# AXIe : AdvancedTCA<sup>®</sup> Extensions for Instrumentation and Test

# Overview



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## AXIe: What and Why

### • What is it?

 An open system modular instrumentation standard based on AdvancedTCA<sup>®</sup>, that delivers high performance instrumentation for aerospace defense, high energy physics, semiconductor test and other industries.

### What advantages does it bring?

- "Big brother to PXI." Same PCIe fabric and programming, but with:
- Horizontal configurations for minimal rack space, vertical for large systems
- Larger boards for highest rack and power densities per rack inch
- High speed trigger, timing, and local bus
- Semiconductor test extensions
- ATCA compatibility
- Optional LAN fabric
- Integrates easily with PXI, LXI and IVI





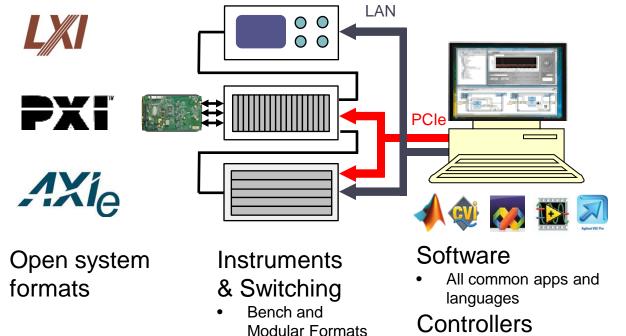
LXI, PXI, and AXIe Rack and Stack System



AXIe + PXI Semiconductor Test System

# AXIe compatibility and scalability

PXI (30 Watts) AXIe (200 Watts)



- Embedded or external
- Standard I/O

# AXIe brings critical functionality to Mil/Aero systems in a dense and powerful form factor

# Image: Construction of modules, with broad functionality in 4U chassis

#### Software

 Common software drives PXI and AXIe

#### Controllers

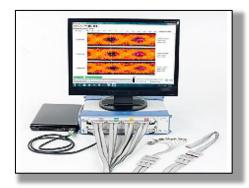
- Embedded or external
- PCIe is common interface
   for PXI and AXIe

Very high performance instrumentation expands performance envelope of modular platforms in 4U chassis



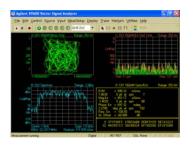


# AXIe brings powerful and cost effective new technology to digital verification and test



AXIe delivers leading edge verification tools including:

- PCIe Gen 1,2,3 exerciser and analyzer
- HDMI 1.4 analyzer
- Industry's fastest logic analyzer
- DDR3 analysis





AXIe digitizers and AWGs deliver industry leading performance for mixed-signal test:

- Digitizers range from 1.6Gs/s @12 bits to 40Gs/s @ 8 bits
- AWGs deliver 8Gs/s @ 14 bits to 12Gs/s @ 12 bits
- Powerful and complex
   waveform creation and analysis



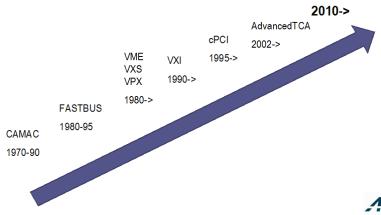
AXIe + PXI Semiconductor Test System offers cost effective alternative to "big iron" testers for small scale manufacturing and design verification



## AXIe brings world-class measurements and density to Big Physics



AXIe is the next logical step in modular instrumentation for physics AXle



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- AWGs deliver 8Gs/s @ 14 bits to 12Gs/s @ 12 bits
- Powerful and complex waveform creation and analysis

AXIe brings unprecedented rack density to high speed digitizers

AXIe is built upon the ATCA standard, enabling a platform for end user customization.

### 4U Rack Height:



40 channels of 1.6Gs/s



20 channels of 10Gs/s



Waveform Capture and Generation



# AdvancedTCA Shelf (Chassis)

- 2-16 Slot Shelf
  - 2-14 Slots in 19" Rack
- 2 Hub Slots
- 14 Node Slots
- User Zone 3 Backplane
- LAN routed to every slot
- PICMG 3.4: PCIe to every slot
- Large form factor cards
- Flexible power (48V) and air cooled design

Zone 3 Zone 2

Zone 1

# **AXIe Specification Structure**

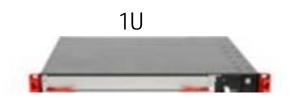
AXIe is a scalable family of specifications allowing a portfolio of applications.

<b>AXIe-3.n</b> Zone 3 Definitions	<u>Semiconductor</u> <u>Test</u> <b>AXIe-3.1</b> • Zone 3 signals • DUT I/O on RTM • Add'I Trigger/Sync	Other future Apps AXIe-3.n • For future expansion	<ul> <li>AXIe-3.n specifications define Zone 3 capabilities for specific markets</li> <li>Can define specific additional system management and resources</li> <li>May work on top of a standard ATCA topologies or AXIe-1</li> </ul>
AXIe-2 Software	<ul> <li>Software Specification</li> <li>Enables AXIe to appear as PXI to a resource manager</li> </ul>		AXIe adds a software specification that makes AXIe appear almost exactly as a PXI system
<b>AXIe-1</b> Zone 1+2 Topology	<ul> <li>AdvancedTCA plus</li> <li>Triggers and Timing</li> <li>Local Bus</li> </ul>		• AXIe expands allowable ATCA Zone 1 and 2 topologies to include AXIe-1, allowing embedded data transfer and synchronization
ATCA	<ul> <li>AdvancedTCA PICMG3.0, PICMG3.4</li> <li>LAN + PCIe</li> <li>System Management</li> </ul>		ATCA is the base specification for all AXIe specifications

# High scalability of AXIe

14 slot Vertical



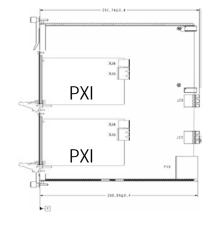




n U Horizontal



Specialty instrument with AXIe module

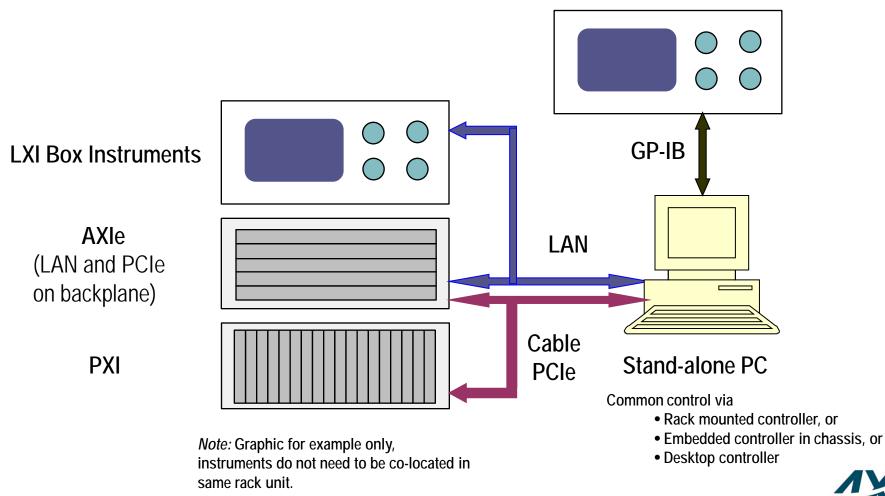


PXI carrier module



### AXIe integration with Rack and Stack

#### **GP-IB** Instruments





# Summary

- Extending AdvancedTCA
  - AXIe is based on AdvancedTCA with extensions for instrumentation and test.
- General Purpose (AXIe-1), Base Software Specification (AXIe-2), & Semiconductor Test (AXIe-3.1)
  - Family of standards
- More Performance, Scalability, Flexibility
  - AXIe delivers higher performance in a flexible, scalable platform.

### • PXI, LXI, IVI

- AXIe works well with other standards, such as PXI, LXI and IVI.
- "Big Brother of PXI"
- Specifications may be downloaded from the AXIe Consortium website at <u>www.axiestandard.org</u>

