

Denso Selects Tektronix for Automotive Test Solution

Largest Japanese Automotive Electronics Manufacturer Uses Tektronix DPO7000 Oscilloscopes and TDP1000 Probes to Enable Nanosecond-Order High Frequency Analysis

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Tektronix, Inc., a leading worldwide provider of test, measurement and monitoring instrumentation, announced that both its DPO7000 Series Oscilloscope and TDP1000 High Voltage Differential Probes are being used by Denso Corporation to successfully analyze nanosecond transient noise spikes in its Electronic Control Units (ECUs) for engine control. Denso is Japan's largest automotive electronics components manufacturer and was the first domestic company to develop engine control ECUs.

Automotive engines are electronically controlled by an onboard computer known as an ECU. An ECU computes information in real time to determine optimum values for engine control parameters based on data relayed from sensors placed around the vehicle. Multiple control ECUs are used in contemporary automotive electronics systems, with as many as a 100 built into top-of-the-line luxury vehicles. However, because ECUs form part of the vehicle's onboard system, they are required to function in an extremely challenging environment. Malfunctions cannot be tolerated as this could jeopardize passenger safety.

Operational conditions and requirements for these units have become increasingly stringent in recent years. Similarly, demand for the ability to analyze higher frequencies has escalated, particularly with regard to noise immunity to transient signals or spikes in the millisecond or microsecond, and most recently at the nanosecond level. However, analysis of high-frequency noise in the order of nanoseconds with conventional oscilloscopes and probes had been problematic because of the presence of extremely noisy waveforms.

To address this challenge, Tektronix proposed to reduce the electrical load on the measurement system, including the probe. Although the passive voltage probes being used previously were simple to use, input capacitance was quite large with a pF in the teens, consequently distorting the waveform being measured. To correct for this, Denso utilized the Tektronix DPO7000 series Oscilloscope and the TDP1000 Active High Voltage Differential Probe, which is connected directly to the oscilloscope. The differential input capacitance of the TDP1000 is low, at less than 1pF, so any influence of the measuring instruments on the measurement system is minimal.

Another key feature is that differential input facilitates resistance to common mode noise. Accordingly, any influence on the waveform quality resulting from connection of the probe is suppressed to the minimum, making it possible to further refine analysis from microseconds previously to the order of nanoseconds. This has enabled Denso to visualize and identify which signal line is causing which behavior, even in cases where nanosecond-order high-frequency noise is experienced. This is an extremely significant achievement that will result in enhanced quality and reliability for ECUs.

"Now that ECUs are built into vehicle engine compartments rather than the cabin interior, the environment for noise has become even more severe," said Mr. Tetsuya Nakamura, of Denso's Electronics Engineering Department 2, Design Section 1. "This new combination of the Tektronix DPO7000 oscilloscope and TDP1000 High Voltage Differential Probe has enabled us to accurately capture and analyze high frequency transient noise at the nanosecond level, a feat impossible until now. Accordingly, we have been able to provide even higher quality for ECUs. The ability of Tektronix to provide a solution for analyzing ECU noise in the order of nanoseconds is proof of the effectiveness of measurement technologies, as well as being a major contribution towards the development of automotive electronics."

About the TDP1000 High Voltage Differential Probe

The TDP1000 and TDP0500 High Voltage Differential Probes provides excellent high-speed electrical and mechanical performance required for today's Switch Mode Power Supply (SMPS), CAN/LIN Bus, and high-speed digital system designs.

Specifically designed for use with and direct connection to the TekVPI™ probe interface used on Tektronix' DPO7000, DPO4000, and MSO4000 Series oscilloscopes, the TDP1000 and TDP0500 High Voltage Differential Probes achieve high-speed signal acquisition and measurement fidelity by solving three traditional measurement challenges:

- Outstanding Electrical Performance
- Versatile Device Under Test Connectivity
- Ease-of-Use

About the DPO7000 Series Oscilloscope

The DPO7000 is a high performance Oscilloscope unlike any other, with a maximum sample rate of 40GS/s, maximum record length of 400M (deep memory), and able to capture 250,000 waveforms every second using Tektronix's own unique DPX technology. This Oscilloscope can be used to analyze ECUs employed in automotive electronics systems by equipping it with a variety of application software, or for other uses such as power analysis of inverter switching devices.

About Tektronix

Tektronix is a leading supplier of test, measurement, and monitoring products, solutions and services for the communications, computer, and semiconductor industries -- as well as military/aerospace, consumer electronics, education and a broad range of other industries worldwide. With 60 years of experience, Tektronix enables its customers to design, build, deploy, and manage next-generation global communications networks, computing and advanced technologies. Headquartered in Beaverton, Oregon, Tektronix has operations in 19 countries worldwide. Tektronix' Web address is <http://www.tektronix.com/>.

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