



Digital oscilloscopes feature 100 GHz bandwidth

New sampling techniques permit LeCroy Corp.'s new digital oscilloscopes, WaveExpert 9000 and SDA 100G, to offer unprecedented 100 GHz bandwidth. In addition, they offer an exclusive coherent interleaved sampling (CIS) mode that enables the capture and display of very long serial data waveforms without the need for an external pattern trigger. The oscilloscopes have an acquisition rate of 10 Mega samples per second (Msps), which is a 100x improvement over existing instruments in this class, according to LeCroy. The real-time waveform (voltage vs. time) capability permits evaluation of high-speed serial buses, such as next-generation PCI Express, SAS, Fibre channel and FB-DIMM. Additionally, the oscilloscopes can output a time domain reflectometry (TDR) pulse with 20 ps incident rise time, which is 50% faster than existing instruments.

While WaveExpert 9000 is aimed at general-purpose signal integrity applications, including TDR and eye pattern analysis, the SDA 100G specifically targets serial data applications and includes the coherent interleaved time base as well as a full jitter application standard.

This breakthrough in bandwidth is enabled by a new monolithic sampling head design that employs a patented non-linear transmission line in the sampling strobe generation circuit, creating a rectangular sampling aperture.

Previous sampler designs produced approximate Gaussian apertures. The rectangular sampling strobe results in a nearly 100% efficiency, better bandwidth control and lower jitter over previous designs.

The CIS time base developed by LeCroy derives the sampling gate by phase locking to the clock signal. This technique results in fast sampling rates and precise tracking of the signal bit rate. The coherent nature of the sampling gate allows the system to lock to the data pattern by knowing its length. The resulting waveform can be measured and processed in the same manner as a real-time oscilloscope trace. The random interleaved sampling (RIS) mode, a first for this type of instrument allows pulsed signals to be measured without an external trigger signal.

Besides real-time waveform displays, these instruments offer a special jitter measurement mode that measures total jitter as well as random and deterministic jitter components. The basic waveform memory in this mode is 4 Mega samples per channel, which enables jitter component breakdown and equalization on long serial data patterns. It can be expanded to 2 G samples per channel so that the oscilloscopes can capture, display and measure bit patterns that are millions of bits in length.

Both WaveExpert 9000 and SDA 100G use LeCroy's user interface (UI), which provides quick and easy access to more than 50 measurements and math functions. Similar to a UI found on real-time oscilloscopes, the interface makes it a simple transition for engineers who are new to sampling oscilloscopes. The UI also allows functions and measurements to be combined to create an almost unlimited number of complex measurements.

In addition to the two mainframes, several plug-in modules are available for measuring electrical or optical signals. The electrical modules have bandwidths of 20 GHz, 30 GHz, 50 GHz, 70 GHz, and 100 GHz while the optical modules have optical bandwidths of 25 GHz and 50 GHz. The module design allows customers to configure WaveExpert 9000 and the SDA 100G for their existing testing needs while maintaining the flexibility to extend the instruments' capabilities as analysis requirements expand.

The WaveExpert 9000 (sampling oscilloscope mainframe) is priced at \$21,500, and SDA 100 G (serial data analyzer mainframe) is priced at \$41,500.

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