

## AXIe Highlights of 2013

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For those of you unfamiliar with AXIe, AXIe is a modular instrument standard, abbreviated from AdvancedTCA Extensions for Instrumentation and Test. Like VXI (VMEbus Extensions for Instrumentation) and PXI (CompactPCI Extensions for Instrumentation), AXIe is based on an industrial bus architecture with extensions for instrumentation, AdvancedTCA. Like PXI and VXI, AXIe has added timing, synchronization, and triggering capabilities to make it suitable for test applications.

AXIe has a little more than eight times the volume of a 3U PXI module, 14 percent more than a VXI module. AXIe modules typically are mounted horizontally in a chassis, allowing very short chassis heights and maximum rack density. The availability of 2-slot and 5-slot horizontal chassis allows system integrators to deploy AXIe either as the principal modular architecture in a system, or complementing a PXI or VXI subsystem. AXIe is often referred to as the “big brother” of PXI because, despite its much larger module envelope, it acts logically as a PXIe (PXI Express) system. Communication is performed over a 4-lane PCIe (PCI Express) bus on the backplane either through external or embedded controllers. Provisions are now being made for a 8-lane PCIe backplane.

AXIe is managed by the [AXIe Consortium](#). Two videos on the AXIe home page give a short (15 minute) or longer (45 minute) overview of AXIe. AXIe is an open system, open to all vendors, and there are currently [10 members](#). In 2013, the Consortium approved an [updated revision](#) of the base architecture specification, AXIe-1. All specifications may be found [here](#). The updated revision was the result of extensive interoperability testing and reviews.

AXIe got a boost late this year when two new vendors of AXIe products, Elma Electronic and Hiller Measurements, [announced development tools](#) for the AXIe modular instrument standard at Autotestcon 2013. The tools are designed to help vendors and system integrators quickly develop and deploy AXIe instruments and systems.

For chassis developers, [Elma Electronic](#) has developed an AXIe IPMI (Intelligent Platform Management Interface) Shelf Manager card with redundant IPMB (Intelligent Platform Management Bus). For module developers, Elma has developed an IPMI controller mezzanine card that fits onto a standard AXIe or AdvancedTCA-based (ATCA-based) module. This card allows users to quickly deploy the required IPMI functionality, freeing their engineers to focus on the unique added value of their designs.

For AXIe module developers requiring a more turnkey development environment, [Hiller Measurements](#) is releasing the MiAXIe© AXIe Development System. Similar to their MiPXIe© System, the product provides the hardware and software interfaces for an AXIe module that can be quickly adapted to a customer’s application. In its initial release, Hiller Measurements offers the MiAXIe© System as a design service, with a standard hardware development kit scheduled for release in 2014.

These development tools address two markets. One is vendors looking for a larger modular standard than PXI, perhaps as a migration path from VXI. Another is system integrators who need to deploy custom hardware quickly. The large module size and power capability makes AXIe the ideal platform for this.

[Agilent Technologies](#) and [Guzik Test and Measurement](#) each added new AXIe products to their portfolios.

Agilent has upgraded its data converter product lines with enhanced AXIe digitizers and AWGs (arbitrary waveform converters). The [M9703A](#) is a 12-bit digitizer, with up to eight channels per module at 1.6Gs/s, or four channels at 3.2Gs/s. Due to the multi-module synchronization, it can analyze up to 40 phase coherent signals in a single 5-slot AXIe chassis. Real-time digital downconversion extends the resolution to nearly 16 bits. Agilent recently announced 16GB memory option, or 1Gs per channel.

Agilent's flagship AWG is the AXIe [M9180A](#), a dual channel synthesizer at 12Gs/s and 12 bits of resolution. Agilent recently announced the [M8192A Synchronization Module](#), a companion to the M9180A. It allows the synchronization of up to six M9180As, or 12 channels in total.

For digital signal and protocol test, Agilent has recently introduced two products. The [M8061A](#) is a 2:1 Multiplexer with de-emphasis that acts as a companion to Agilent's J-BERT N4903B, expanding the pattern generation to 28Gb/s. The [U4431A](#) is a MIPI M-PHY Protocol Analyzer, focused on next generation mobile computing platforms.

Guzik Test and Measurement offers several 40Gs/s 8-bit digitizers in channel combinations of 1 x 40Gs/s, 2 x 20Gs/s, and 4 x 10Gs/s as the [ADC 6000 series](#). Each supports 64GB of memory, and can stream data at full speed via the [local bus](#). A companion digital processing module, the DP 6000, is expected to be shipping soon. It sports two large user-configurable Altera Stratix V FPGAs, and is able to stream off-board to an external RAID array or co-processor. An article elsewhere in the newsletter shows that 80GB/s local bus speed has been achieved.

These product introductions show that AXIe is living up to its reputation of high performance, delivering capability unmatched in any form factor. But it is also living up to its interoperability goals. In [this application example](#) earlier this year, an astrochemist, Dr. Shipman, was able to achieve over a 1000x improvement in test speed by combining Agilent and Guzik modules in an AXIe test system. Dr. Shipman summarized by saying, "The speed to which it can acquire data is still breathtaking."

With the development tools from Elma and Hiller, hopefully other vendors will also take advantage of the AXIe architecture to deliver these compelling capabilities. But that's for 2014...