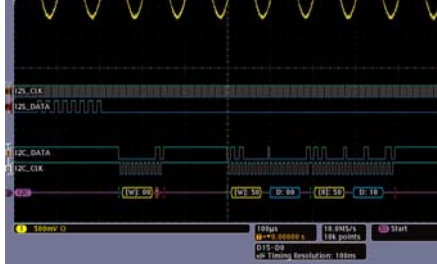




### Digital Phosphor Technology

- See glitches and other infrequent transients within seconds with a fast waveform capture rate of greater than 50,000\* waveforms per second.
- See just how often anomalies occur with an intensity-graded display. The history of a signal's activity is shown by intensifying areas of the signal that occur more frequently.

\* Varies by Series



# Capture Your Event the First Time

Discovering a device fault is only the first step. Next, you must capture the event of interest to identify root cause.

The MSO/DPO Series offers a comprehensive set of over 125 trigger combinations to help you quickly and easily capture device problems or other events of interest. The trigger can be applied across all input channels, automatically time-correlating all signals – analog, digital and serial.

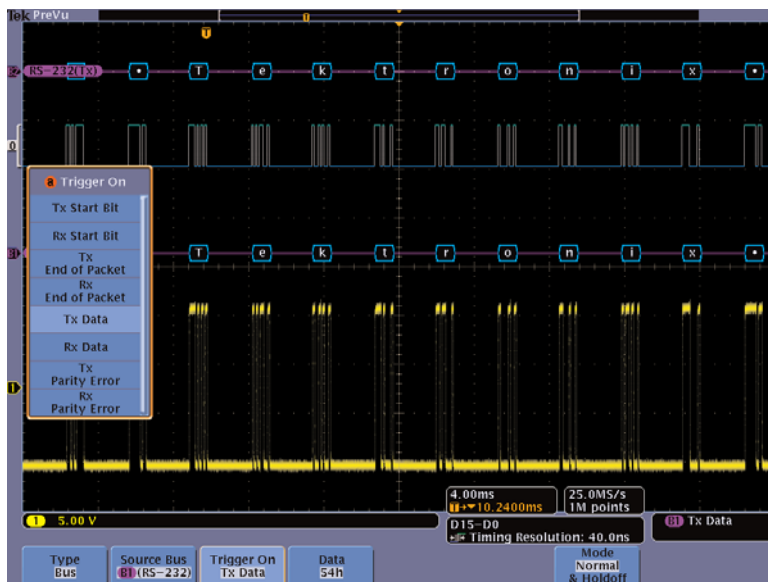
Each analog channel offers a minimum of 5x oversampling, regardless of how many channels are active. With the MagniVu™ high-speed acquisition available on all digital channels\*, you can capture your digital signals with up to 60.6 ps resolution - the industry's best digital timing resolution. Fast sample rates on all channels ensure you can precisely capture today's complex signals.

What's more, with the deep record length, you can capture many events of interest, even thousands of serial packets in a single acquisition. This allows you to acquire a long time record for analyzing your device's behavior while maintaining high resolution to zoom in on fine signal detail.

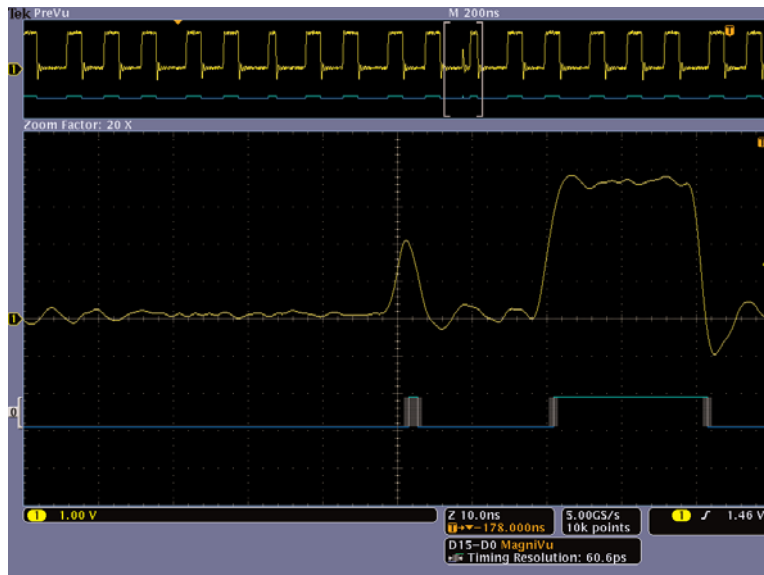
\* Varies by Series

## Over 125 trigger combinations

Quickly capture your event of interest with a comprehensive set of triggers – including runt, logic, pulse width/glitch, setup and hold violations, serial packet content, and parallel bus data.







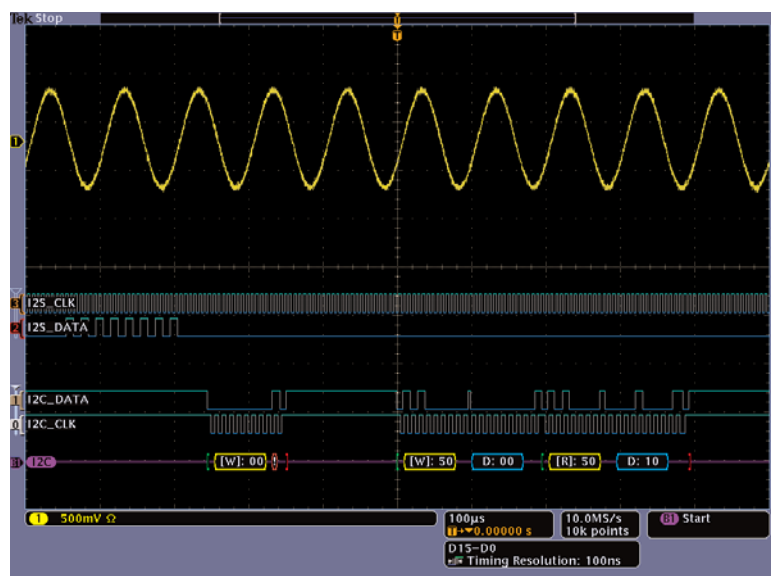
### MagniVu high-speed digital acquisition\*

Capture fine signal detail – up to 60.6 ps resolution – around your trigger for precision measurements such as setup and hold, clock delay, and glitch characterization on your digital channels.

### Time-correlated analog, digital and serial signals

Quickly troubleshoot system-level interactions with up to 4 analog and 16 digital channels.

Up to 4\* serial and/or parallel buses can also be simultaneously decoded and seen on the same display providing further insight into system behavior.



\* Varies by Series



# Search Your Entire Record Instantly

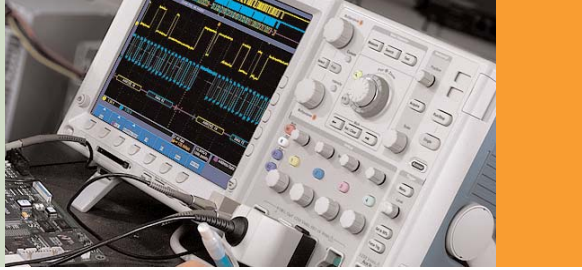
Finding your event of interest in a long waveform record can be time-consuming without the right search tools. With today's record lengths pushing beyond a million data points, locating your event can mean scrolling through thousands of screens of signal activity.

The innovative Wave Inspector® controls of the MSO/DPO Series offer the industry's most comprehensive search and waveform navigation. The dedicated front-panel controls speed panning and zooming through your record, enabling you to move from one end to the other in just seconds. The automatic search function will instantly search your entire record for criteria you define. Along the way, Wave Inspector will automatically mark every occurrence so you can quickly move between events. You can even search for specific serial packet content or parallel bus data.

## Wave Inspector Search and Navigation

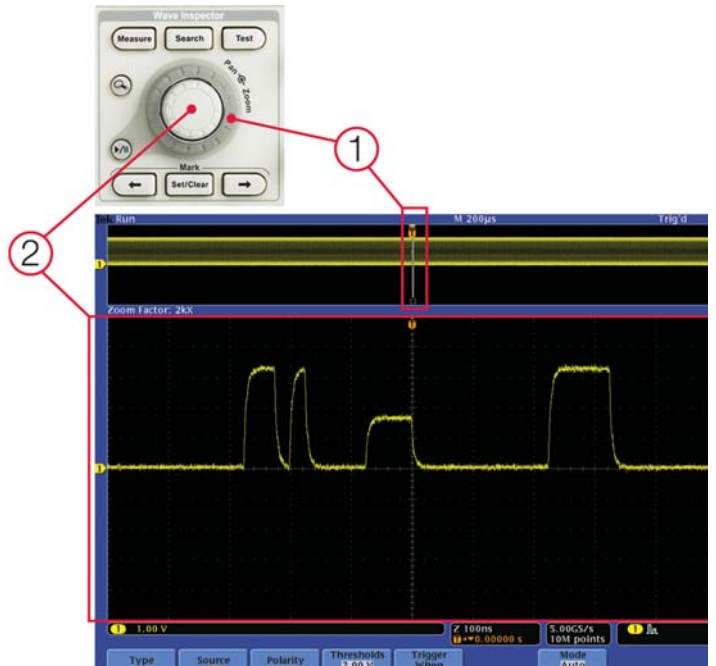
Wave Inspector controls provide unprecedented efficiency in viewing, navigating, and analyzing waveform data.





### Dedicated Pan and Zoom Controls

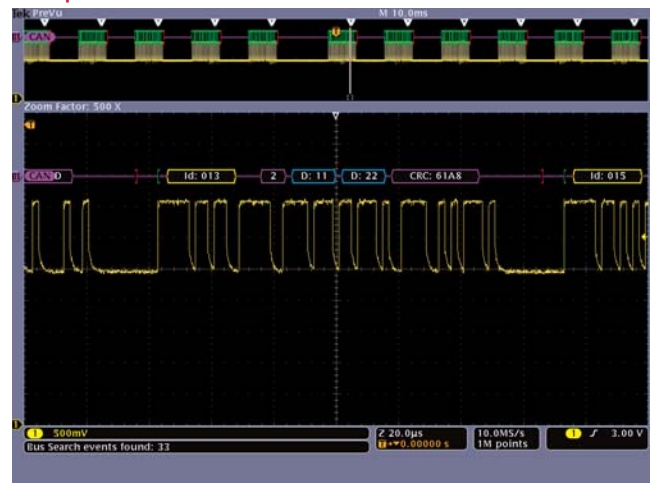
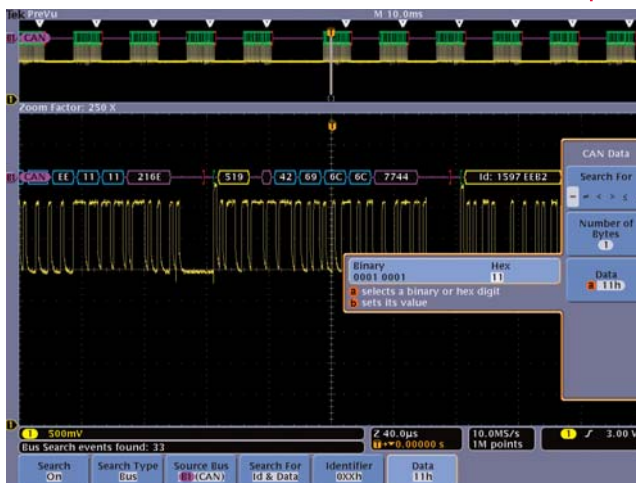
Zip through your record by turning the outer pan control (1). Get from the beginning to end in seconds. See something of interest and want to see more details? Just turn the inner zoom control (2).

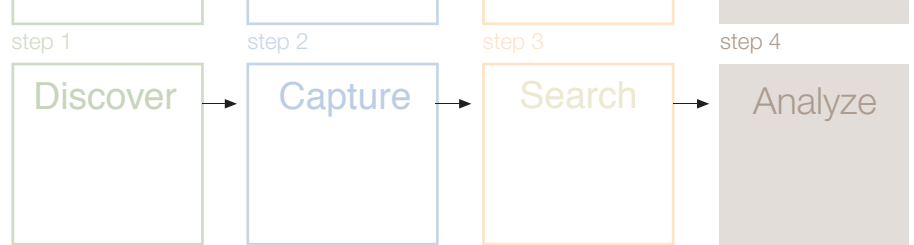


### Automated Search and Mark

Step 1: Define the event you would like to find.

Step 2: Wave Inspector automatically searches through the entire record and marks each event with a hollow white triangle. Use the previous and next buttons to jump from one event to the next.

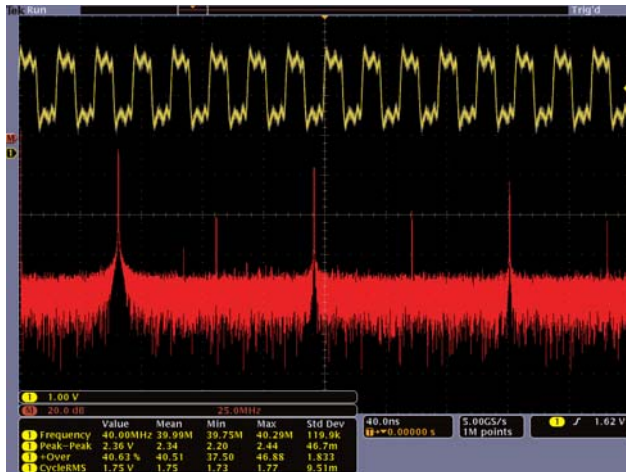




# Analyze Your Device Fast and Efficiently

Verifying that your prototype's performance matches simulations and meets the project's design goals requires analyzing its behavior. Tasks can range from simple checks of rise times and pulse widths to sophisticated power loss analysis and investigation of noise sources.

The MSO/DPO Series offers a comprehensive set of integrated analysis tools to simplify verifying and characterizing your device's behavior. Specialized application support for serial and parallel bus analysis, power supply design and video design is also available.



## Built-in Waveform Analysis Tools

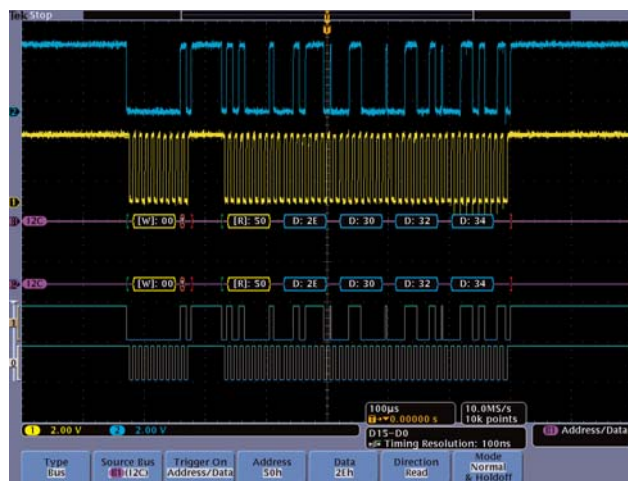
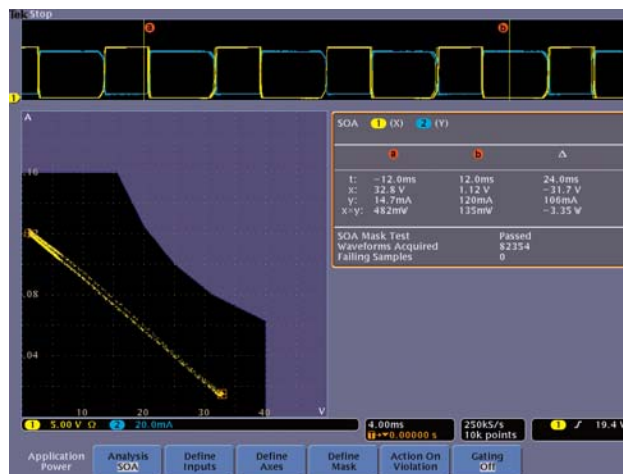
Efficiently analyze your device with 29 automated measurements, measurement statistics, advanced waveform math including arbitrary equation editing, waveform histograms, FFT analysis, and trend plots for visually determining how a measurement is changing over time.\*

\* Varies by Series



### Automated Power Measurements\*

Simplify and speed power analysis with automated measurements for power quality, current harmonics, switching loss, safe operating area and more.

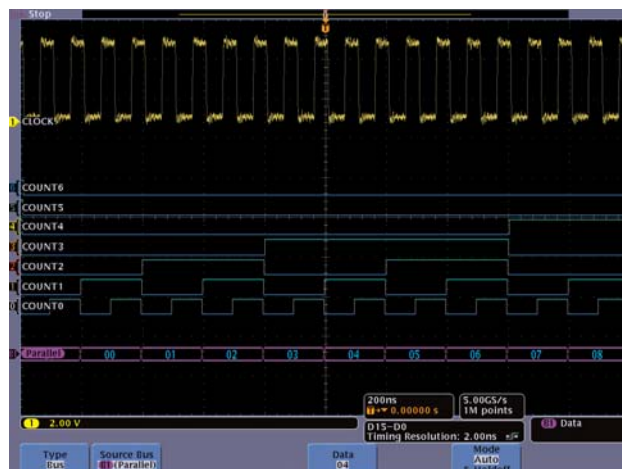


### Automated Serial Bus Analysis

Automatically trigger, decode and search on serial packet content. Optional serial analysis modules are available for I<sup>2</sup>C, SPI, USB, CAN, LIN, FlexRay, RS-232 and audio buses.\*

### Automated Parallel Bus Analysis\*

Automatically trigger, decode and search on clocked or unclocked parallel data.



\* Varies by Series





# Probes & Accessories

## Measurement Accuracy Begins at the Probe Tip

The TekVPI™ probe interface on the MSO/DPO Series sets the standard for ease of use in probing. Current probes can be directly attached to the oscilloscope without using a separate power supply\*. And, the TekVPI interface allows smart communication between the oscilloscope and probe. Pushing the probe menu button will bring up a menu on the oscilloscope display with all relevant settings and controls for the probe. The correct measurement unit and scaling for the probe will also be automatically displayed on the oscilloscope.

TekVPI probes feature status indicators and controls right on the probe allowing you to easily remove probe offset or degauss your current probe. They can also be controlled remotely through USB, GPIB, or Ethernet, enabling more versatile solutions in ATE environments.

Tektronix offers the industry's widest range of oscilloscope probes for any measurement challenge. To find the right probe for your application, please visit us at [www.tektronix.com/probes](http://www.tektronix.com/probes).

\*Varies by Series



TAP Series Active Probes



TDP Series Differential Probes



TCP Series Current Probes





# Service Plans

## Maintain Your Oscilloscope at Peak Performance

The MSO/DPO Series comes standard with a 3-year warranty covering all parts and labor\*. Tektronix offers a range of repair and calibration plans to extend your coverage and keep your instrument operating at optimal performance.

### Repair Service Extended Coverage

- Save money with multi-year coverage
- Priority service
- Covers equipment, parts, labor and transportation
- Applicable software, safety and reliability updates

### Calibration Service Coverage

- Accredited calibration
- Traceable calibration
- Functional verification
- Applicable software, safety and reliability updates
- Calibration records retention

### Multi-Vendor Calibration Service

- Single point of contact for all of your calibration needs
- Simplify your operations and reduce administrative costs
- On-site delivery for convenience and reduced downtime

\* Excludes probes

## Contact Tektronix:

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**Sweden** 00800 2255 4835\*  
**Switzerland** 00800 2255 4835\*  
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\* European toll-free number. If not accessible, call: +41 52 675 3777

Contact List Updated 09 December 2009

### For Further Information

Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit [www.tektronix.com](http://www.tektronix.com)



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