

## **Motor Drive Analyzers Create A 16-Channel Data Acquisition System**

[Teledyne LeCroy's](#) MDA 8000HD Motor Drive Analyzers leverage the new WaveRunner 8000HD High Definition Oscilloscope (HDO) platform of eight analog channels, 12-bit vertical resolution at all times, up to 5 gigapoints of acquisition memory (1.25 gigapoints on all 8 channels), a 10-GS/s sample rate, and bandwidths up to 2 GHz. Using the company's new OscilloSYNC technology, two MDA 8000HD instruments can be linked to create a 16-channel analyzer—twice the number of channels previously available—with a large 15.6-in. display (see the figure). Like the earlier MDA800A, this iteration performs comprehensive static and dynamic three-phase electrical and mechanical power analysis and complete test coverage of the entire motor-drive system.

Ubiquitous and growing in complexity, motors and drives are increasingly optimized for dynamic operating conditions. According to the vendor, traditional power analyzer instruments have not kept up with industry needs for dynamic power analysis. At the same time, oscilloscopes are the traditional tool for gaining insight into embedded control system operation. The two instruments operate in different domains, making it difficult to correlate their respective data sets and leaving large gaps in engineers' knowledge of system operation.

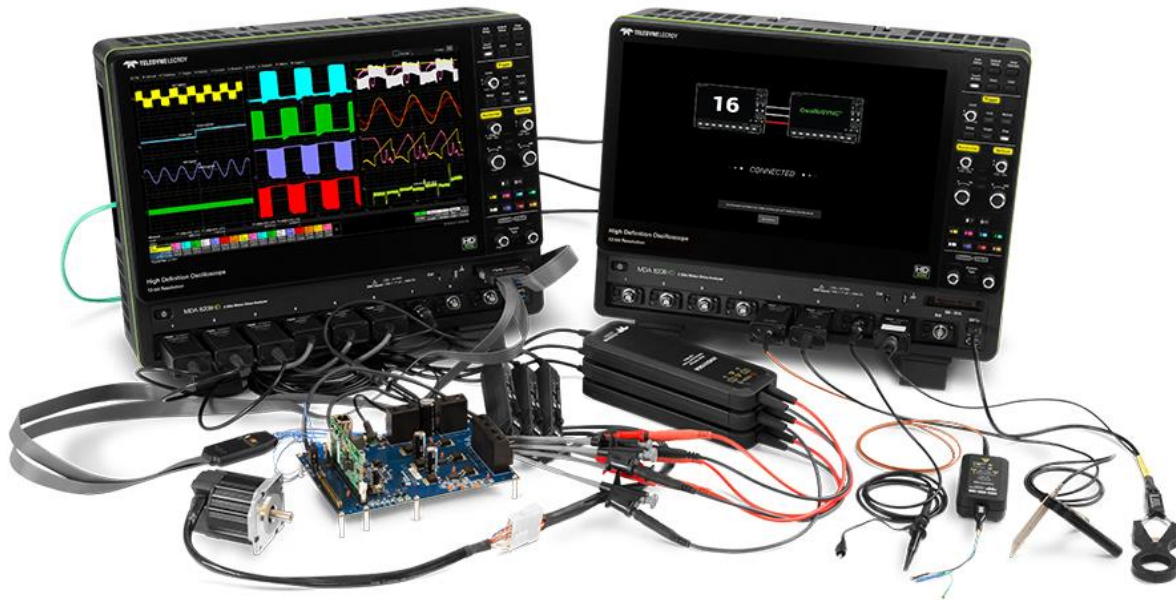
To close that knowledge gap, the MDA 8000HD captures waveforms from the drive's three-phase power conversion section; individual power transistors; motor speed, angle and torque sensors; and the embedded control system, while performing coincident three-phase electrical and mechanical power analysis. The MDA performs static (steady-state) power measurements—like a power analyzer—and also performs power measurements under dynamic operating conditions. It then provides per-cycle waveforms showing power values changing over time.

These waveforms can then be time-correlated using Zoom+Gate functionality and deep acquisition memory to isolate and correlate dynamic events to other power or control-system behaviors. Furthermore, power can be analyzed during periods as short as a single semiconductor device switching cycle—capability not provided by power analyzers but essential for debug of modern motor drive controls. All of this capability, combined with the synchronized acquisition of up to 16 analog channels, offers complete insight into the entire system.

Teledyne LeCroy's new OscilloSYNC technology breaks channel-count barriers by teaming two MDA 8000HD instruments to view and control 16 synchronized analog channels from a single display and front panel—just like having a single 16-channel acquisition system. The MDA 8000HD doubles the number of input channels compared to the previous model, enabling:

- Complete three-phase ac input, dc bus, three-phase drive output, plus mechanical power output and efficiency calculations; requires 16 analog channels.
- Automotive torque vectoring applications requiring simultaneous analysis of two three-phase drive systems plus other signals; requires 12 to 16 analog channels.
- Cascaded H-bridge (three-phase) inverter subsection analysis, requiring measurement of six power-semiconductor outputs and six gate-drive signals; some scenarios may add three-phase output signals and one dc bus-voltage signal; requires 12 to 16 analog channels.

The MDA 8000HD Motor Drive Analyzers start at \$33,265. They are offered in bandwidths of 350 MHz, 500 MHz, 1 GHz, and 2 GHz; with sample rates up to 10 GS/s; and with up to 1.25 gigapoints of acquisition memory on each channel (5 gigapoints interleaved). For further information, contact Teledyne LeCroy at 1-800-553-2769 or visit the company [website](#).



*Figure. Teledyne LeCroy's new OscilloSYNC technology breaks channel-count barriers by teaming two MDA 8000HD instruments to view and control 16 synchronized analog channels from a single display and front panel—just like having a single 16-channel acquisition system.*