

PXI Express™

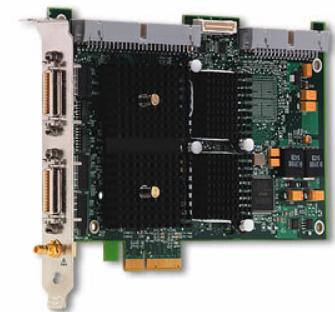
Integrating PCI Express into the PXI Backplane



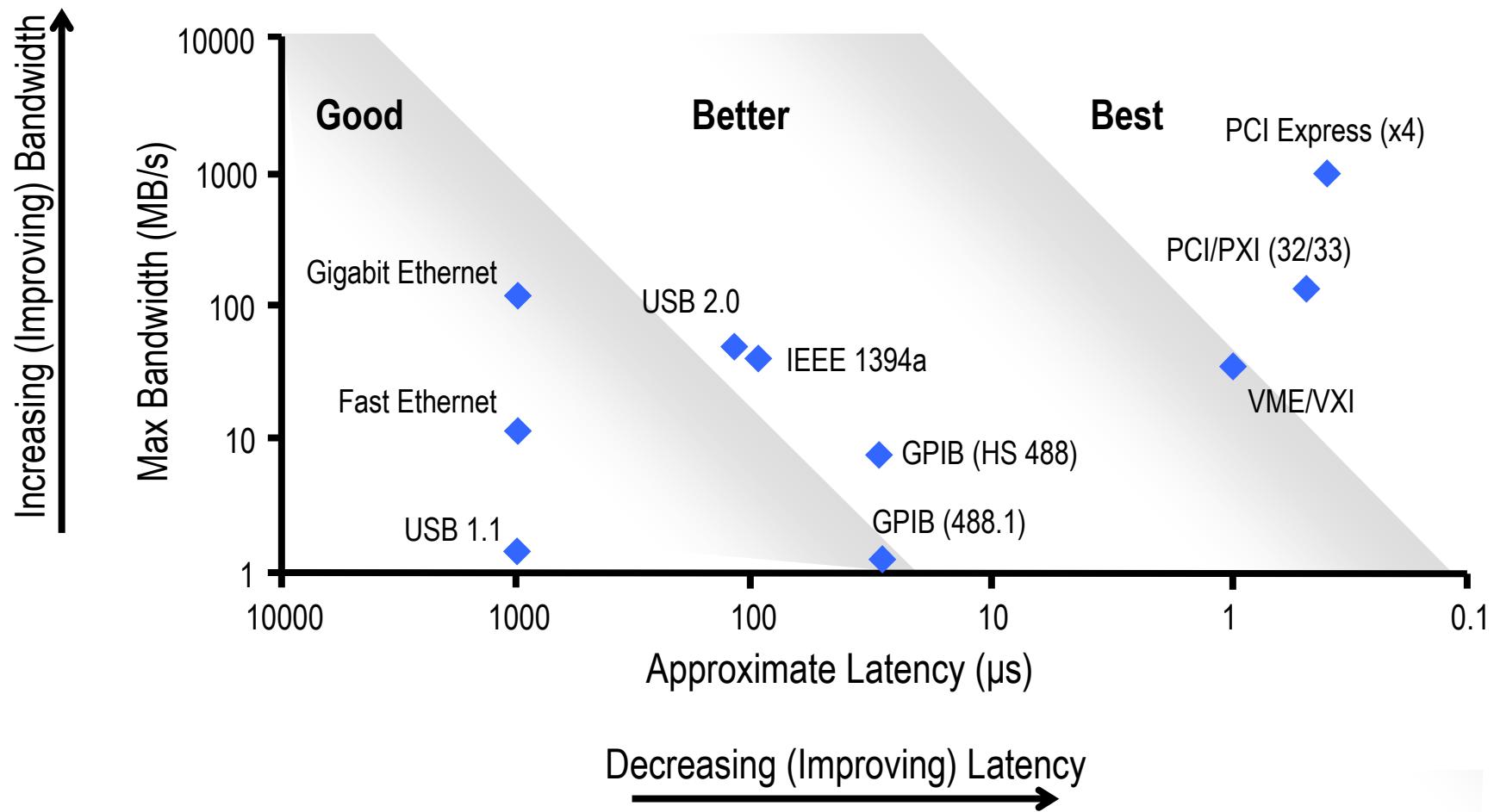
PCI Express Overview



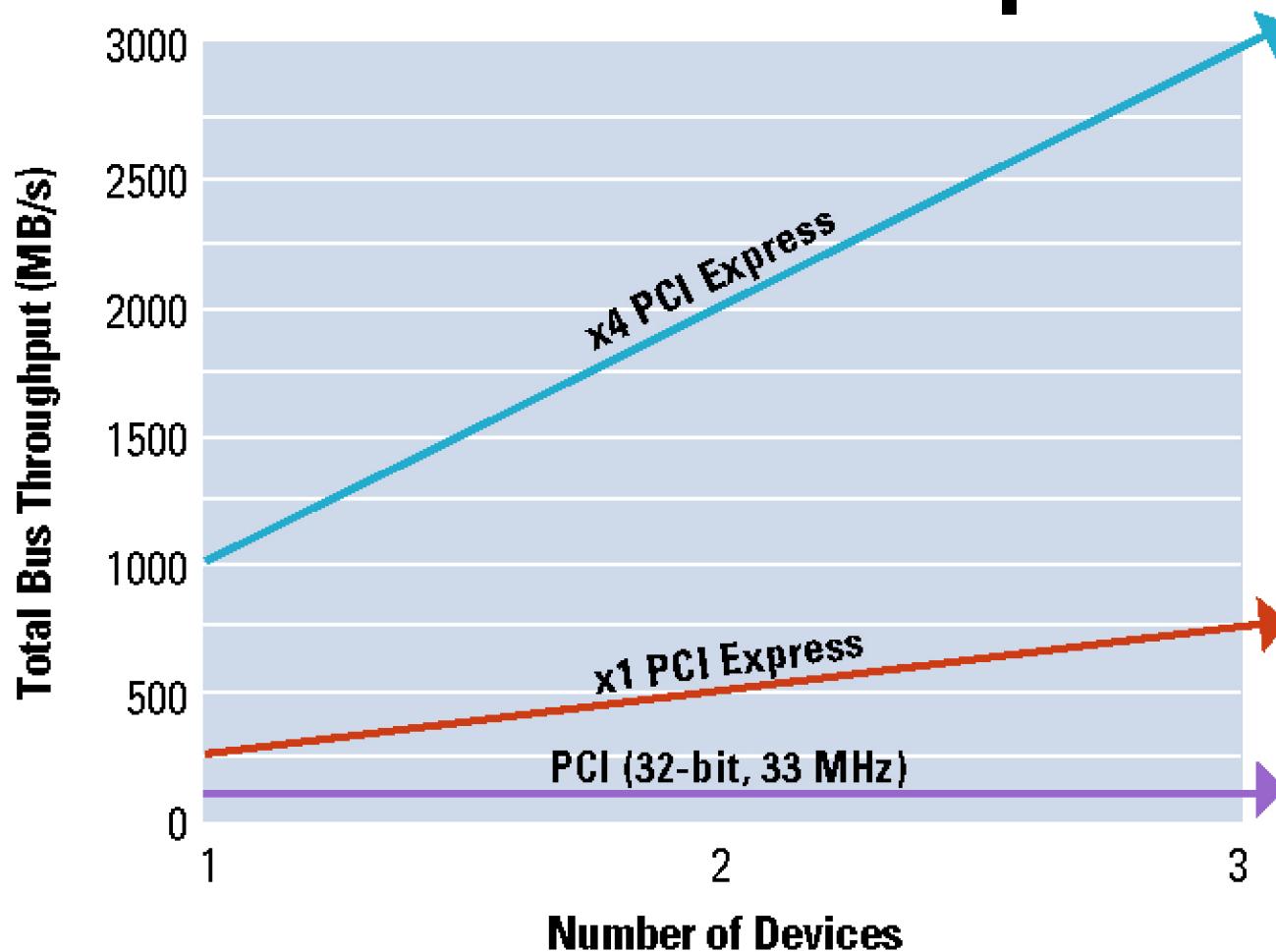
- Serial interconnect at **2.5 Gbits/s**
 - PCI transactions are packetized and then serialized
 - Low-voltage differential signaling, point-to-point, 8B/10B encoded
 - Multiple lanes can be grouped together to form links
 - x1 (by 1) has bandwidth of **250 MBytes/s/direction**
 - x16 (by 16) has bandwidth of **4 GBytes/s/direction**
- Uses same software model as PCI
 - Ensures software compatibility
- Roadmap for longevity with Gen-2 clocking (5 Gbits/s)



Bandwidth vs. Latency



Dedicated Bandwidth per Device



PCI Express Industry Adoption

- First PCI Express desktops shipped mid 2004
- First ExpressCard laptops shipped early 2005
- PCI and PCI Express are side-by-side in all Intel/Dell roadmaps
- Primary consumer drive is graphics processing (gamers, video editing)
 - PCI Express x16 replacing AGP



PCI Express Advantages

- Software compatibility with PCI
- High bandwidth (up to > 4 GBytes/s)
- Scalable bandwidth
- Dedicated bandwidth per slot
- Low latency
- Peer-to-peer communication
- Long life (20+ years in mainstream market)

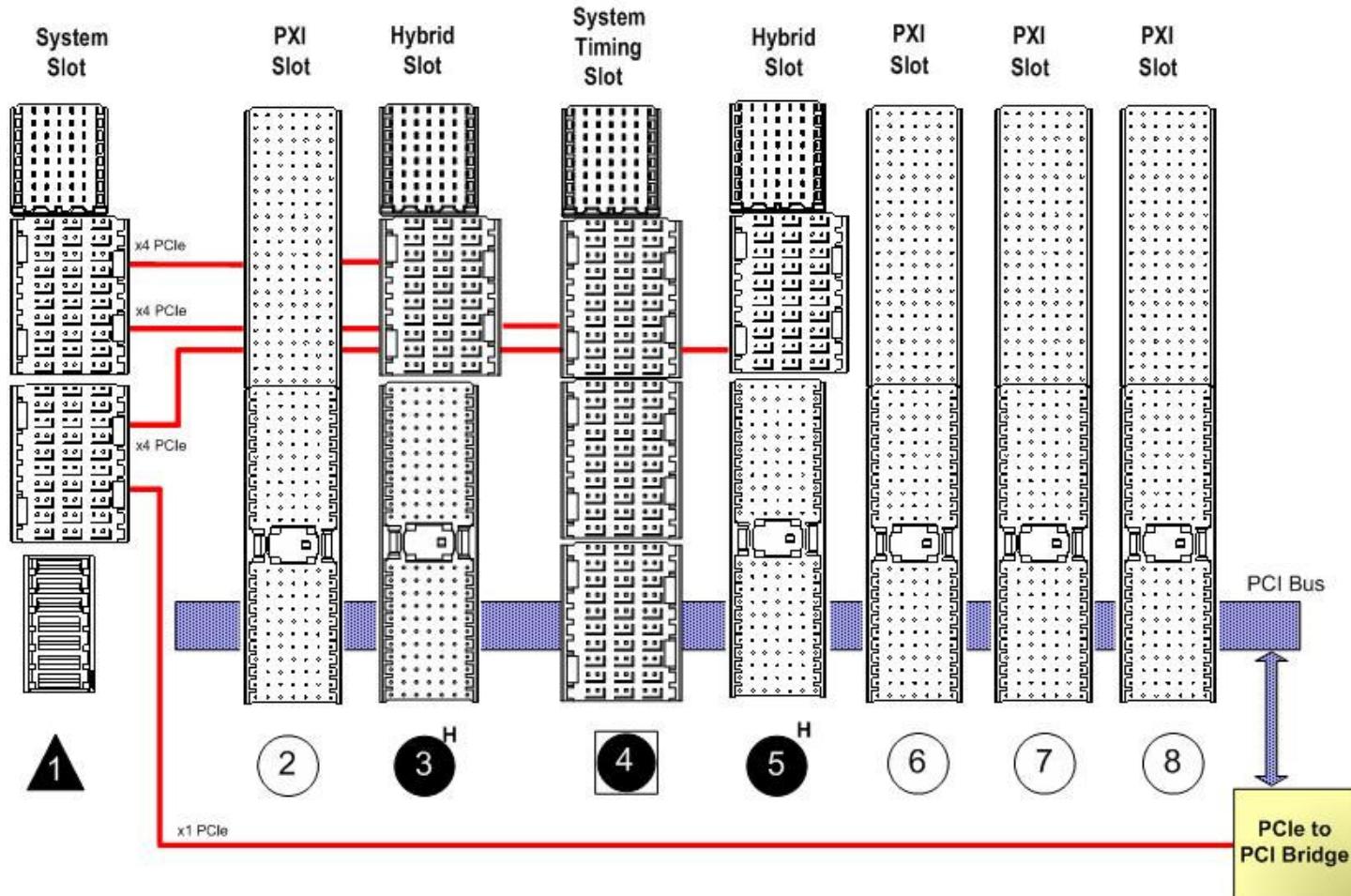


Integrating PCI Express into the PXI Backplane

- Backwards compatibility
 - Complete software compatibility
 - Hybrid slot definition - install modules with either PCI or PCI Express signaling in a single slot
- Up to 6 GBytes/s backplane and 2 GBytes/s slot bandwidth
- Enhanced synchronization capabilities
 - 100 MHz differential clock, differential triggering

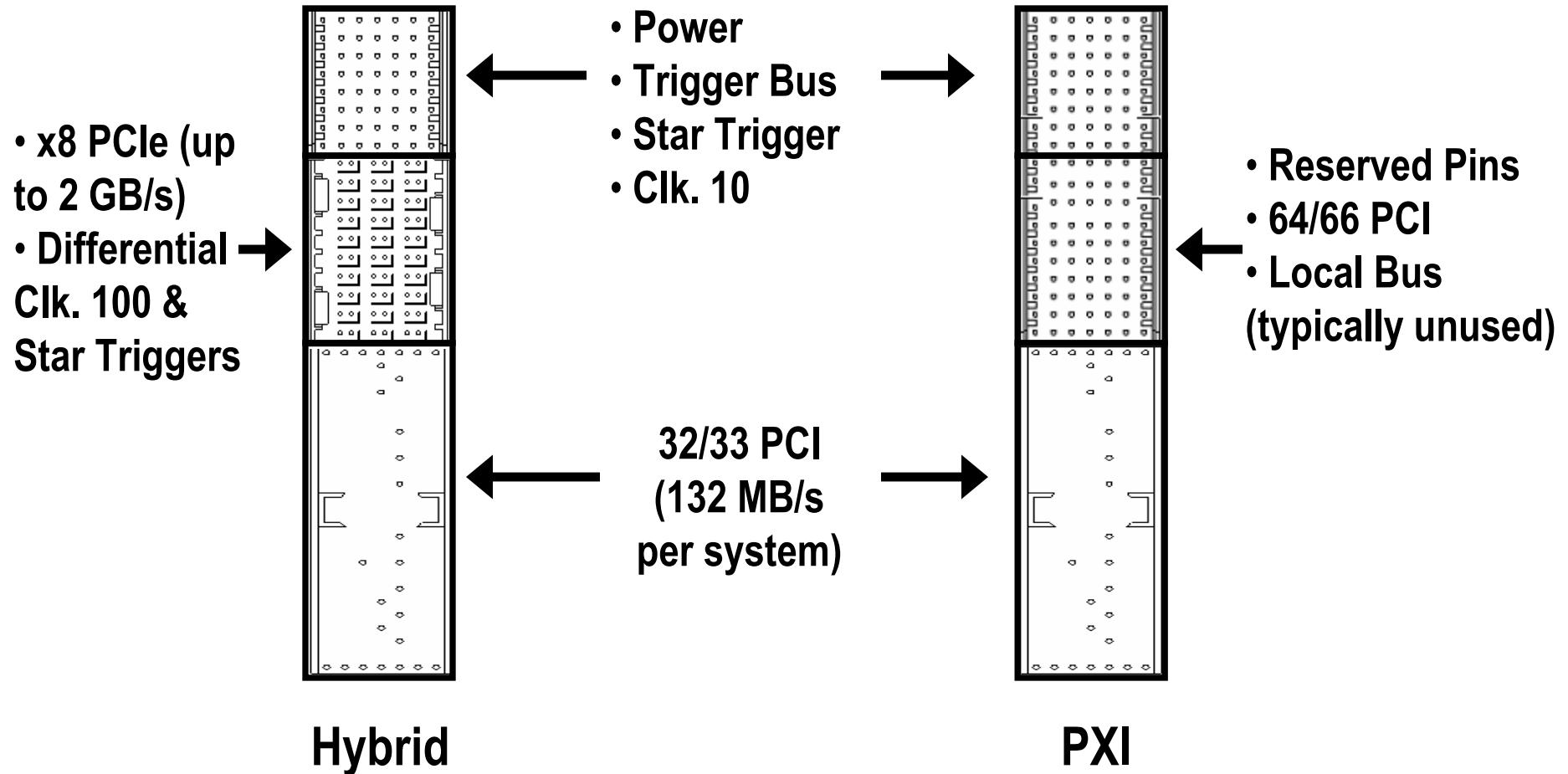


PXI and Hybrid Slots Ensure Compatibility

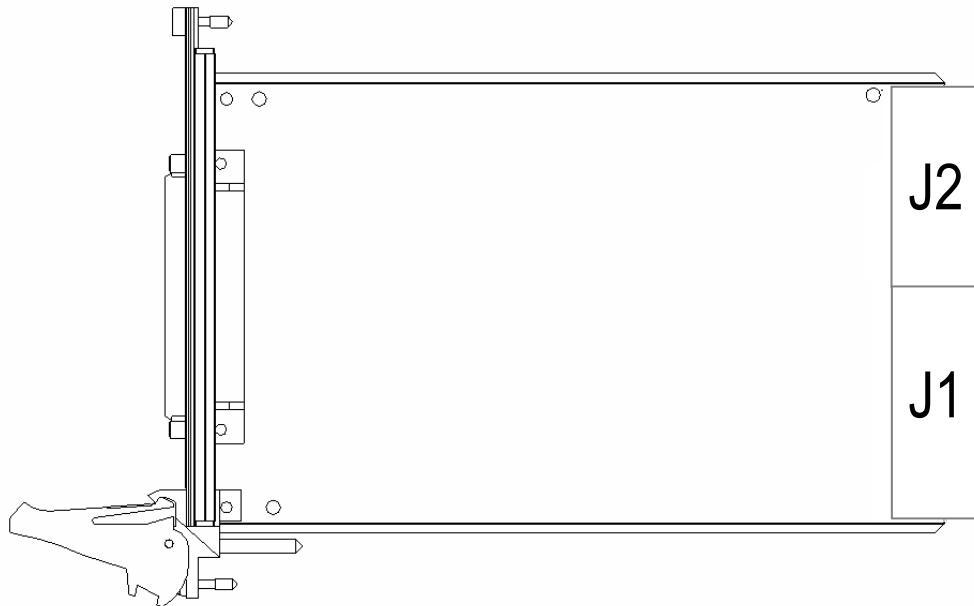


PXI
Systems Alliance

Compatibility of PXI and Hybrid Slots

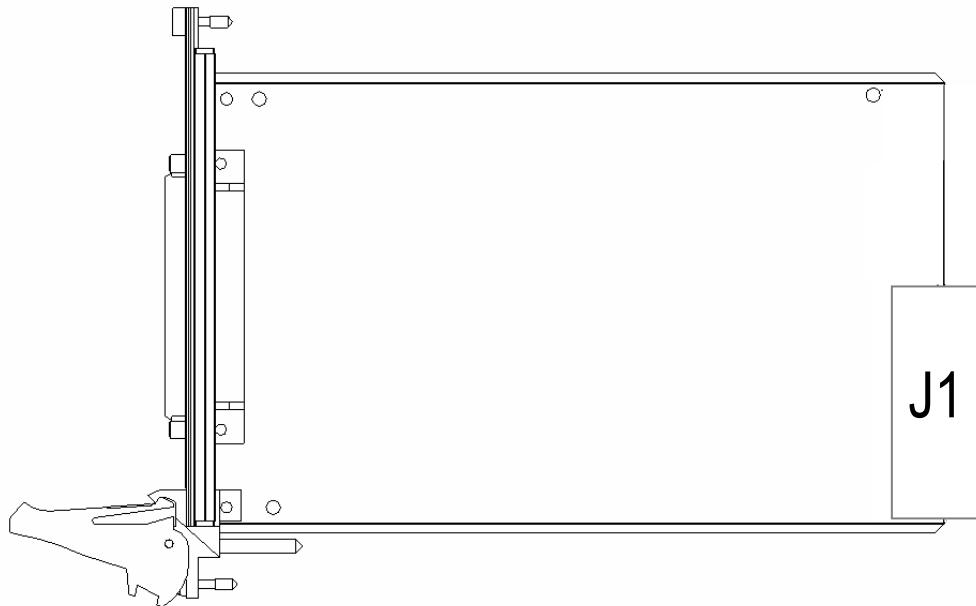


Creating a Hybrid Slot Compatible PXI Module



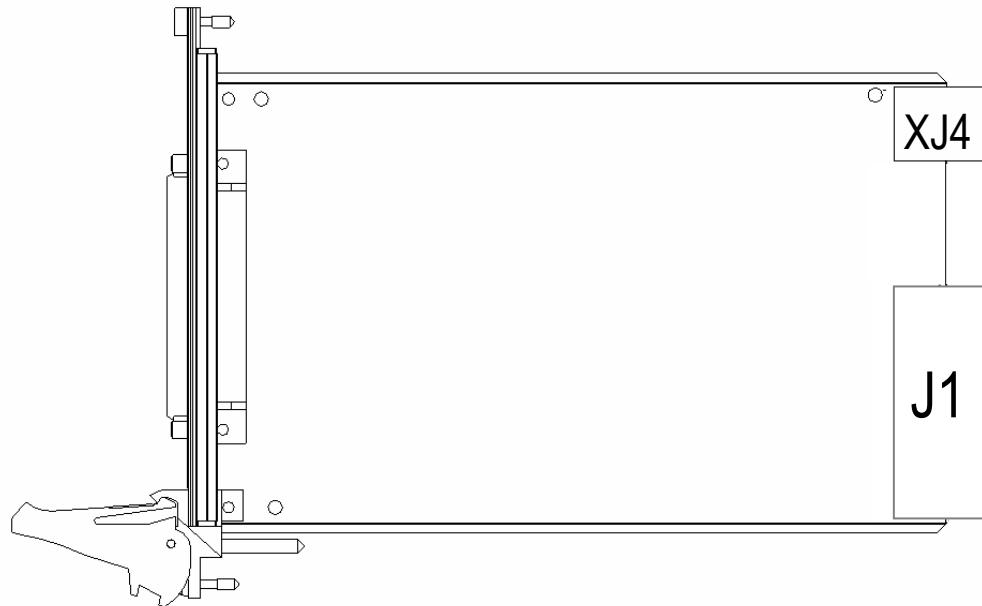
1. Start with a PXI peripheral module

Creating a Hybrid Slot Compatible PXI Module



1. Start with a PXI peripheral module
2. Depopulate J2

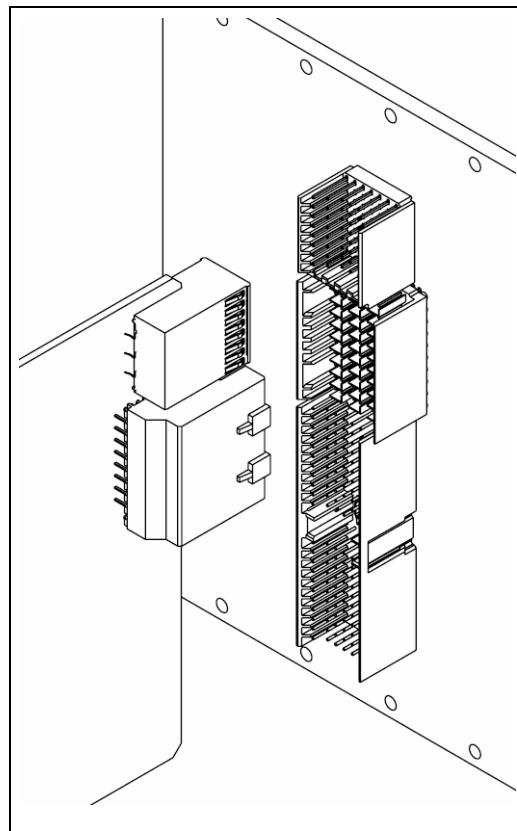
Creating a Hybrid Slot Compatible PXI Module



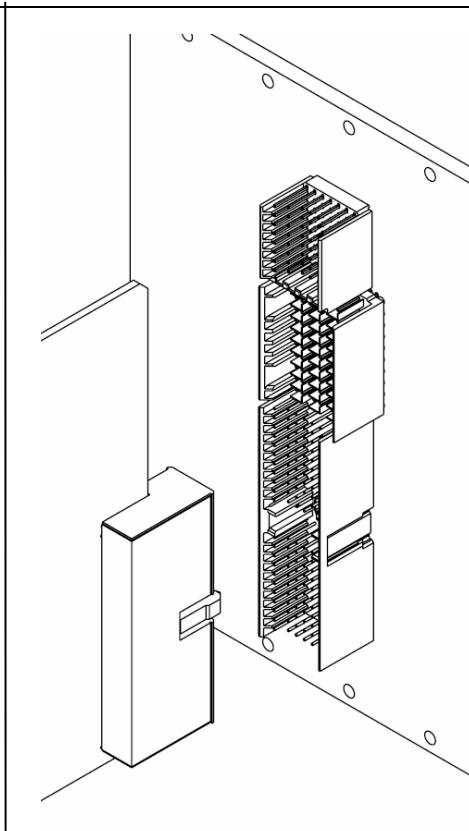
1. Start with a PXI peripheral module
2. Depopulate J2
3. Populate XJ4

Hybrid Slot Flexibility

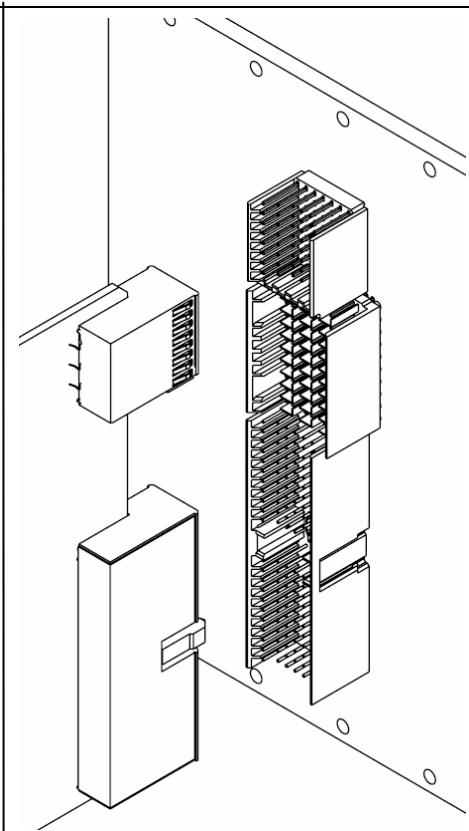
**PXI Express
Peripheral Module**



**32-bit CompactPCI
Module**



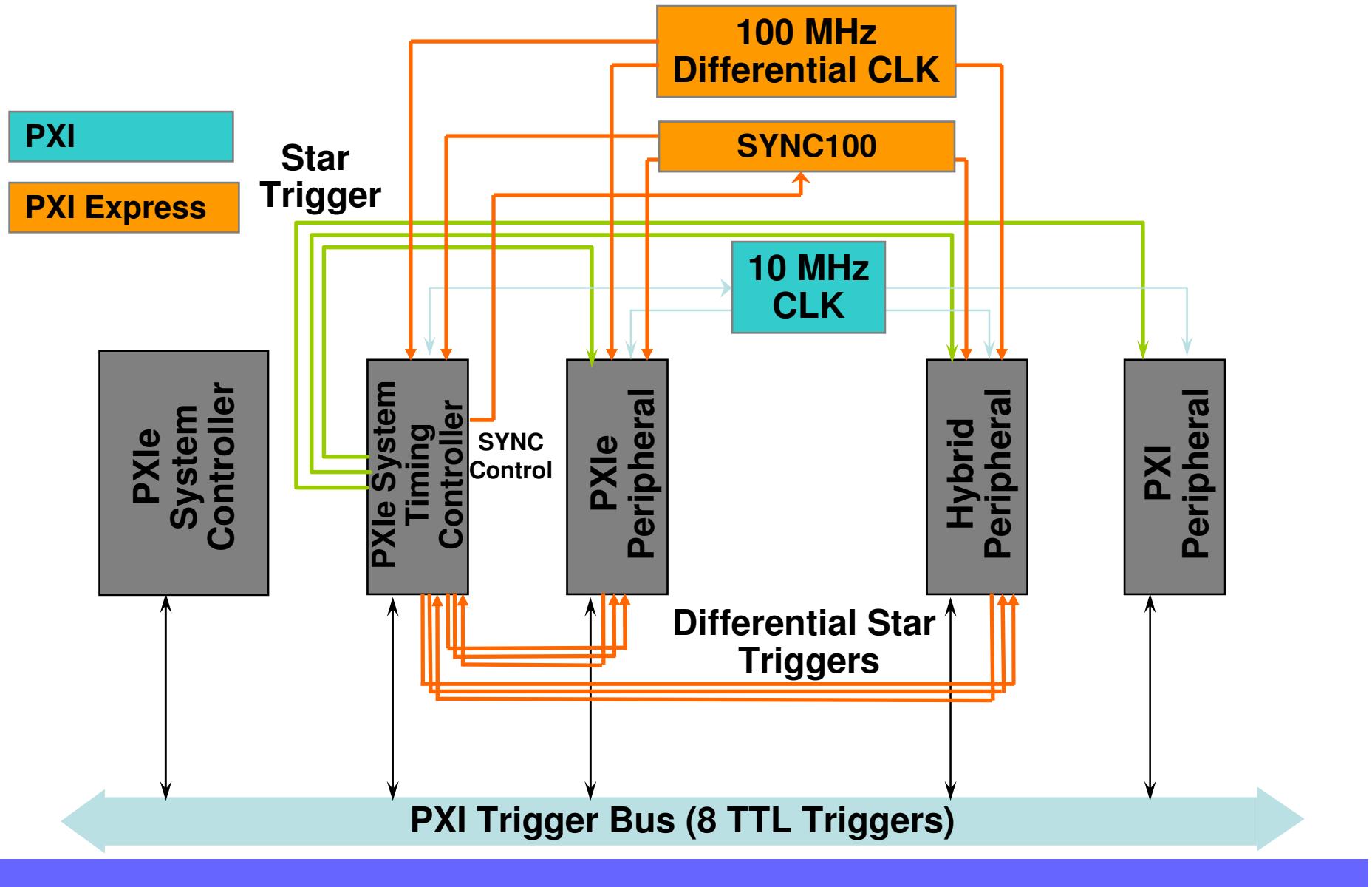
**Hybrid Slot Compatible
PXI Module**



Increased BW Enables New Applications

- **PXI applications requiring PCI bandwidth**
 - General purpose automated test (DMMs, switching, baseband instruments, etc)
 - General purpose data acquisition (AI, AO, DIO, etc)
 - Bus interfaces (CAN, 1553, ARINC, etc)
 - Motion control
- **PXI applications requiring PCI Express bandwidth**
 - High frequency, resolution IF / RF systems
 - High speed digital interfaces
 - High channel count data acquisition
 - High speed imaging





PXI Express Timing & Synchronization Backplane



PXI Express Software Specification

- Retains software compatibility with PXI, CompactPCI, and other PCI-based devices
- Adds system-level management software extensions:
 - System-level geographical addressing
 - Slot type / capability identification
 - Chassis monitoring (temperature, fan speed, etc)



PXI Specifications

- PXI-1 PXI Hardware Specification
- PXI-2 PXI Software Specification
- PXI-3 VISA for PXI Specification
- PXI-4 Module Description
- PXI-5 PXI Express Hardware Specification
- PXI-6 PXI Express Software Specification



Timeline and Organizations

- **PCI Industrial Manufacturers Group (PICMG)**
 - January 2003: CompactPCI Express research began
 - April 2004: CompactPCI Express specification development officially began
 - June 2005: CompactPCI Express (EXP.0) specification passed
 - February 2006: First chassis and controllers released
- **PXI Systems Alliance (PXISA)**
 - May 2005: PXI Express specification development officially began
 - June 2005: PXI-1 ECN for hybrid-slot-compatible PXI modules passed
 - August 2005: PXI-5 PXI Express hardware specification passed
 - September 2005: PXI-6 PXI Express software specification passed
 - April 2006: First chassis and controllers released
 - August 2006: First peripheral modules released
- **PXI Express and CompactPCI Express product rollout throughout 2006/7**



PXI Express Summary

- PXI Express integrates PCI Express into PXI
 - Up to 6 GBytes/s backplane bandwidth
 - Up to 2 GBytes/s slot bandwidth
- PXI Express maintains backwards compatibility with PXI
 - Software compatibility
 - Hardware compatibility with hybrid slots and hybrid systems
- PXI Express opens new applications to the PXI platform



Please E-Mail Questions to
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