

New flagship AWG cards generate waveforms with 10 GS/s and 2.5 GHz bandwidth

Spectrum Instrumentation launches flagship series of AWG cards in PCIe format

Grosshansdorf, Germany – 23.10.2024. Scientists and engineers now have a way to produce high frequency arbitrary waveforms, with high purity and low distortion, directly from their PC. Using the new PCIe flagship AWG cards from Spectrum Instrumentation and cost-effective COTS (Commercial-of-the-shelf) PC-parts, it is possible to generate nearly any waveform with up to 10 GS/s output rates, 2.5 GHz bandwidth and 16-bit vertical resolution. The new cards make a powerful alternative to benchtop AWGs that often face a bottleneck when loading data for new waveforms. The cards offer a massive onboard memory of up to 8 GigaSamples (16 GB) and the possibility to stream data at up to 10 GigaBytes per second directly from CPUs or even GPUs. Four different models make up the M5i.63xx AWG series, offering a perfect fit solution for every application.

[Link to the product video \(5 min\):](#)

Insert the cards into a suitable PC and it turns into one of the most powerful signal generation instruments on the market. The four AWG variants deliver waveform generation with bandwidths of 2.5 and 1.5 Gigahertz (GHz) and output rates of 10, 5 or 3.2 GigaSamples per second (GS/s). The units combine 16-bit vertical resolution with programmable full-scale outputs. Single outputs deliver up to ± 500 mV into 50 Ohm and ± 1.0 V into high impedance loads - or double the range in differential mode.

Ultrafast data streaming

Each card comes with 2 GSamples of onboard memory (8 GSamples optional) and high-speed data transfer using a 16 lane, Gen 3, PCIe bus. This ultrafast bus allows data to be sent to cards at a staggering 10 GB/s. For demanding applications, data can even be continuously streamed directly to the AWG for replay in a FIFO mode - a process that allows almost limitless waveform production. Add Spectrum's SCAPP driver package, which allows FIFO streaming directly to and from a GPU, and turbocharge the waveform processing even further.

Versatile Waveform Generation

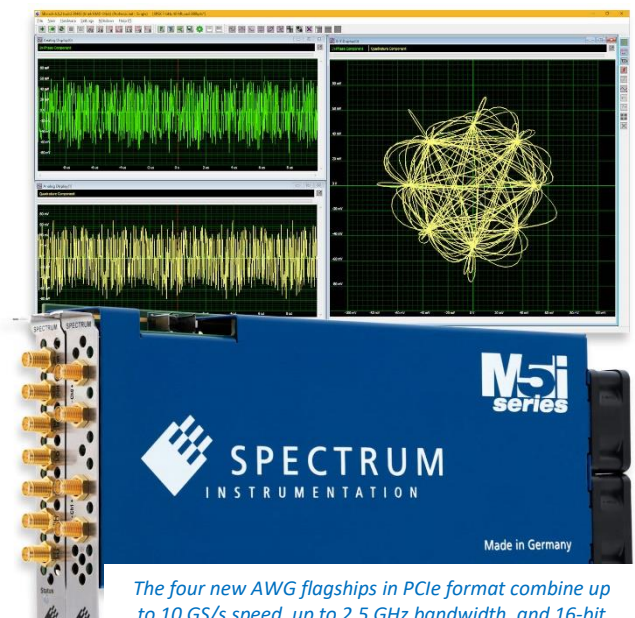
Waveforms can be output in Single-shot, Repeated and Multiple Replay modes. To maximize memory efficiency, Multiple Replay can be used to output segmented data and can also be combined with FIFO streaming. Waveform replay can be initiated by a simple software command or via a trigger event. Trigger signals can be input on two external trigger lines.

Multi-channel Systems

Individual cards have one or two analog output channels. To create larger multi-channel systems, cards can be connected together using the company's proprietary Star-Hub clock and trigger synchronization module. Star-Hub allows systems with up to eight cards to share a common clock and trigger, delivering fully synchronous output rates of 5 GS/s on up to 16 channels, or 10 GS/s on up to eight channels.

Mixed AWG and Digitizer Systems

The four new models of the M5i.63xx AWG series and the seven variants of the M5i.33xx digitizer series are designed for working together, making them ideal for use in stimulus-response, receiver-transmitter or closed-loop type testing systems. For example,



The four new AWG flagships in PCIe format combine up to 10 GS/s speed, up to 2.5 GHz bandwidth, and 16-bit resolution.

In the diagram, a two-channel M5i.6357 generates the two signals (I and Q component) for a Quadrature-Modulation.

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if two Star-Hubs are used, ultrafast MIMO systems can be built that contain up to 8 AWGs and 8 digitizers. This allows the creation of systems with up to 16 transmit and 16 receiver channels, each channel with 5 GS/s.

Easy connection with other devices

For easy system integration, the front-panel hosts four multi-function SMA connectors. These can perform a variety of Input/Output tasks like Asynchronous Digital-I/O, Timestamp Reference Clock Input, Synchronous Digital-Out, Trigger Output, Run and Arm status flags, or the System Clock. By switching the multi-function I/O lines to digital outputs, another four synchronous output channels can be added to the AWG. As such, a single AWG card can generate up to two analog and four digital outputs, in parallel, at full speed. As an option, a Digital Pulse Generator firmware is available to turn the four digital outputs into digital generators outputs. All these features are very helpful when interfacing with other equipment for experiment control or in OEM projects.



The new flagship AWGs are available with one or two output channels, which can be used single-ended or differential (see front panel on the right).

Fully programmable

Fully programmable, the cards run under Windows or LINUX operating systems, using today's most popular and powerful software languages. All products are shipped together with SDKs for C++, C#, Python, VB.NET, Julia, Java and IVI. Drivers are also provided for third-party software products LabVIEW and MATLAB.

Five Year Warranty

The Spectrum M5i.63xx series AWGs are available for immediate delivery. All cards are shipped factory tested and include a five-year warranty, with software and firmware updates, free of charge, for the lifetime of the product.

About Spectrum Instrumentation

Spectrum Instrumentation, founded in 1989, uses a unique modular concept to design and produce a wide range of more than 200 digitizers and generator products as PC-cards (PCIe and PXIe) and stand-alone Ethernet units (LXI). In over 30 years, Spectrum has gained customers all around the world, including many A-brand industry-leaders and practically all prestigious universities. The company is headquartered near Hamburg, Germany, known for its 5-year warranty and outstanding support that comes directly from the design engineers. More information about Spectrum can be found at www.spectrum-instrumentation.com

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