

Tektronix Breaks Innovation Barrier and Delivers Transformational New Oscilloscope Category

World's First Mixed Domain Oscilloscope Combines Scope and Spectrum Analyzer Functionality in a Single Instrument – Providing Time Correlated Analog, Digital and RF Signals

BEAVERTON, Ore., August 30, 2011 – Tektronix, Inc., the world's leading manufacturer of oscilloscopes, today introduced the world's first mixed domain oscilloscope (MDO) that delivers the functionality of an oscilloscope and a spectrum analyzer in a single instrument. The new MDO4000 Mixed Domain Oscilloscope Series gives engineers the unique ability to capture time-correlated analog, digital and RF signals for a complete system view, helping them to rapidly solve complicated design issues.

More than 60 percent of oscilloscope users also use a spectrum analyzer to troubleshoot embedded system designs with integrated wireless functionality, requiring them to work in both the time and frequency domain. Traditionally, an engineer was either a mixed signal/digital engineer or an RF engineer. But with wireless becoming more commonplace, design engineers must often work in both domains. The MDO4000 Mixed Domain Oscilloscope Series is the first oscilloscope ever to integrate the functionality of a spectrum analyzer to provide a unique toolset which will save days or even weeks of debug time.

“We believe that the MDO4000 Series is the most revolutionary product to hit the oscilloscope market in the last 20 years, for the first time breaking down the barrier between time and frequency domains,” said Roy Siegel, general manager, Oscilloscopes at Tektronix. “It fundamentally changes what’s involved in debugging designs with RF where there is a need to correlate events in the frequency domain with the time domain phenomena that caused them. Just as the mixed signal oscilloscope (MSO) is the standard for embedded design test, we expect the MDO will become the new standard for designs that increasingly include RF capabilities.”

“The complexity of debugging issues in modern wireless systems, combined with the lack of equipment designed for the task has forced us to spend many hours focusing on the test setup rather than the design issue itself,” said Ward Ramsdell, Electrical Engineer and Owner of Prototype Engineering. “Based on our early usage of the MDO series, we believe that these oscilloscopes will help us to deliver our designs to our customer faster than ever before, and with more comprehensive verification of the system's functionality. This is because for the first time we’re able to simultaneously visualize multiple points in a design, looking at analog, digital and RF aspects of the system's operation, which allows us to quickly track down design issues and better understand the real-world performance of the system at a high level. The Mixed Domain Oscilloscope signifies a fundamental change in the test equipment landscape, and will absolutely improve the way we approach our work.”

Mixed Domain Oscilloscope Advantages

With the MDO4000, engineers can replace both a scope and spectrum analyzer with a single instrument. This enables them to continue using their tool of choice, the oscilloscope, to look at the frequency domain rather than having to find and relearn a spectrum analyzer.

And the MDO4000 goes well beyond typical spectrum analyzer functionality by allowing users to capture time-correlated analog, digital and RF signals across 4 analog, 16 digital and 1 RF channel. The RF input frequency range extends up to 6 GHz and provides a capture bandwidth of ≥ 1 GHz at all center frequencies, 100 times wider than typical spectrum analyzers. Users can even see up to 4 decoded serial and/or parallel buses at one time on the same display. Due to this time correlation between domains, engineers can now make accurate timing measurements to understand delays and latencies between command / control events in

their design and changes in the RF spectrum. For example, viewing the spectrum as a VCO/PLL turns on, or measuring the transition characteristics of a frequency hopping RF signal are now simple tasks. And finding the source of intermittent, device-state dependant EMI noise has never been easier thanks to the MDO4000s ability to provide a complete time correlated system view across both domains, something that is simply not possible with today's test equipment.

In another industry first, the MDO4000 allows designers to see the RF spectrum of a signal at any point in time within a long acquisition to see how the spectrum changes over time or with device state. By simply moving the unique and patent pending Spectrum Time throughout the time domain acquisition, designers can see the RF spectrum for any point in their acquisition while simultaneously seeing their analog, digital and/or decoded buses at the same point in time.

Similarly, RF time domain traces are used to show how the amplitude, frequency or phase of the RF input signal changes relative to time. This makes it easy to characterize frequency hop transitions, settling times, and RF event timing relative to other system components and activities. The RF time domain traces are shown in the same window as the analog, digital and serial/parallel bus decoded waveforms, providing instant insight into device operation.

In addition to the standard RF power level trigger, an optional module (MDO4TRIG) allows additional trigger types to use the RF power level as a source, enabling customers to further isolate an RF event of interest. Users can trigger on a specific pulse width, or look for a timeout event or runt, or even include the RF input in a logic pattern defined along with the analog and digital channels. This ability to trigger on whatever the user is interested in regardless of whether it's analog, digital, RF or some combination thereof represents another industry first for the MDO4000 Series.

Application Examples for the Mixed Domain Oscilloscope Series Include Some of the Following:

System-level debug of wireless-enabled designs

Debugging integration of common wireless modules below 6 GHz (WLAN, Bluetooth, Zigbee, etc.)
Debugging common 'home grown' amplitude, frequency, or phase modulated wireless communications
Wideband analysis of dual band transceivers. For example, capturing both Zigbee at 900 MHz and Bluetooth at 2.4 GHz in a single acquisition.

Timing analysis for mixed domain designs

Observing spectrum changes over time during turn on of VCO/PLLs
Easily measure time to stability when turning on or off RF signals
Easily determine latencies from control logic signals or serial bus commands to resultant RF changes

Tracking down sources of noise or interference

Analyzing root cause of radiated or coupled emissions
Measuring switch-mode power supply effects on the rest of the system
Correlation with time domain signals enables root cause analysis of spurious noise sources

In addition to its industry-first mixed-domain capabilities, the MDO4000 offers all the feature-rich tools of Tektronix MSO4000B Mixed Signal Oscilloscope Series combined with the features of a mainstream spectrum analyzer. The MSO4000B Series offers a robust set of features to speed every stage of debugging designs – from quickly discovering an anomaly and capturing it, to searching waveform records for the event and analyzing its characteristics and the device's behavior.

The Inventor's Story

This remarkable advance in oscilloscope technology is the result of a multi-year research and development effort by Tektronix to overcome the obstacles inherent in integrating the time and frequency domains in a single instrument. Over the course of the development, Tektronix has filed for 26 patents that are pending. To learn more, watch this video on the making of the MDO4000 and the supporting white paper.

Availability

The MDO4000 Series oscilloscopes will be available globally beginning in late August, 2011. Pricing starts at \$19,900 U.S. MSRP.

Join Our Online Launch Event

Register to attend the online launch event, and get exclusive access to launch activities, including demos, webinars, product videos and a chance to win over \$30,000 in prizes. To participate and register to win prizes go to www.scoperevolution.com then join us starting August 30, 2011 at 8 a.m. PDT for exclusive access to webinars, demos, product videos and application notes.

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For more than sixty years, engineers have turned to Tektronix for test, measurement and monitoring solutions to solve design challenges, improve productivity and dramatically reduce time to market. Tektronix is a leading supplier of test instrumentation for engineers focused on electronic design, manufacturing, and advanced technology development. Headquartered in Beaverton, Oregon, Tektronix serves customers worldwide and offers award-winning service and support. Stay on the leading edge at www.tektronix.com.

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