



Pericom Solutions for PCI Express (PCIe)

August 2006



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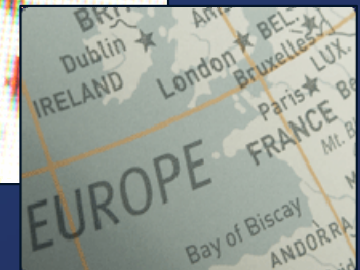
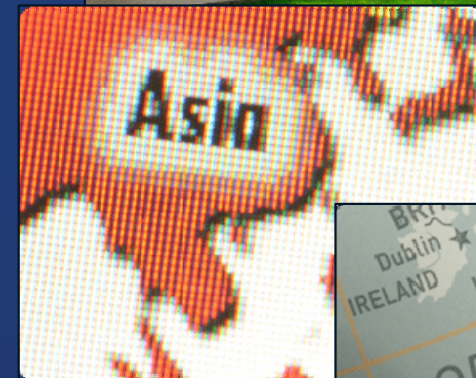
Corporate Overview

→ Public U.S.A. Company

- Founded in 1990
- IPO in 1997
 - NASDAQ: PSEM

→ Headquarters in San Jose, California (Silicon Valley)

- ~250 Employees
- Global Sales & Support Offices
- Design Centers in San Jose, Hong Kong, China, and Taiwan
- Fabless IC Business Model



Product Line Families

SiliconSwitch



- High-Performance Bus Switch
 - Market Leader
- Analog Switch
- Application Specific Switch
 - PCI Express, LAN, USB 2.0, and Video Switches

SiliconConnect



- PCI Bridges
 - PCI, PCI-X, PCI Express
- PCI Express Packet Switch
- LVDS
- SerDes

SiliconClock



- Standard & Zero-Delay Drivers
- Programmable Clock Drivers
- Clock Generators
- Memory Module PLL's

SiliconInterface



- PCI Express Re-Driver
- Voltage Translator / Level Shifter
- High Speed Logic
- Memory Module Registers
- μ P Supervisory Circuits

*SaRonix & *eCERA

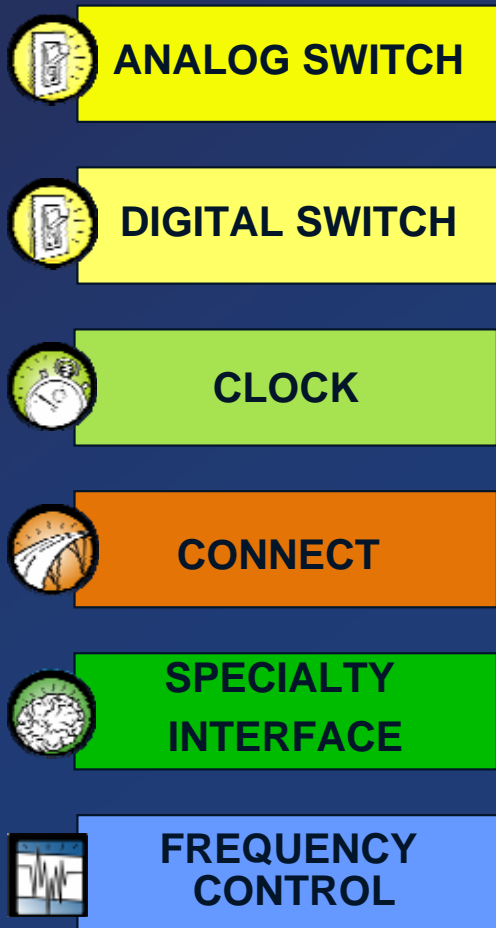


- Frequency Control
 - Oscillators & Crystals

*Wholly owned subsidiaries

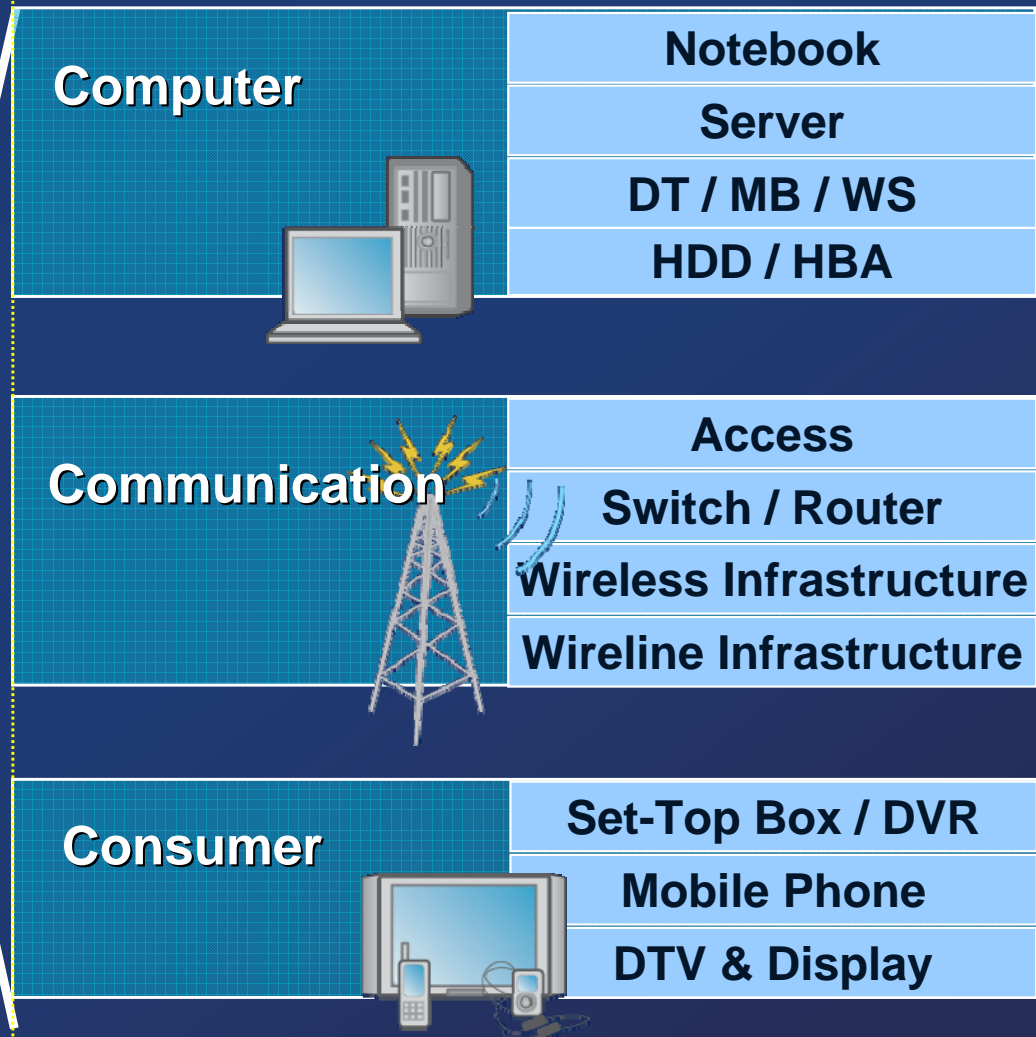
Growth Driven Market Segments

Product Families



Total System Solutions

Target High Growth Markets



Industry Leading Customer Base



Computer

Communication

Consumer





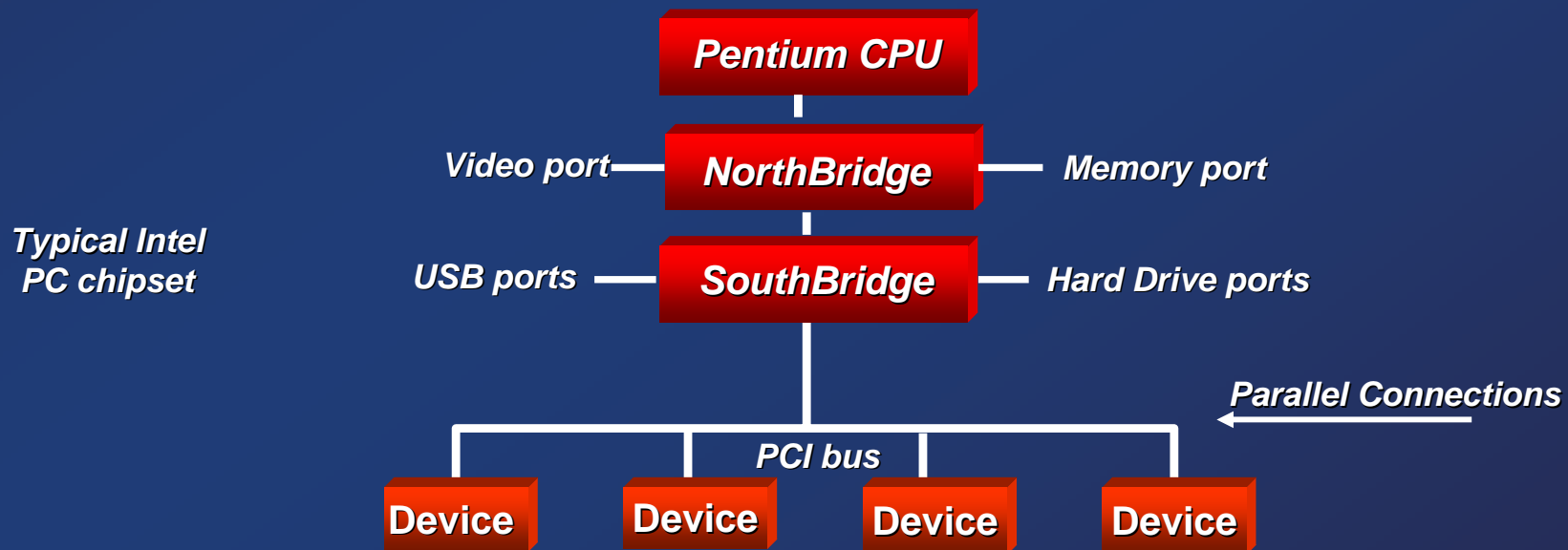
About PCI Express (PCIe)

www.pericom.com/pcie



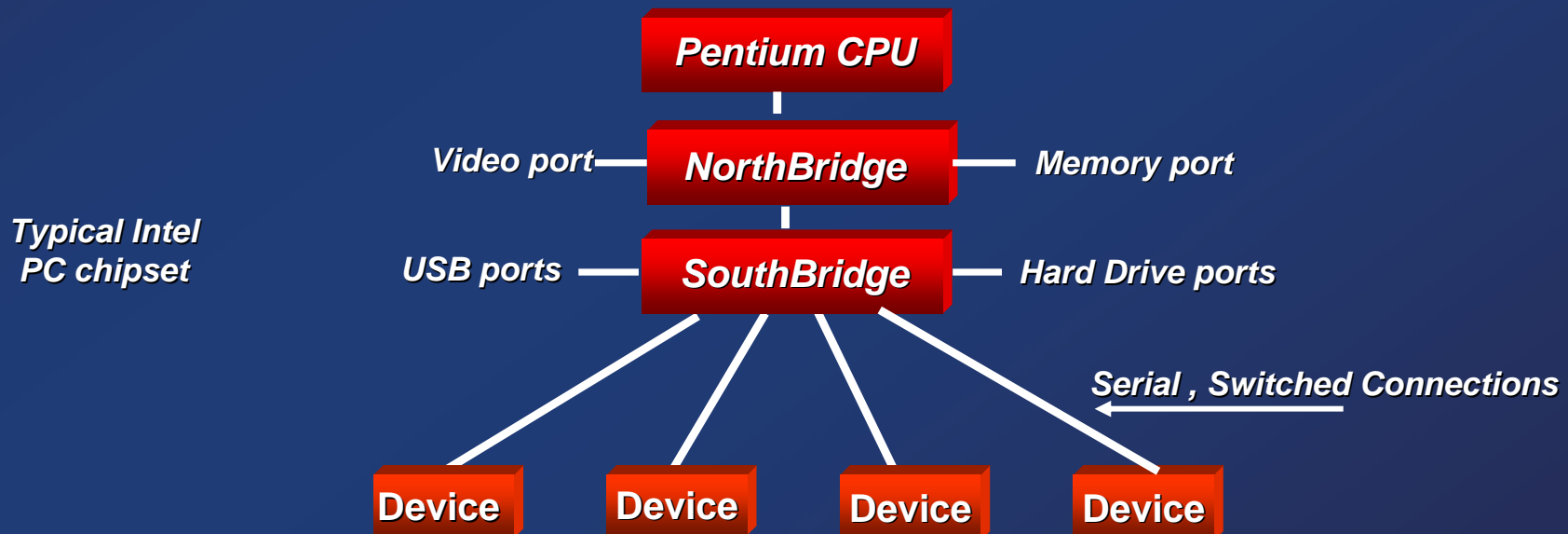
What is PCI?

- PCI stands for Peripheral Computer Interconnect
- PCI has been the main I/O bus connecting the CPU chipset with Peripheral Devices (main connection to the outside world)
 - PCI was invented by Intel in the early 1990's
 - Peripheral devices include add-in cards to the PC such as modem and Ethernet cards, sound and graphics cards, and HDD.
 - PCI is a shared connection and can talk to only 1 device at a time



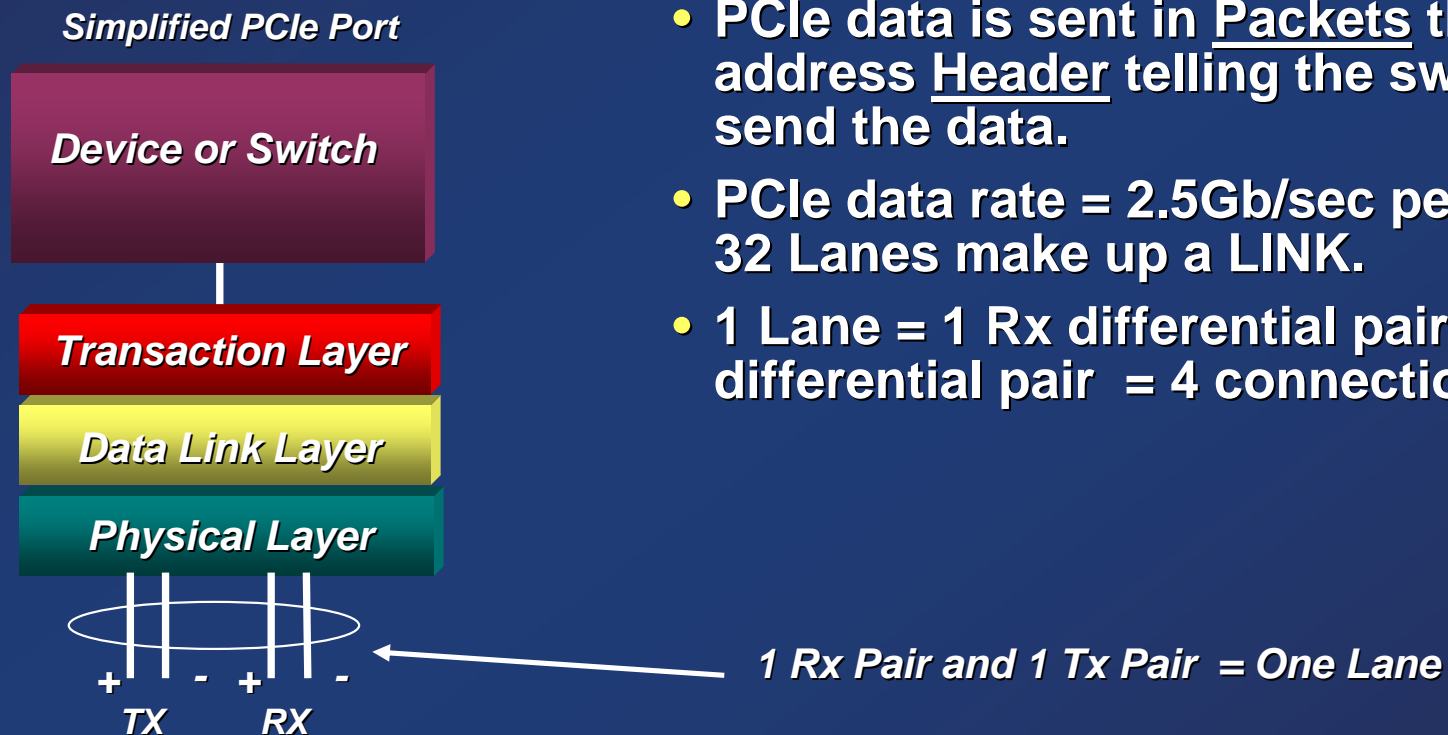
What is PCI Express (PCIe)?

- **PCI Express is a much updated and faster version of PCI**
- **PCI Express uses a similar data format as PCI, but sends it as a high-speed, serial data stream**
 - PCIe was invented by Intel and introduced in 2004
 - PCIe can do everything that PCI can, but faster and more efficient
 - PCIe is a switched connection and can talk to all devices at once



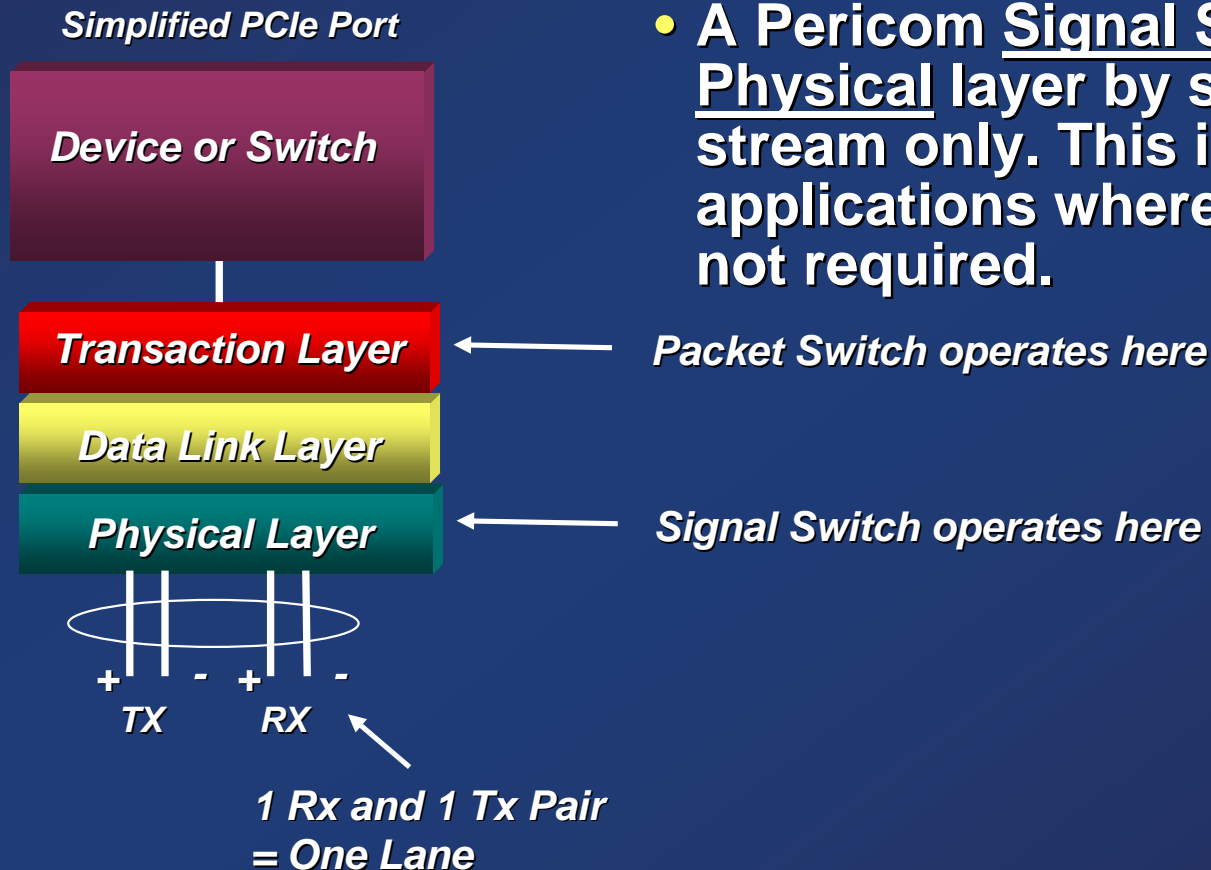
PCIe Technical Overview

- PCIe data transfer is much faster than PCI because PCIe devices operate in Full Duplex mode - send and receive data directly to each other at the same time. No sharing of a common bus like PCI.



PCIe Technical Overview

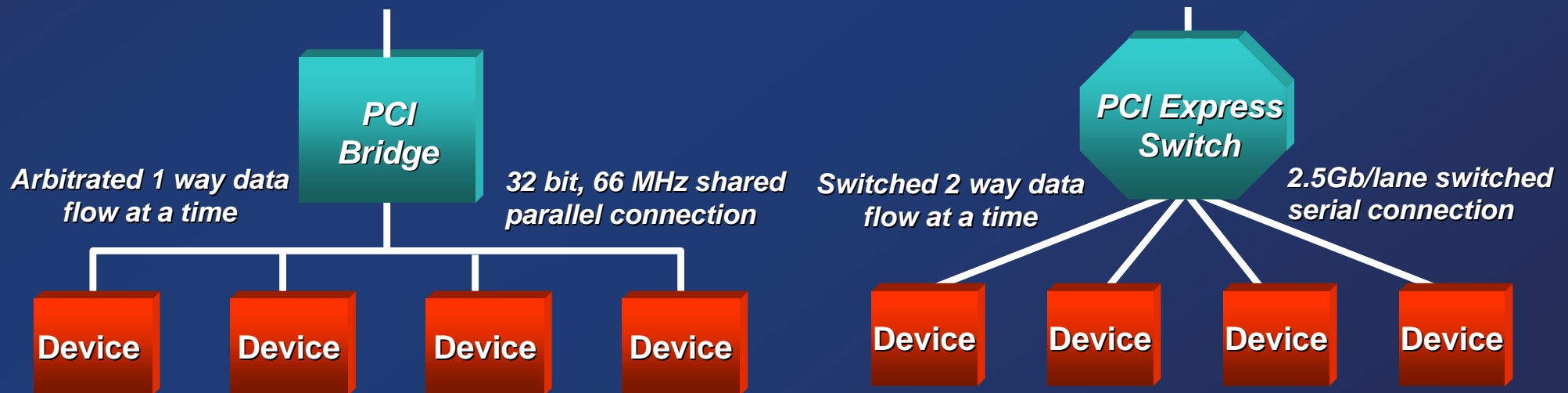
- A Pericom Packet Switch operates at the Transaction layer by reading the data packet header and switching the data from one port to another directly. No need for CPU intervention.



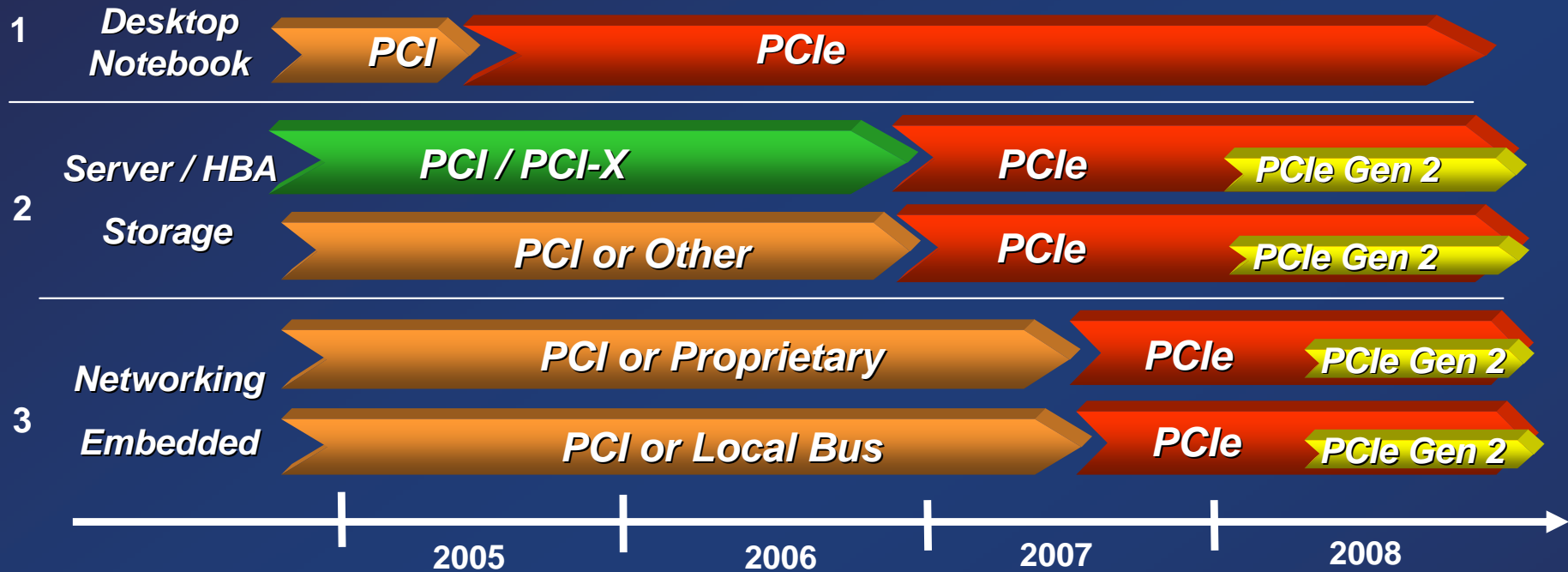
- A Pericom Signal Switch operates at the Physical layer by switching the raw data stream only. This is good for low cost applications where a packet switch is not required.

Technology Shift to PCI Express

- **All market segments are now transitioning from PCI to PCI Express (PCIe), affecting many new products and platforms**
 - **Faster** - PCIe is a high speed (2.5Gb/lane) serial connection
 - **Better** – PCIe devices are switched - not shared on a bus
 - **Bigger** - Up to 32 lanes can be grouped together for a huge 80Gb Link
 - **Smaller** – PCIe uses thinner cable and smaller connectors
 - **Versatile** – PCIe can be used as an external connection



Technology Shift to PCI Express

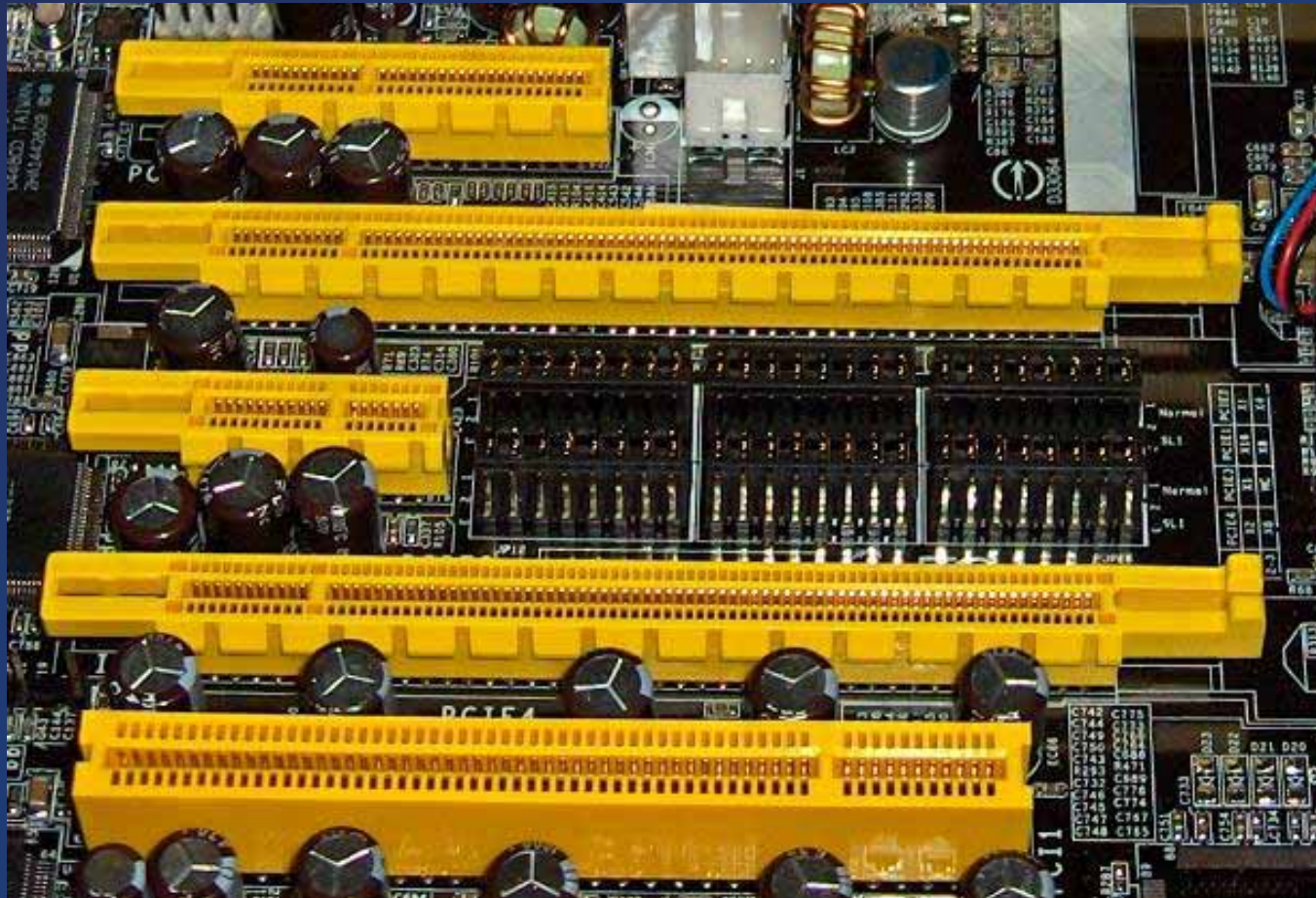


→ All Market Segments affected:

- 1st Main Transition – PC and add in card – Intel Driven
- 2nd Main Transition – Server/Storage/HBA – Intel/AMD/Sun Driven
- 3rd Main Transition – Networking/Embedded – Freescale Driven

- PCI is in its 15th year - PCIe will be around as long or longer
- PCIe Gen 2 (5Gb) appears late 2007 with 2008 production – driven by Sun Niagara II and Intel MCH for high end server segment

What do PCI Express slots look like?



PCI Express slots (from top to bottom: x4, x16, x1 and x16), compared to a traditional 32-bit PCI slot (bottom)



Why choose Pericom for PCIe?

www.pericom.com/pcie



Pericom Differentiation and Value

Pericom differentiates by providing a *complete serial connectivity* solution to the marketplace:

1. Industry's broadest line of signal switching & routing products:



- PCIe Gen I and Gen II, USB, HDMI / DVI, SAS/SATA, XAUI, Fibre Channel
- Fully featured PCIe Bridge and Packet Switch families

2. Industry unique Signal Integrity solutions:



- Re-Driver boosts distance on PCB or through connectors and cables while maintaining proper signal eye diagram and integrity
- Product families covering PCIe, SAS, SATA, XAUI, Fibre Channel and more

3. Precise timing references and clock distribution solutions:

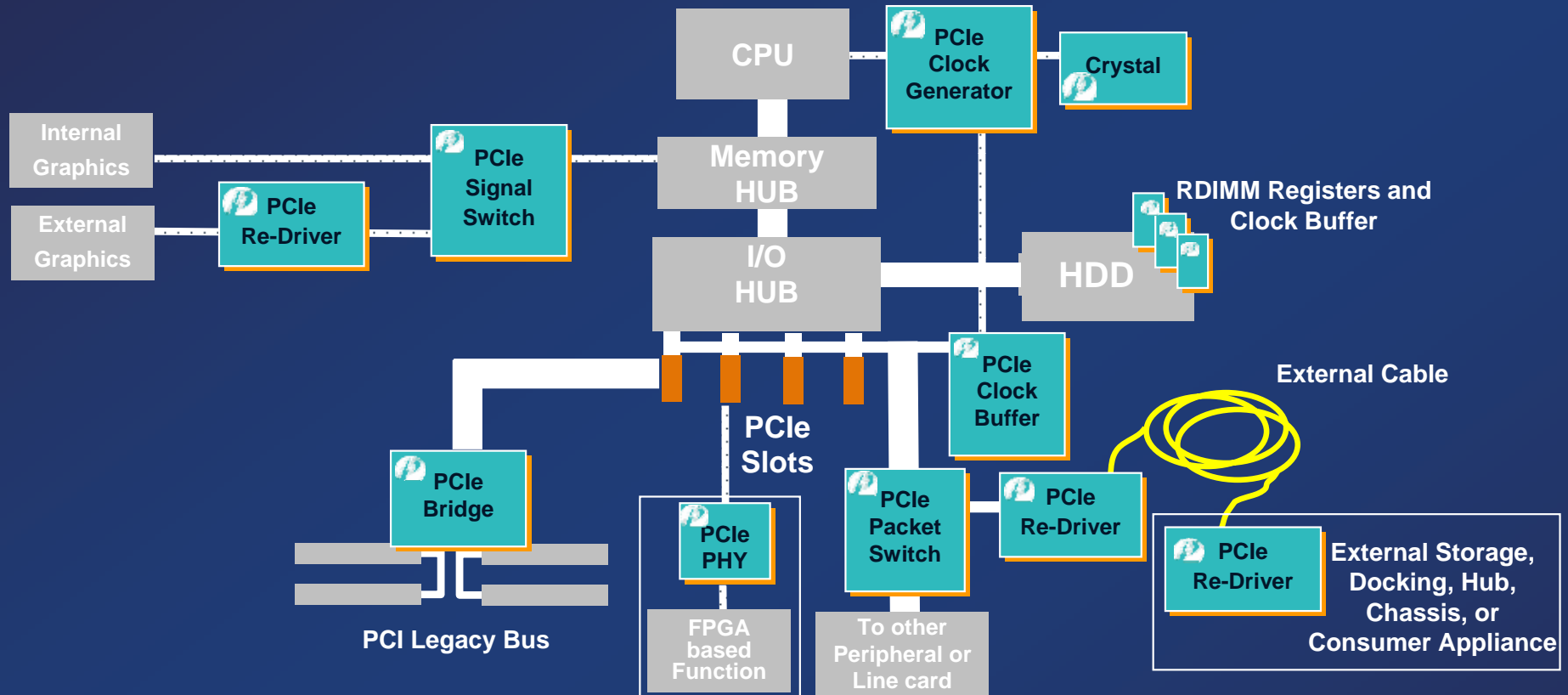
- PCIe Clock IC's, Zero-Delay Buffers, Crystal, Crystal Oscillators
- PCIe family targets PC, server, networking



Comprehensive PCIe Offering

 = Pericom devices

Generic example of typical CPU chipset application



→ Pericom is *the only* manufacturer that addresses the PCIe market application need with all 6 product functions:

→ Bridge, Packet Switch, Re-Driver, Clock, Signal Switch, and Stand Alone PHY.

→ Pericom has product roadmaps built around all these functions

Multiple Family PCIe Solutions

→ **Pericom offers the broadest PCI Express product family in the industry:**

- We offer a complete PCIe solution for each of our targeted market segments including Servers, Notebooks, Storage, and Networking.
- Internal and external extended PCI Express support
- Our 3 main product groups work together to provide the best PCIe solution. We are proud of our Top Tier PCIe sponsor customers.

Vendor	Connect			Switch		Timing	
	Bridge	Packet Switch	Stand Alone PHY	Signal Re-Driver	Signal Switch	Clock and Timing	Oscillator & Crystal
PERICOM	X	X	X	X	X	X	X
Comp P	X	X					
Comp I		X				X	
Comp T	X	X					

Industry Recognition

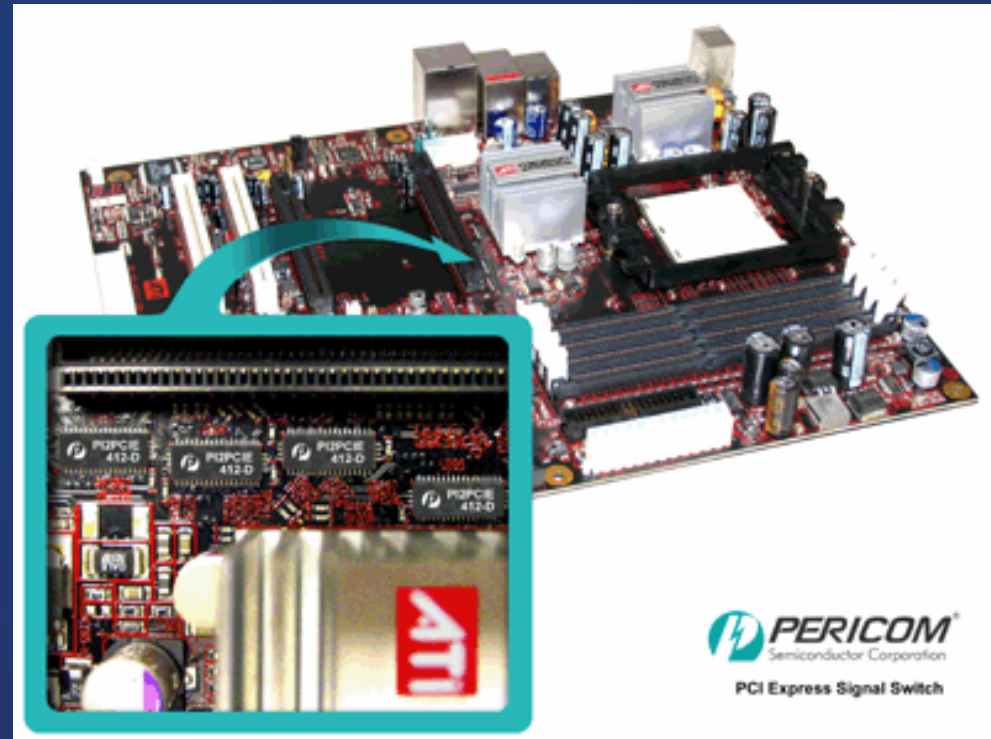
→ Press Release:

- Pericom Wins First Place Award at Intel Developer Forum (Spring IDF 2006)
 - Exhibit titled PCI Express extravaganza!



→ Press Release:

- Pericom Technology a Key Component to Enabling ATI's CrossFire™ Multi-GPU Mode



 **PERICOM**
Semiconductor Corporation
PCI Express Signal Switch



Connect Products Detail

August 2006



Strong Foundation in PCI/X

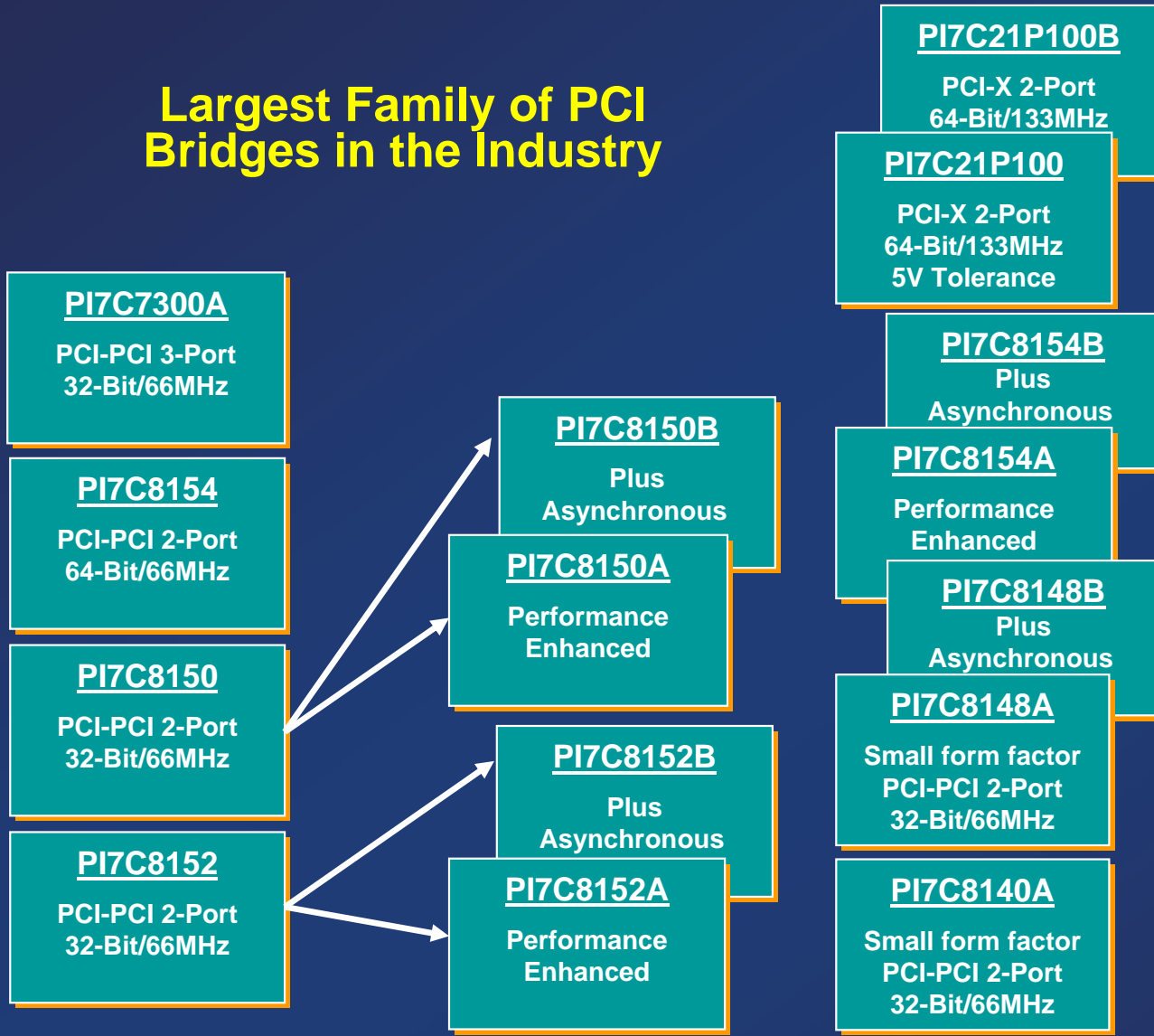
→ We Have a Great PCI/X Track Record

- A Market Leader in PCI and PCI-X
- 5 Years in PCI / PCI-X Bridge Business
- #2 in PCI / X to PCI / X Bridge Market
- Doubled our PCI Business every year for the last 3 yrs
- ALL our Designs done in-house - full access to design team
- WE WIN ON GREAT PERFORMANCE and SERVICE
 - *Dynamic Prefetching Control* – lowest latency in the industry
 - Asynchronous mode support
 - Industry Unique 3-port PCI bridge – PI7C7300
 - Offers peer to peer transaction feature
 - Industrial temperature support (-40°C to 85°C)
 - Industry's smallest package – 12 x 12mm PBGA
 - Fully staffed Applications, Marketing, and Design Groups
 - We encourage customer dialog and stand behind our products

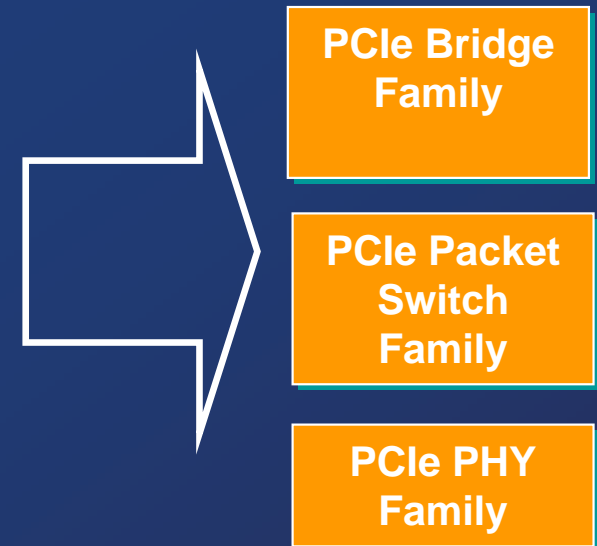
→ WE LEVERAGE THIS EXPERTISE TO PCI EXPRESS

Strong Foundation in PCI/X

Largest Family of PCI Bridges in the Industry



NOW Introducing Next Generation: PCI Express



2000

2005 +



Pericom PCIe Bridge Solutions

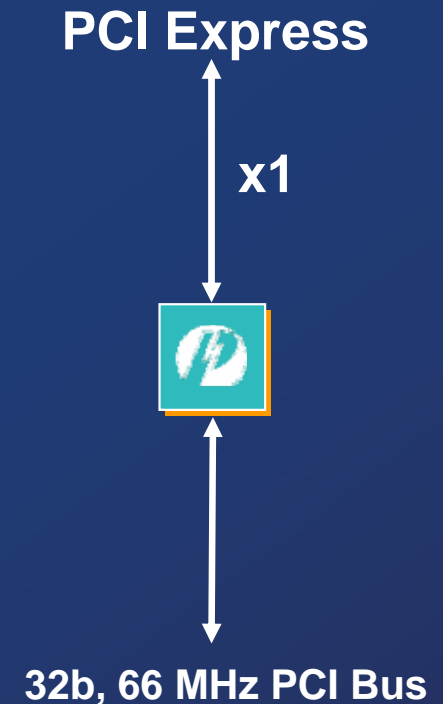
www.pericom.com/pcie



PCI Express to PCI Reversible Bridge

→ **PI7C9X110A:**

- Reversible – Configurable via PCIe or PCI
- PCI port - 32-bit / 66MHz
- 3.3V signaling w/5V I/O tolerance
- Support for up to 8 PCI devices
- Configurable Transparent / Non-Transparent
- Internal arbitration for 8 PCI bus masters
- Supports up to 512B payloads
- Programmable 2-level priority arbiter
- PCI Express Port – x1 support
- PCI Express Hot Plug
- Programmable 2-level priority arbiter
- GPIO Support – 4 GPIO pins
- Isochronous support
- I2C Bus support
- 160 PBGA 12mmx12mm



Prod Samples:	NOW
Production:	3Q06

PCI Express to PCI-X Reversible Bridge

→ **PI7C9X130:**

- Reversible - configurable via PCIe or PCI-X
- PCI-X port – 64-bit / 133MHz
- Supports PCI mode
- 3.3V signaling w/5V I/O tolerance
- Support for up to 6 PCI bus masters in PCI mode
- Configurable Transparent / Non-Transparent
- Supports up to 512B payloads
- Programmable 2-level priority arbiter
- PCI Express Port – Up to x4 support
- PCI Express Hot Plug
- Programmable 2-level priority arbiter
- GPIO Support – 6 GPIO pins
- Isochronous support
- I2C Bus support
- 256 PBGA - 17mmx17mm - 1mm pitch

PCI Express

x4



64b, 133MHz
PCI-X Bus

Samples:	NOW
Production:	3Q06



Pericom PCIe Packet Switches

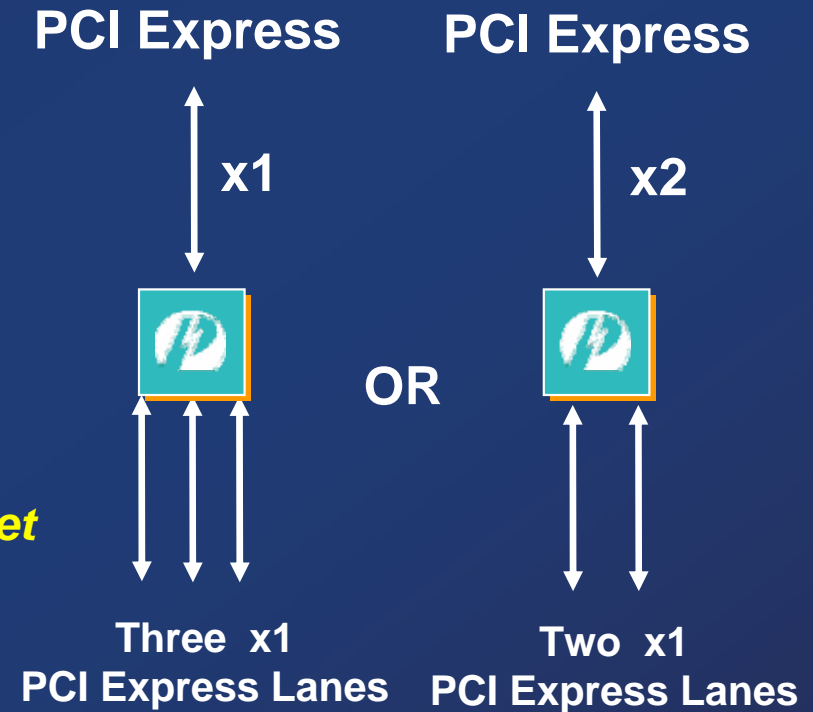
www.pericom.com/pcie



PCIe 4-Lane / 4 Port Packet Switch

→ PI7C9X20404A:

- x1 to 3 x1's or x2 to 2 x1's
- Cut Through or Store/Forward Option
- Low Power – 2W typical
- Low Latency - <300nS typical
- 128 or 256B payload - programmable
- Cost Effective
 - *Smallest PCIe Packet Switch in the market*
- Programmable PHY drive and EQ
- I2C bus support
- Advanced Power Management
- PCIe Hot Plug compliant
- 2 VC's and 8 TC's per Port
- Isochronous Support on VC1
- 1.8V +2.5V Supply
- 208 PBGA 23mmx23mm



Prod Samples:	NOW
Production:	3Q06

Packet24 Family Key Features

→ 4 KEY DESIGN GOALS:

1. Lowest Latency in the market:

- Design goal – 150nS typical, 200nS across temp

2. Lowest Power in the market:

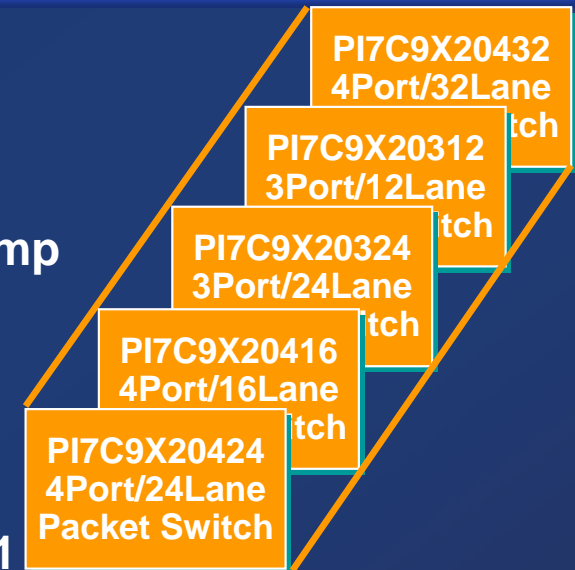
- No heat sinks required in 55degC still air

3. Most Wanted feature set in the market:

- Fully compliant to latest PCISIG PCIe spec 1.1
- Fully compliant to latest PCISIG PCI spec 1.2
- Read and Write to configuration registers via SM bus
- Programmable PHY parameters by port via I2C bus
- Programmable 128 or 256B payload
- Programmable cut through or store/forward
- Isochronous traffic support

4. Most Cost Effective in the market:

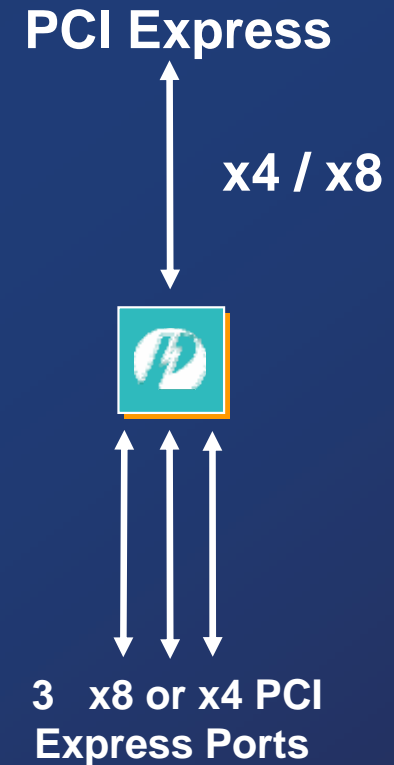
- Wide ball spacing = more efficient PCB routing = less system cost
- Lower Pd = less heat budget = less system cost
- Efficient die design = less unit cost



4 Port 24-Lane Packet Switch

→ PI7C9X20424

- Compliant to PCIe spec rev 1.1
- 1 x8 or x4 Host to 3 x8 or x4 Ports
- Cut Through or Store/Forward modes
- Low Power – 3.5W typical
- Low Latency – 150nS typical
- 128 or 256B payload - programmable
- Cost Effective, high performance solution
- Programmable PHY drive and EQ
- SM bus and I2C bus support
- Advanced Power Management
- PCIe Hot Plug compliant
- 2 Virtual Channels / 8 Traffic Classes/Port
- Isochronous Support on VC1
- 1.0V +3.3V Supply
- 409 PBGA - 31mmx31mm – 1.27mm pitch

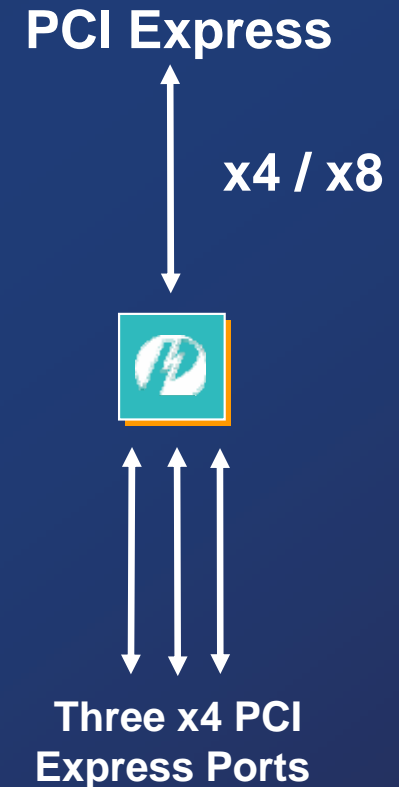


Samples:	3Q06
Production:	4Q06

4 Port 16-Lane Packet Switch

→ PI7C9X20416

- Compliant to PCIe spec rev 1.1
- 1 x8 or x4 Host to 3 x4 Ports
- Cut Through or Store/Forward modes
- Low Power – 2.5W typical
- Low Latency - 150nS typical
- 128 or 256B payload - programmable
- Cost Effective, high performance solution
- Programmable PHY drive and EQ
- SM bus and I2C bus support
- Advanced Power Management
- PCIe Hot Plug compliant
- 2 Virtual Channels / 8 Traffic Classes/Port
- Isochronous Support on VC1
- 1.0V +3.3V Supply
- 336 PBGA - 27mmx27mm – 1.27mm pitch

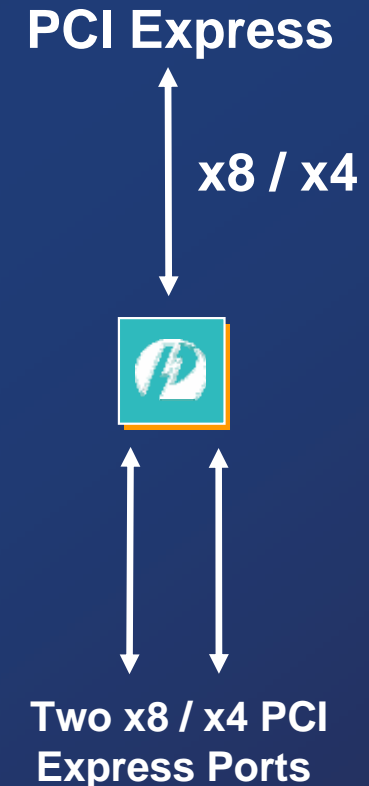


Samples:	3Q06
Production:	4Q06

3 Port 24 Lane Packet Switch

→ PI7C9X20324

- Compliant to PCIe spec rev 1.1
- 1 x8 or x4 Host to 2x8 or x4 Ports
- Cut Through or Store/Forward modes
- Low Power – 3.0W typical
- Low Latency - 150nS typical
- 128 or 256B payload - programmable
- Cost Effective, high performance solution
- Programmable PHY drive and EQ
- SM bus and I2C bus support
- Advanced Power Management
- PCIe Hot Plug compliant
- 2 Virtual Channels / 8 Traffic Classes/Port
- Isochronous Support on VC1
- 1.0V +3.3V Supply
- 409 PBGA - 31mmx31mm – 1.27mm pitch

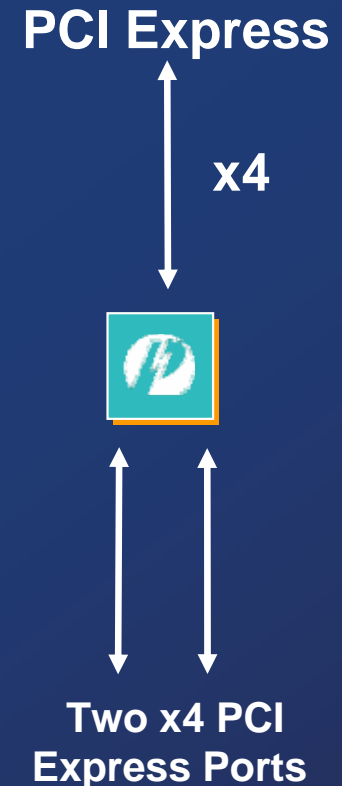


Samples:	3Q06
Production:	4Q06

3 Port 12 Lane Packet Switch

→ PI7C9X20312

- Compliant to PCIe spec rev 1.1
- 1 x4 Host to 2 x4 Ports
- Cut Through or Store/Forward modes
- Low Power – 2.0W typical
- Low Latency - 150nS typical
- 128 or 256B payload - programmable
- Cost Effective, high performance solution
- Programmable PHY drive and EQ
- SM bus and I2C bus support
- Advanced Power Management
- PCIe Hot Plug compliant
- 2 Virtual Channels / 8 Traffic Classes/Port
- Isochronous Support on VC1
- 1.0V +3.3V Supply
- 336 PBGA - 27mmx27mm – 1.27mm pitch

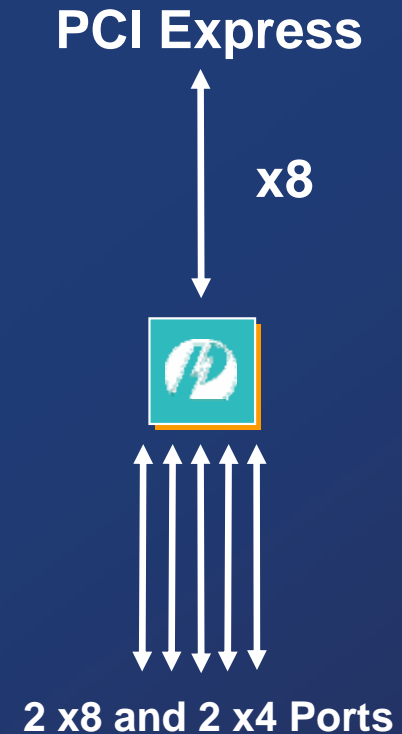


Samples:	3Q06
Production:	4Q06

6 Port 32-Lane Packet Switch

→ PI7C9X20632

- Compliant to PCIe spec rev 1.1
- 1 x8 Host to 5 - x8 or x4 Ports
- Cut Through or Store/Forward modes
- Low Power – 4.0 W typical
- Low Latency – 150nS typical
- 128 or 256B payload - programmable
- Cost Effective, high performance solution
- Programmable PHY drive and EQ
- SM bus and I2C bus support
- Advanced Power Management
- PCIe Hot Plug compliant
- 2 Virtual Channels / 8 Traffic Classes/Port
- Isochronous Support on VC1
- 1.0V +3.3V Supply
- 515 PBGA - 35mmx35mm – 1.27mm pitch



Samples:	4Q06
Production:	1Q07

Packet24 Family is 'Cool'

- **GOAL:**
 - *Packet24* Family = lowest Pd in the market for similar function
- **ACTIONS:**
 - Every design block – major goal is lowest Pd
 - Lowest Pd = highest Tcase allowance (per given Rtp)
 - Implement PCISIG rev 1.1 latest power management features
 - Pericom adds unused lane and port turn off capability
 - Optimized feature set reduces Pd
 - Use lowest Pd PHY - Rambus IP – tried, tested, proven
 - Optimize substrate and package for best ratio of size / Pd / Rt
- **SIMULATION RESULTS:(source: ASEM engineering)**
 - For 409 BGA, 3.8W max loading Pd – 24L version of the *Packet24* Family:
 - Tcase < 112C in still air @ 55C ambient
 - This meets good margin of safety, and confirms no heat sinks required – standard BGA is adequate
 - Reduced system heat load = lower cost, higher reliability

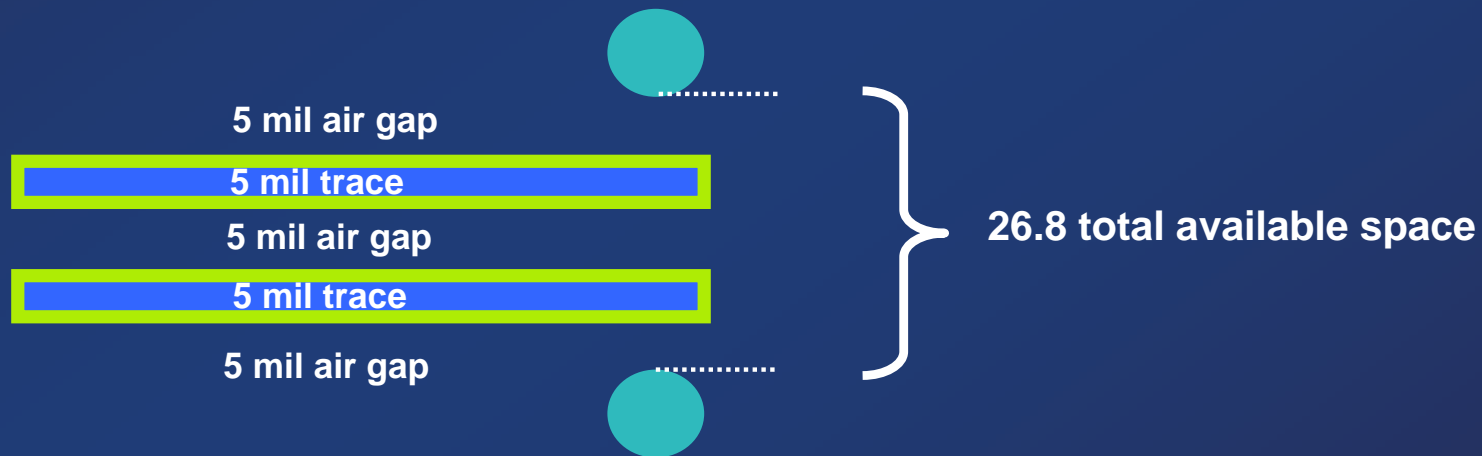
Packet24 Family is 'Wide'

→ GOAL:

- Package design is optimized for PCB layout and less cost

→ ACTIONS:

- Ball spacing (pitch) is 1.27mm – industry standard size
- Ball size is 0.6mm – industry standard with an advantage

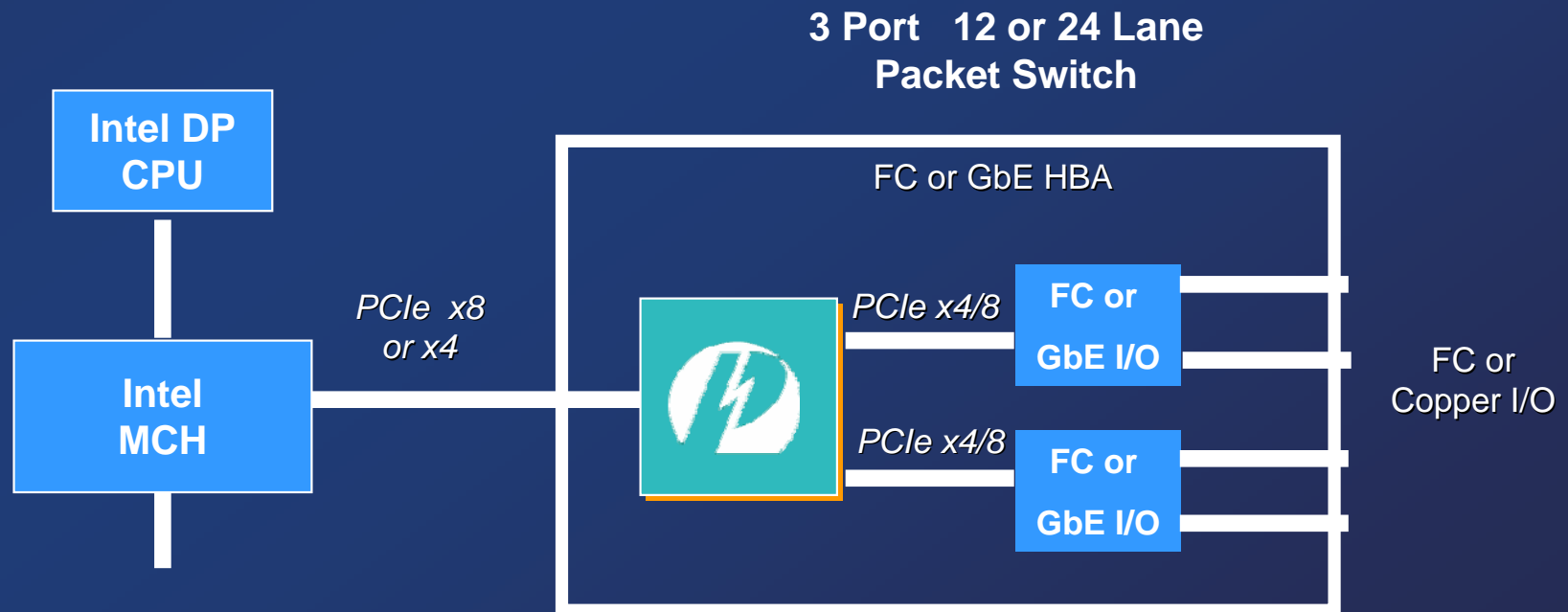


→ ADVANTAGE:

- Allows 2 traces between pins at 10mil pitch = $5+5+5+5+5 = 25$ mils
- Much easier PCB routing, and lower overall PCB cost!

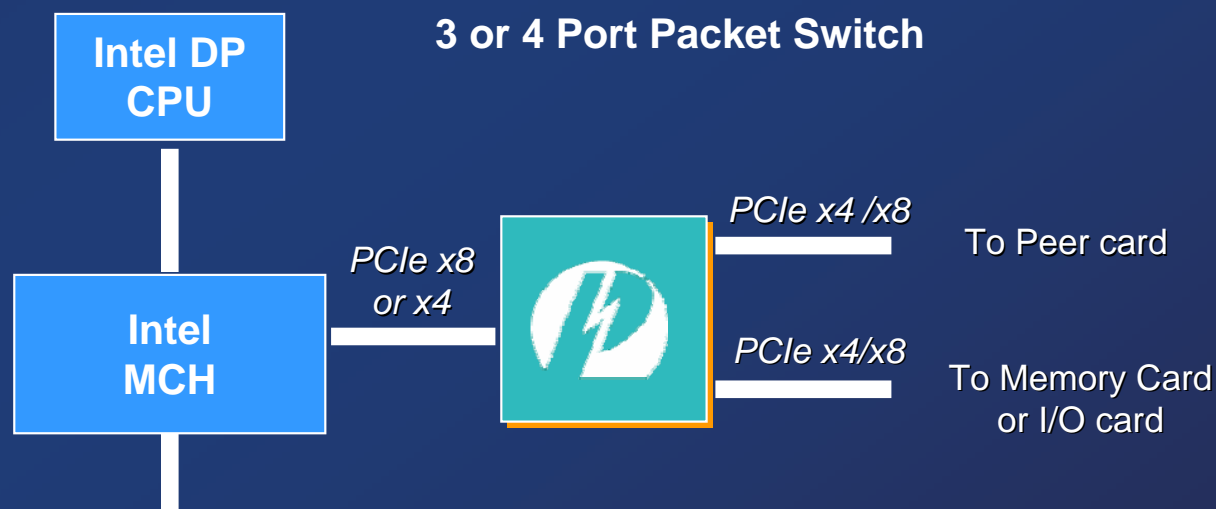
3 Port Application - HBA

- Application Example – FC or GbE HBA or NIC
- Problem – need to switch between Server or high end WS CPU and HBA
or NIC add in card – Fibre Channel I/O IC or GbE Product – 3 Port 24 lane or 12 Lane Packet Switch
- Features – cut through, 150nS latency, 12 or 24 total lanes
- Timing – Mid 2006 samples



3 or 4 Port Application - Server

- Application Example – Mid or High end DP or similar CPU MB
- Problem – need to switch between another peer and a memory card from one or both Root Complexes
- Product – 3 or 4 Port 24 lane Packet Switch
- Features – cut through, 150 nS latency, up to 24 total lanes
- Timing – Mid 2006 samples





Pericom PCIe PHY

www.pericom.com/pcie

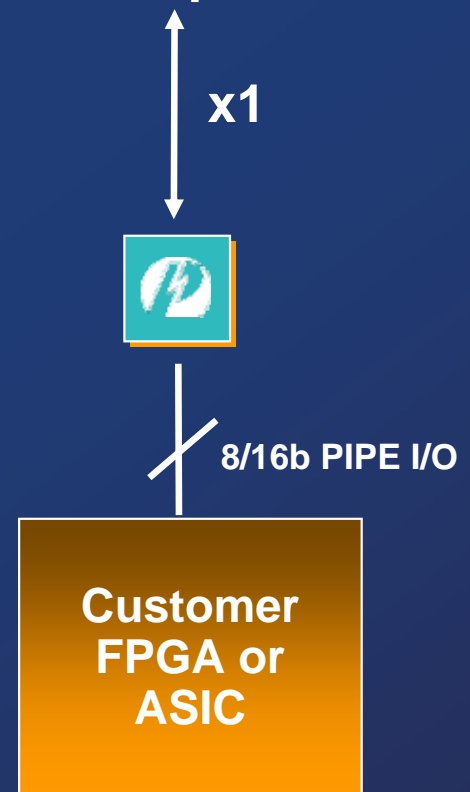


PCIe Express PHY

→ PI7C9X1011:

- Single x1 PCIe to 16b/8b PIPE I/O
- I2C interface for PHY parameter tuning
- Industry supported Intel PIPE
- Compliant to PCISIG spec rev 1.1
- Only 2 Vdd supplies needed
- 100-pin LFBGA 9mm x 9mm package
- Power saver mode
- Target Applications:
 - Low Cost FPGA implementations
 - Customer ASIC needing PCIe I/O
 - Communications, Industrial, Computer,
 - Instrumentation, and Consumer Markets

PCI Express



Samples: MAY 06
Production: 3Q06



Pericom PCIe Signal Switch

August 2006



Signal Routing Experts since 1990

- **5V & 3V Digital Bus Switch Leadership**
 - #1 Supplier since 2001
 - Our focus has evolved to high speed Analog
- **Application Specific Analog Switch Portfolio**
 - USB 2.0/Differential
 - LAN – Ethernet 10/100/Gb
 - Protocol - PCI Express, SATA, SAS, XAUI, HT, IB
 - Video – HDMI and DVI
- **Technical leadership in High Speed Differential Analog Design and Application**
 - Signal Switching
 - Signal Conditioning

High Speed Signal Switching Capability

- **USB 2.0 – 480Mb (HS) and 12Mb (FS)**
- **Ethernet – 10/100/1Gb**
- **SATA I – 1.5Gb**
- **SATA II – 3.0Gb**
- **SAS I – 1.5Gb**
- **SAS II – 3.0Gb**
- **XAUI – 3.125Gb**
- **Hypertransport**
- **Infiniband**
- **PCI Express Gen I – 2.5Gb**
- **PCI Express Gen II – 5.0Gb**
- **HDMI 1.1 and 1.2 – 1.65Gb**
- **HDMI 1.3 – 3.0Gb**
- **RF Signals > 1.8GHz**

PCI Express Switch Overview

- **Characteristics**

- PCI Express Bandwidth: 2.5 Gbps
- Maximum trace length coverage is 27”
- PCI Express signal compliant
- Switching Speed: 4ns
- Cross-talk: -60dB@10MHz
- Off-Isolation: -65dB@10MHz
- Vcc Operating Range: +1.5V to +2.0V
- Advanced Packaging:
 - TQFN (28-contact, 42-contact)

- **Available Now**

- **Competition: None**

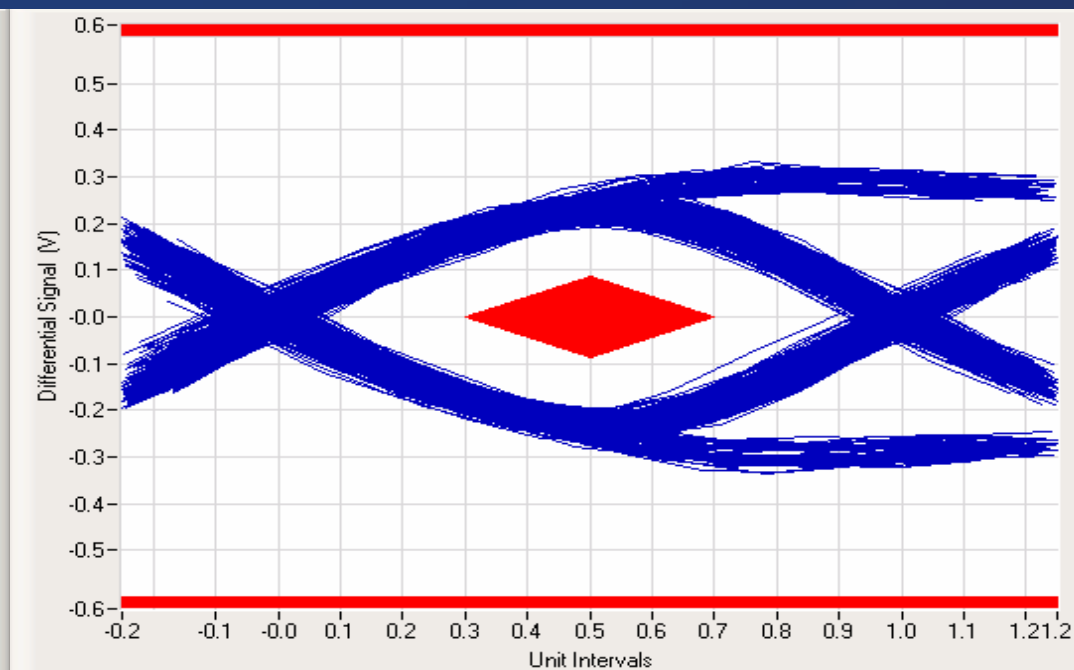
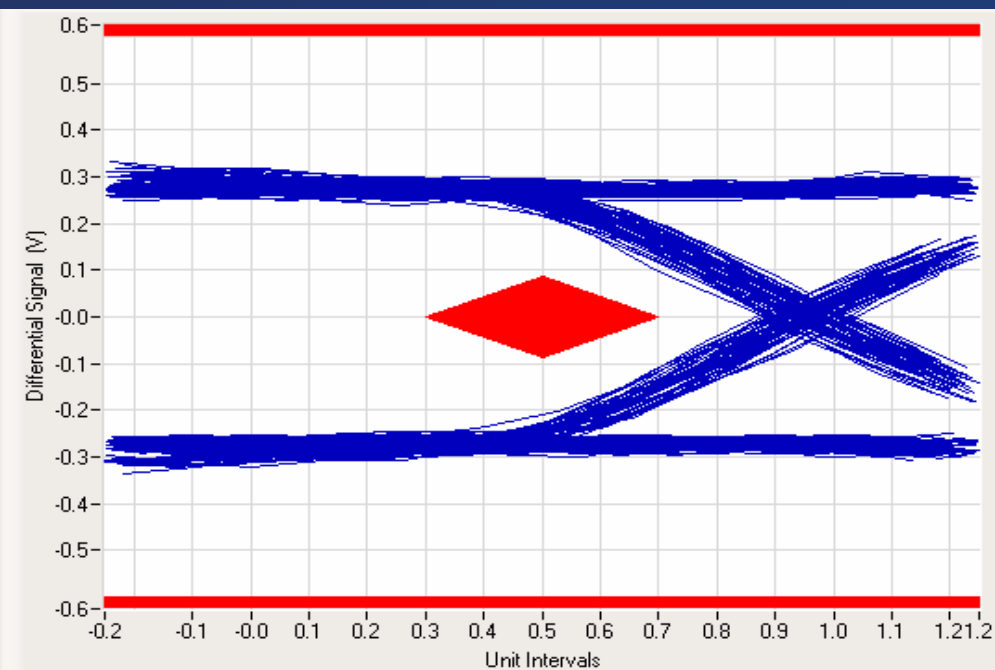
PI2PCIE2412 Key Features

- **2:1 Mux/Demux for 4 differential signal pairs**
 - 2 PCI-E lanes (2 directions, full duplex)
- **PCI-Express Gen II compliant**
 - Supports 5Gbps, 2.5GHz signals
 - Full PCI-E Gen 1 backwards compatibility
- **Enables low-cost duplication of available PCI-E lanes**
 - When lanes are mutually-exclusive (are not needed to operate simultaneously)
 - Ideal for providing multiple port configurations for graphics options, docking station expansion, etc.



PCI Express Switch Solution

- **FIRST** in the industry to introduce PCIe compliant switch
- Highest performance solution available to-date
- Ability to route PCI Express signals flexibly with minimal attenuation
- Active versions available in 2006 (Adaptive Equalization)
- Highest volume IC supplier in the world for PCIe interface



Designing with Industry Leaders

→ Press Release:



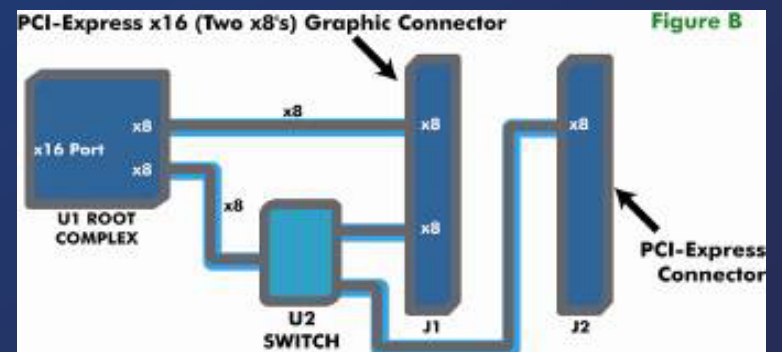
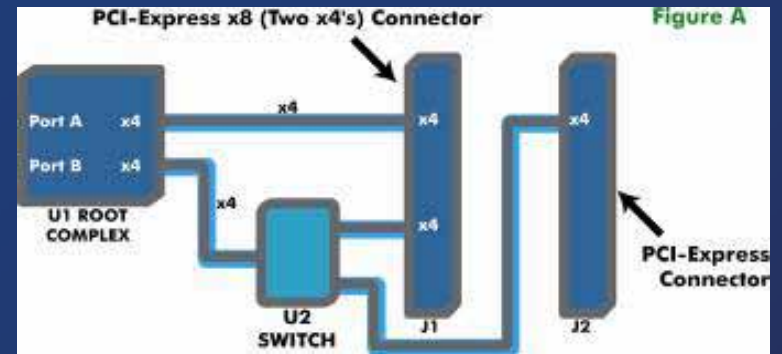
- Pericom and ASUSTeK Together Announce Availability of New Extreme Performance PCI Express Solution



→ Press Release:

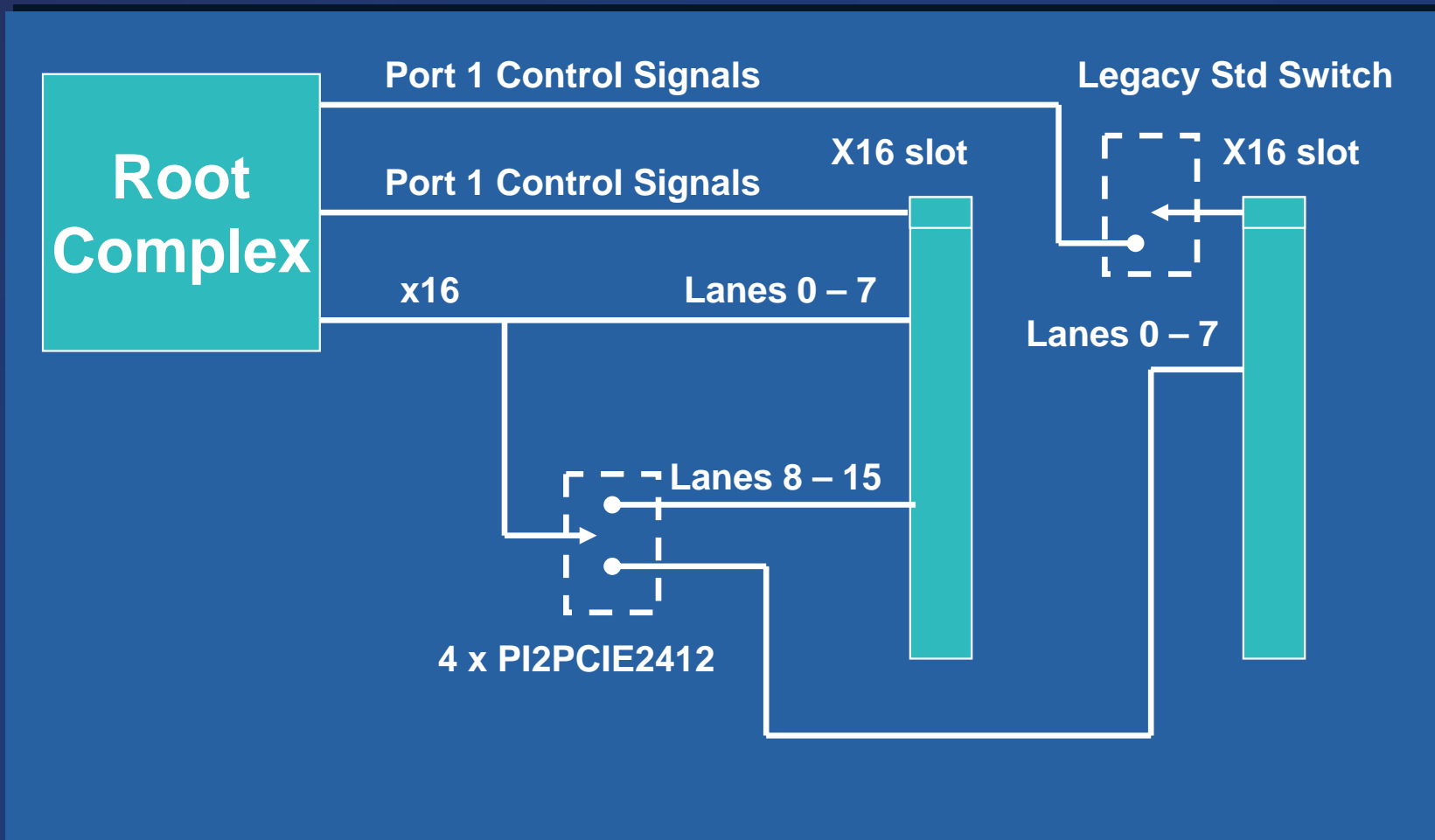


- Pericom Technology a Key Component to Enabling ATI's CrossFire™ Multi-GPU Mode



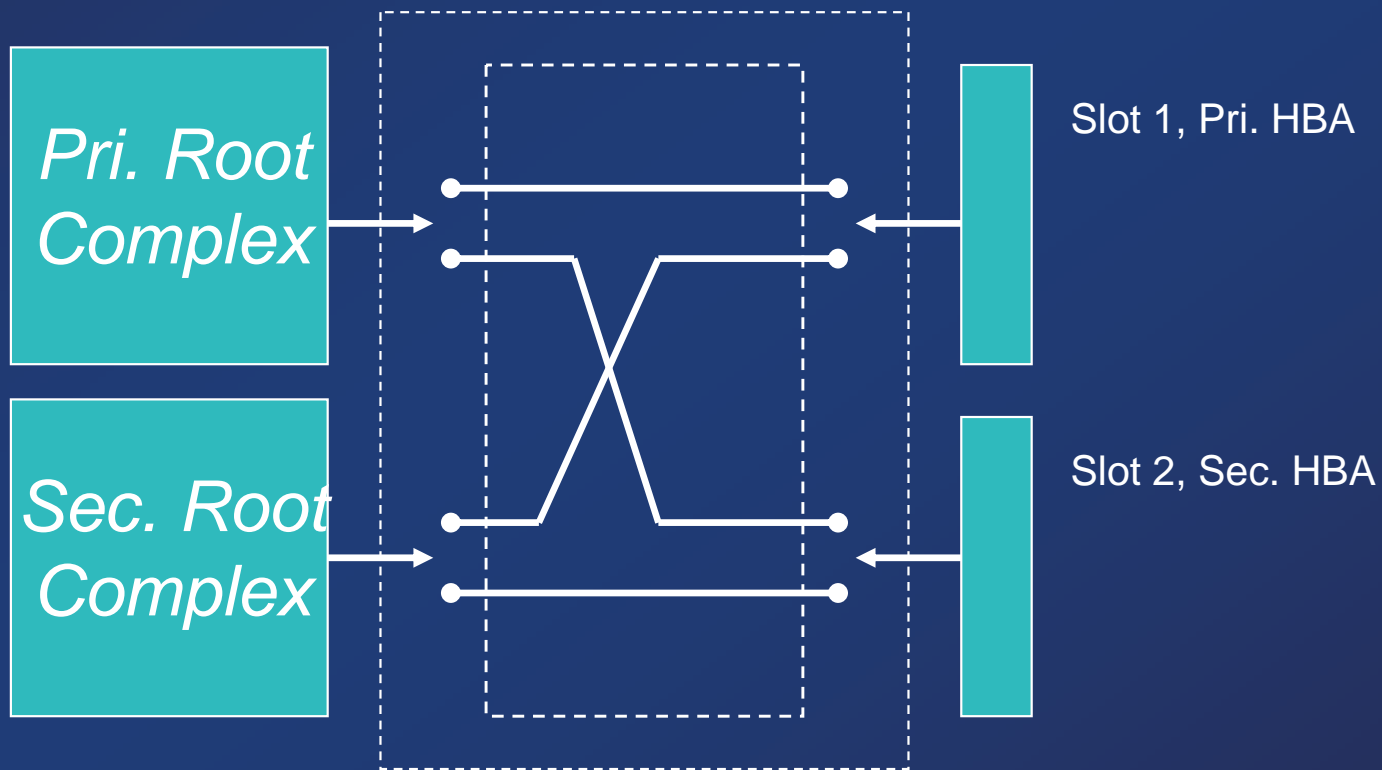
Example – Bus Configuration

Typical Application to split x16 lane to two x8 or
Provide Redundant x16 or x8 Slots



Example Application - Signal Switch

→ Use to Support Redundant setup

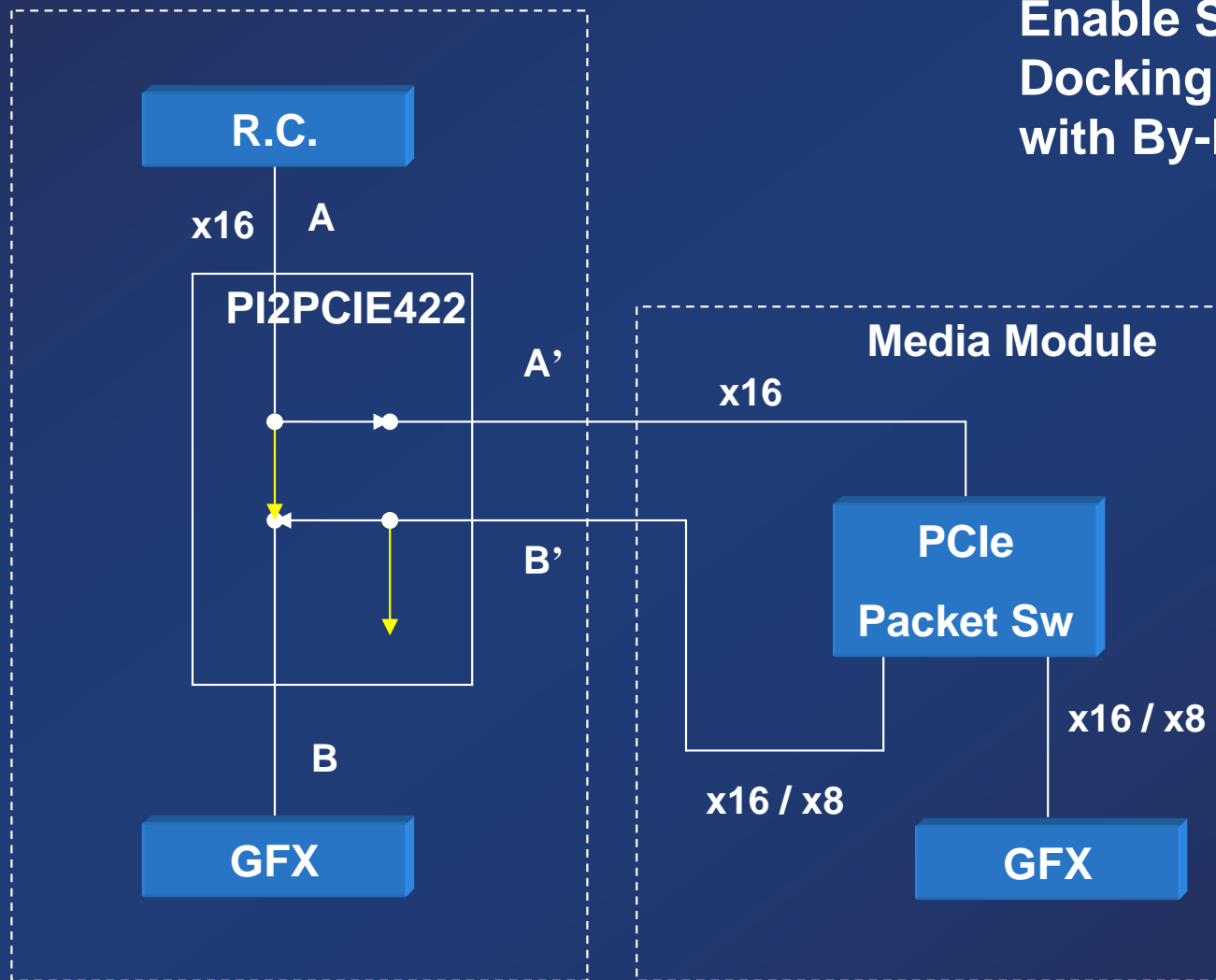


Game NB Dock

- **Packet48, 3 port PCIe Switch**
- **2nd GFX Card for SLI function**
- **HD Mirror via SATA PHY Switch**
- **Gigabit Ethernet TOE**
 - **Reduces Interrupt on Message based communication**
 - **Remote DMA?**

Game/Workstation Dock

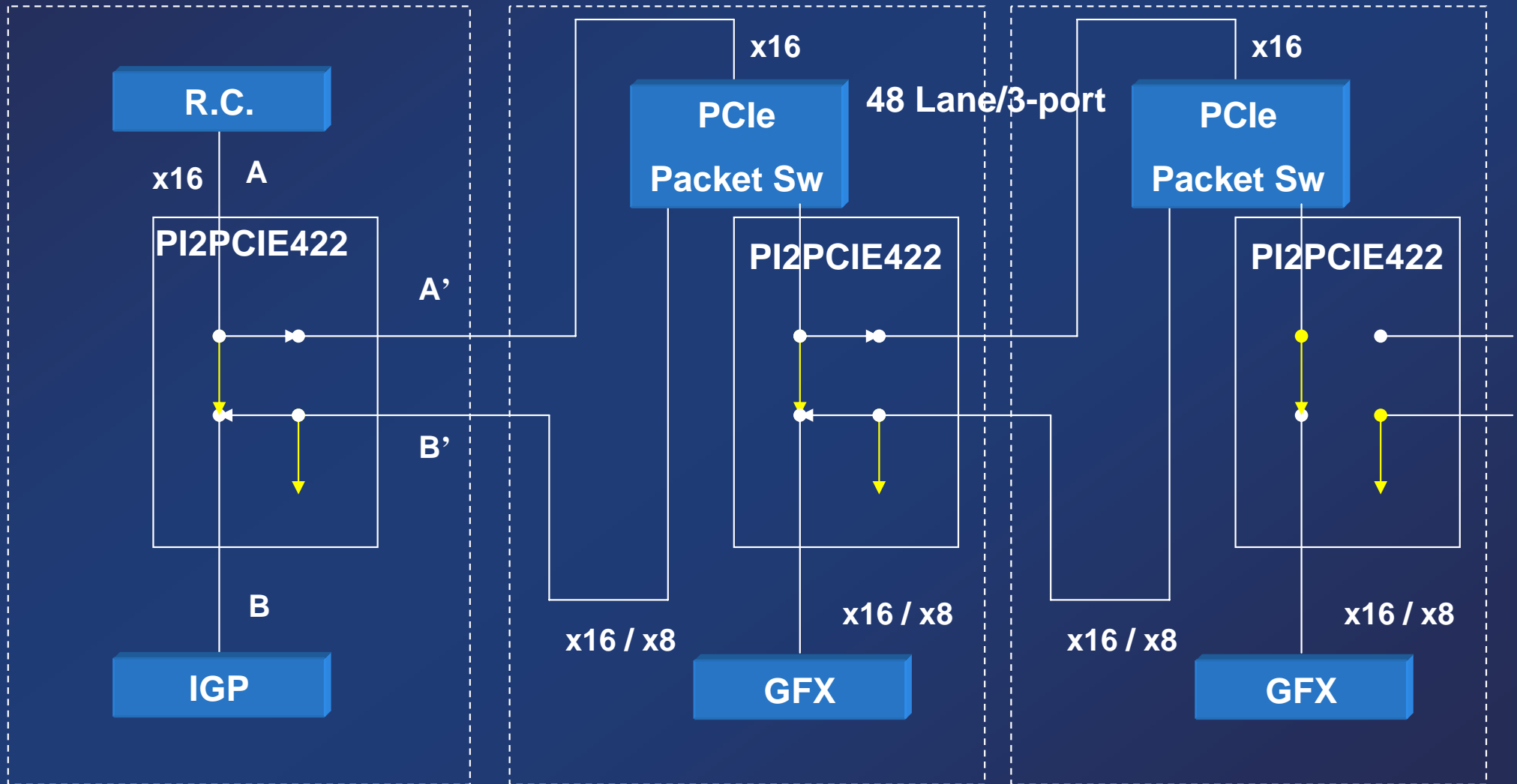
→ Supports External Graphic Processor Module



Enable SLI as an
Docking Option
with By-Pass Switch

Game/Workstation Dock

→ Supports Expandable External Graphic Processor Module





PCI Express Re-Drivers

For Signal Integrity / Signal Conditioning



Signal Conditioning

- Provides Signal Integrity Enhancement and extended signal drive capability – industry unique solutions
- The following high speed protocols are supported:
 - PCI Express
 - XAUI
 - SATA
 - SAS
 - Rapid I/O
 - Infini-band
 - Hypertransport
 - FC 2x, 4x
 - DVI/HDMI (1.1, 1.2, and 1.3)
- Support up to 6Gb by end 2006:
 - PCI Express Gen 2 – 5Gb
 - XAUI - 6Gb

Benefit of Equalization

Example – Extending PCI Express PCB trace lengths well beyond 16” specification

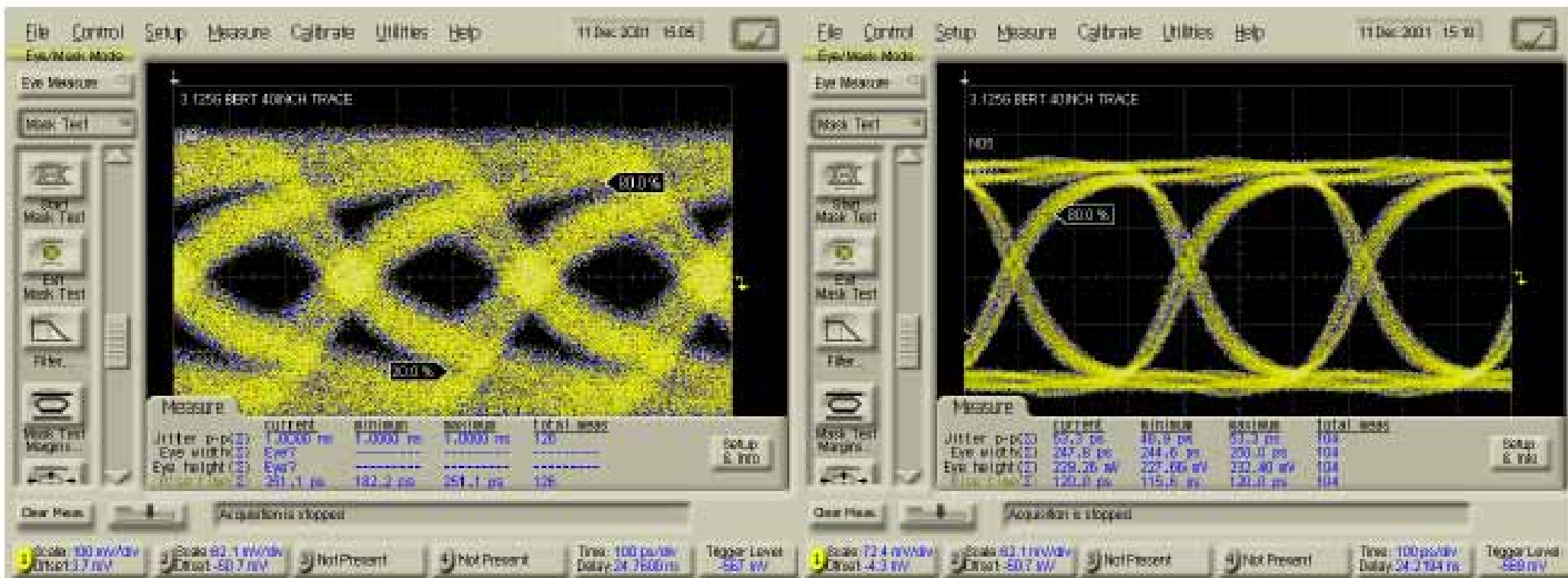


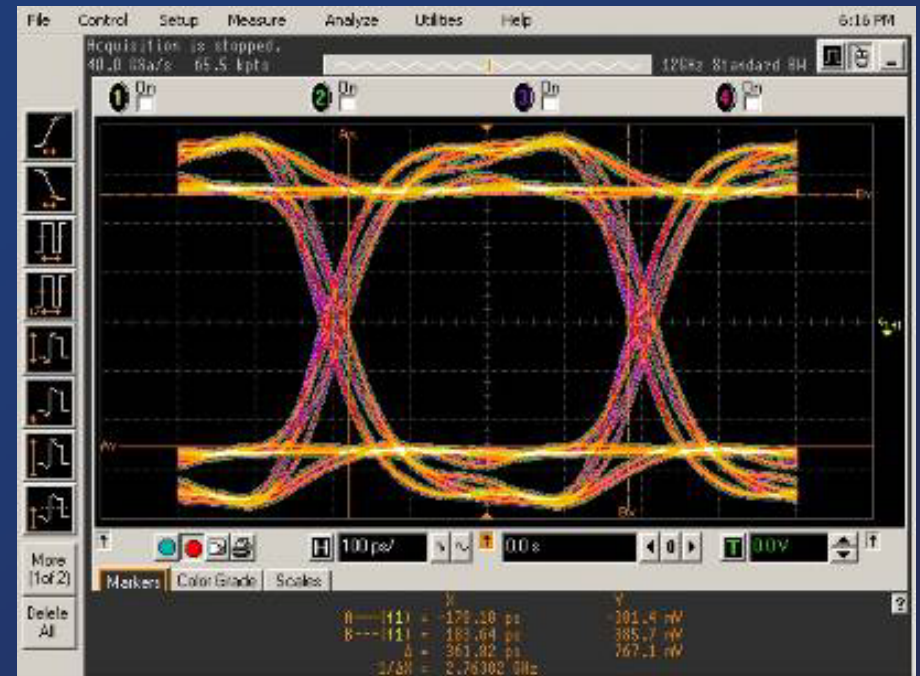
Figure 8 Before and after equalization for the data going through 40inch trace

PI2EQX4401 Characterization Results



Input eye diagram measured before the 2-inch trace connected to AI+/-, running K28.5 pattern at 2.5Gbps thru 30-inch trace.

PI2EQX4401 AO+/- output eye diagram measured differentially at the end of the 2-inch trace connected to AO+/-, Vdd=1.8V, 25C, AI+/- inputs driven with the above K28.5 pattern at 2.5Gbps.

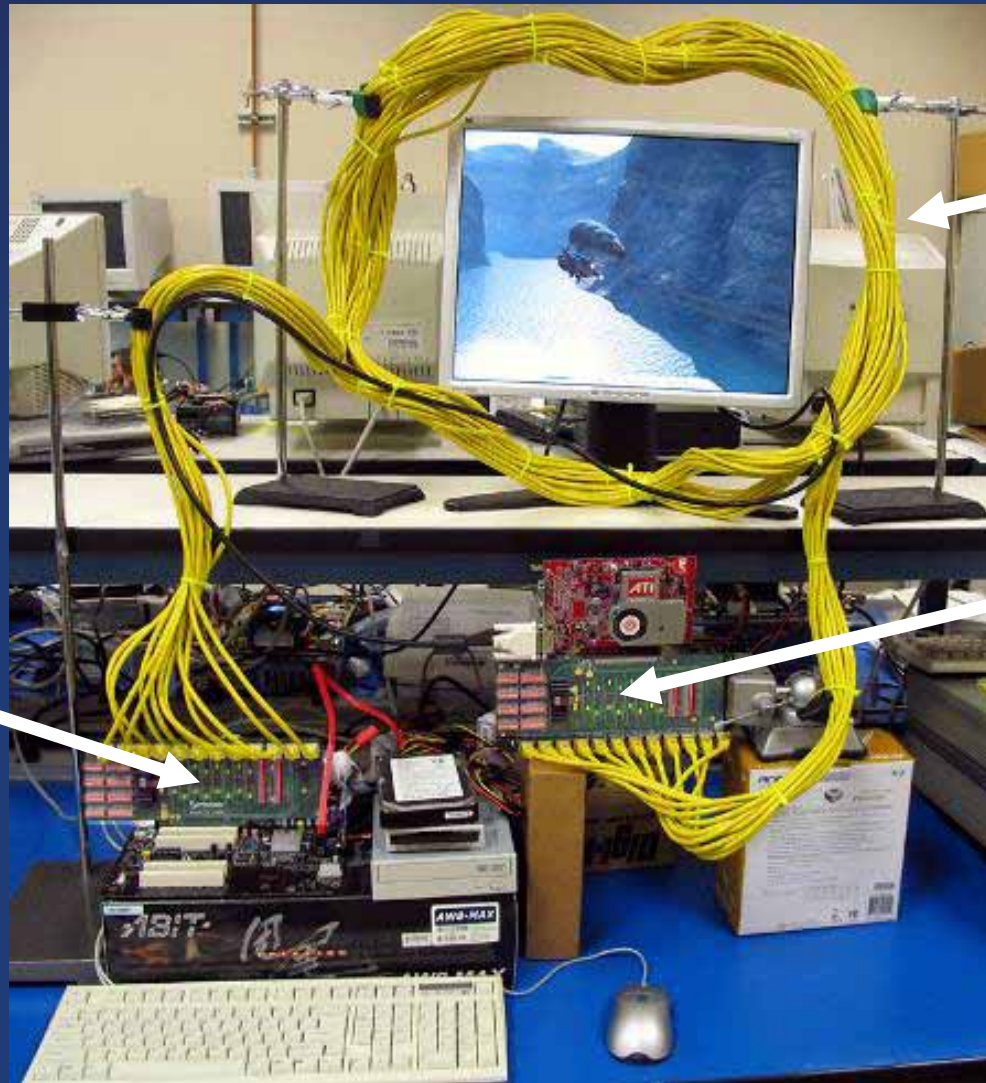


External PCIe Re-Driver Demo

7.6 meters
unshielded
CAT6 cable

Re-Drivers

Re-Drivers

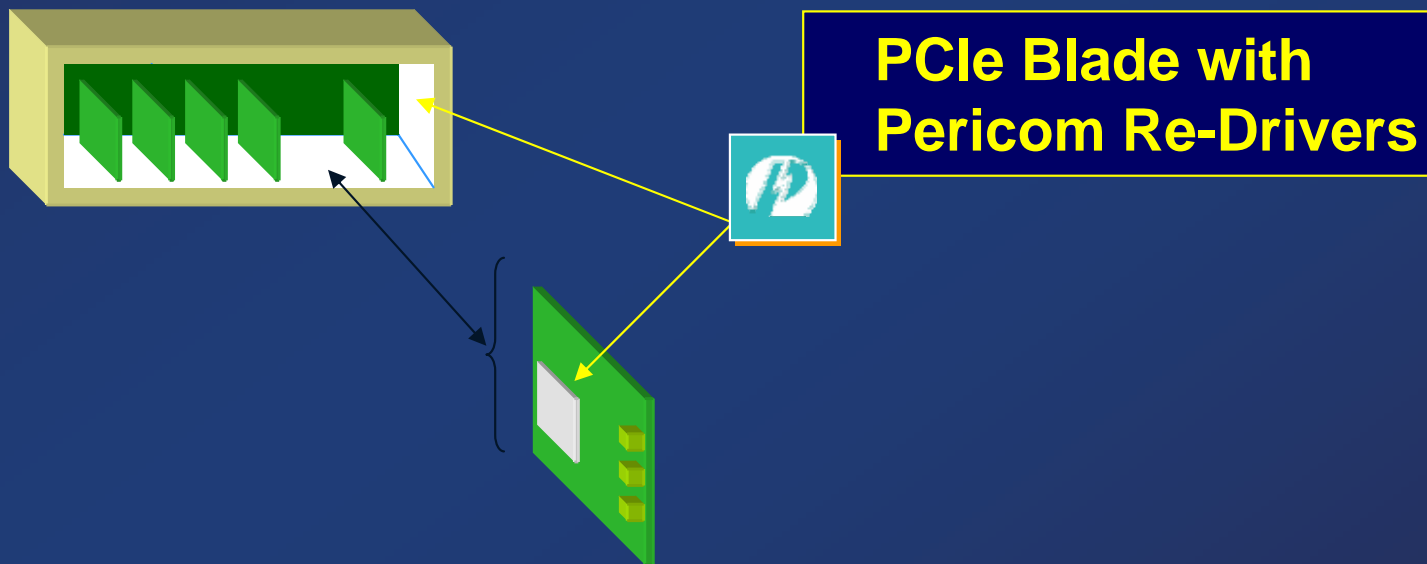


This demo was part of our award winning exhibit at IDF (Spring 06)

PCIe Blade Server

Application: High-speed PCIe backplane
Re-Driver benefit: Re-Driver insures signal integrity across multiple connector in noisy signal environment

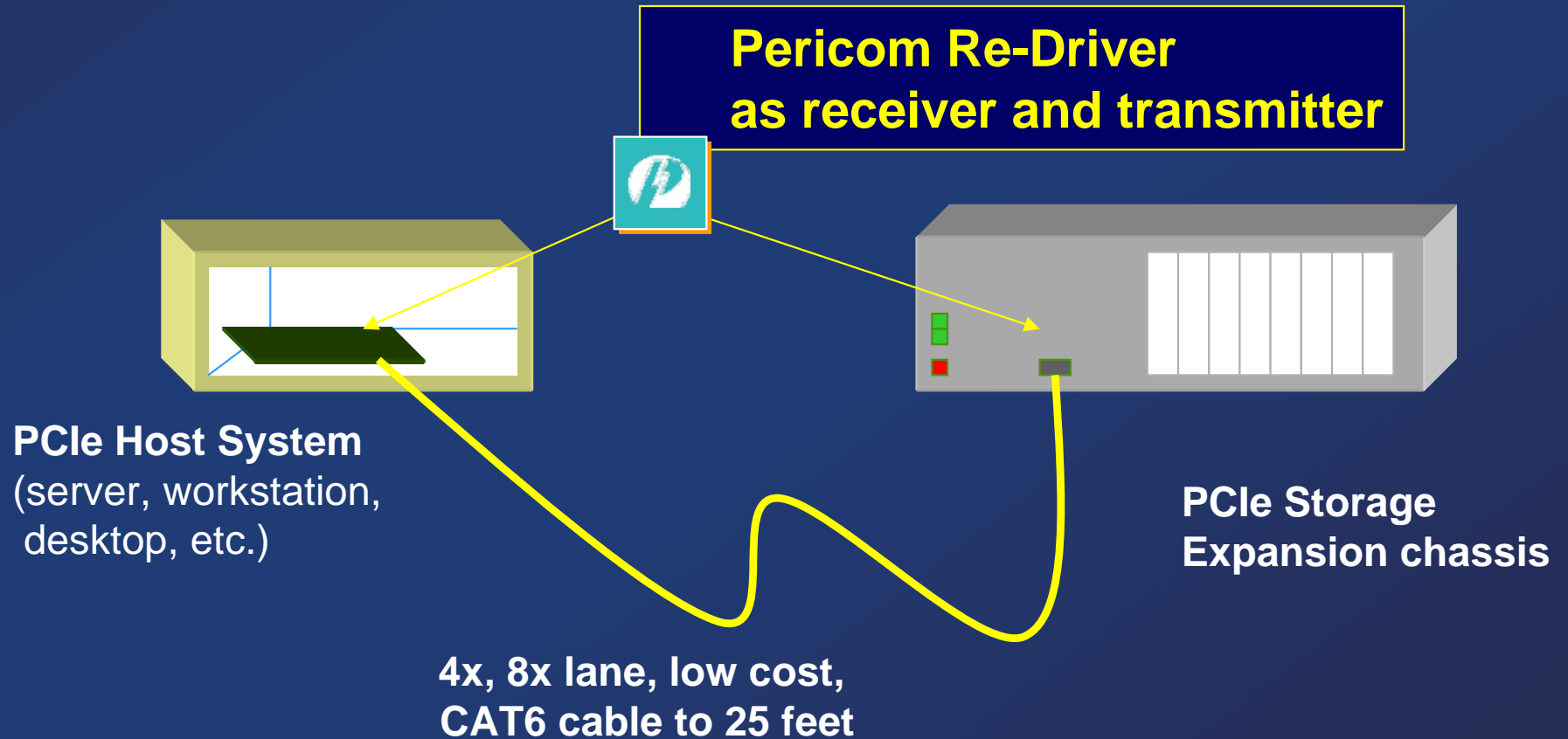
PCIe Blade Server



**PCIe Blade with
Pericom Re-Drivers**

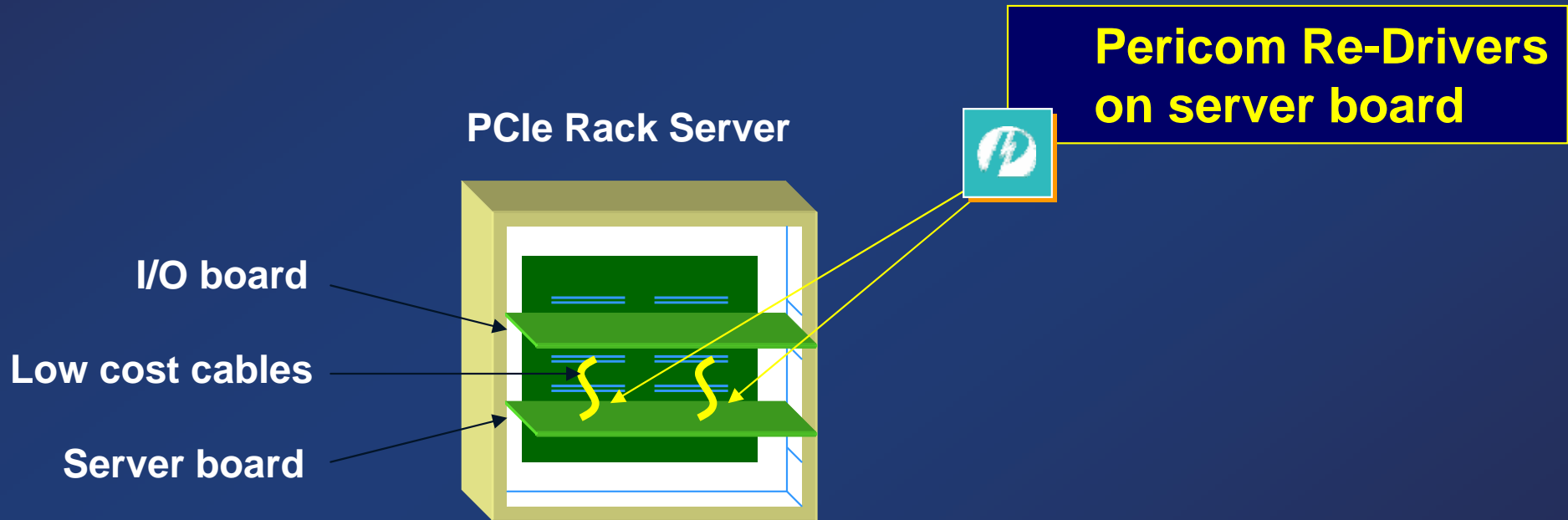
Storage Array Interface

Application: Remote chassis connectivity
Re-Driver benefit: Provides high-speed signal integrity over long cable



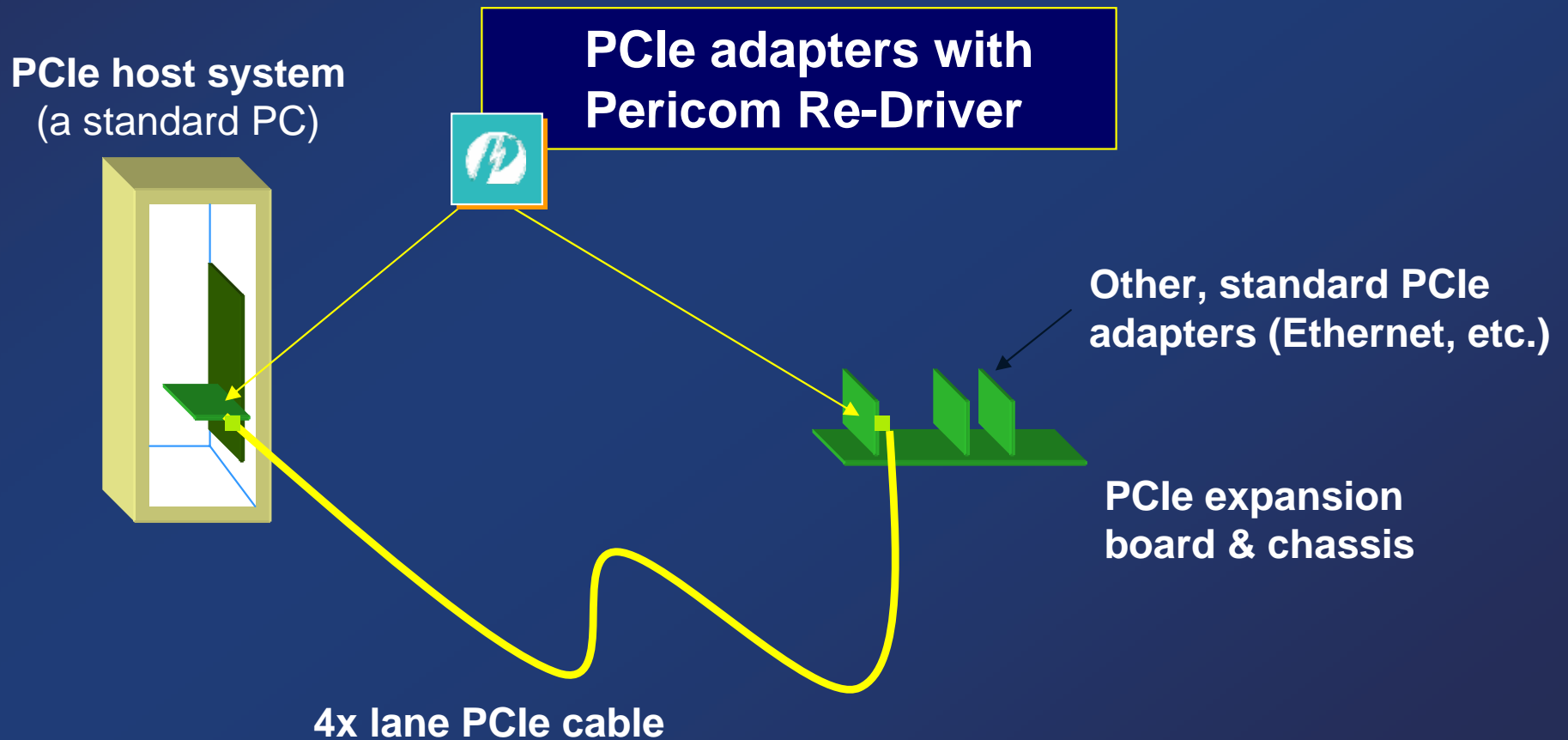
Rack Server – PCB Interconnect

Application: High-speed PCB-PCB connection
Re-Driver benefit: Insures signal integrity with cabling from different manufacturers



External PCIe Expansion

Application: Remote PCIe Expansion chassis
Re-Driver benefit: High-performance, high-reliability, low-cost





Pericom PCIe Timing Solutions

August 2006

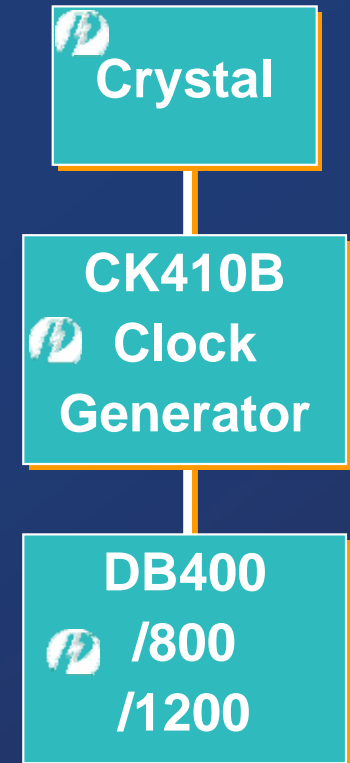


PCI Express Clocks for Intel Platforms

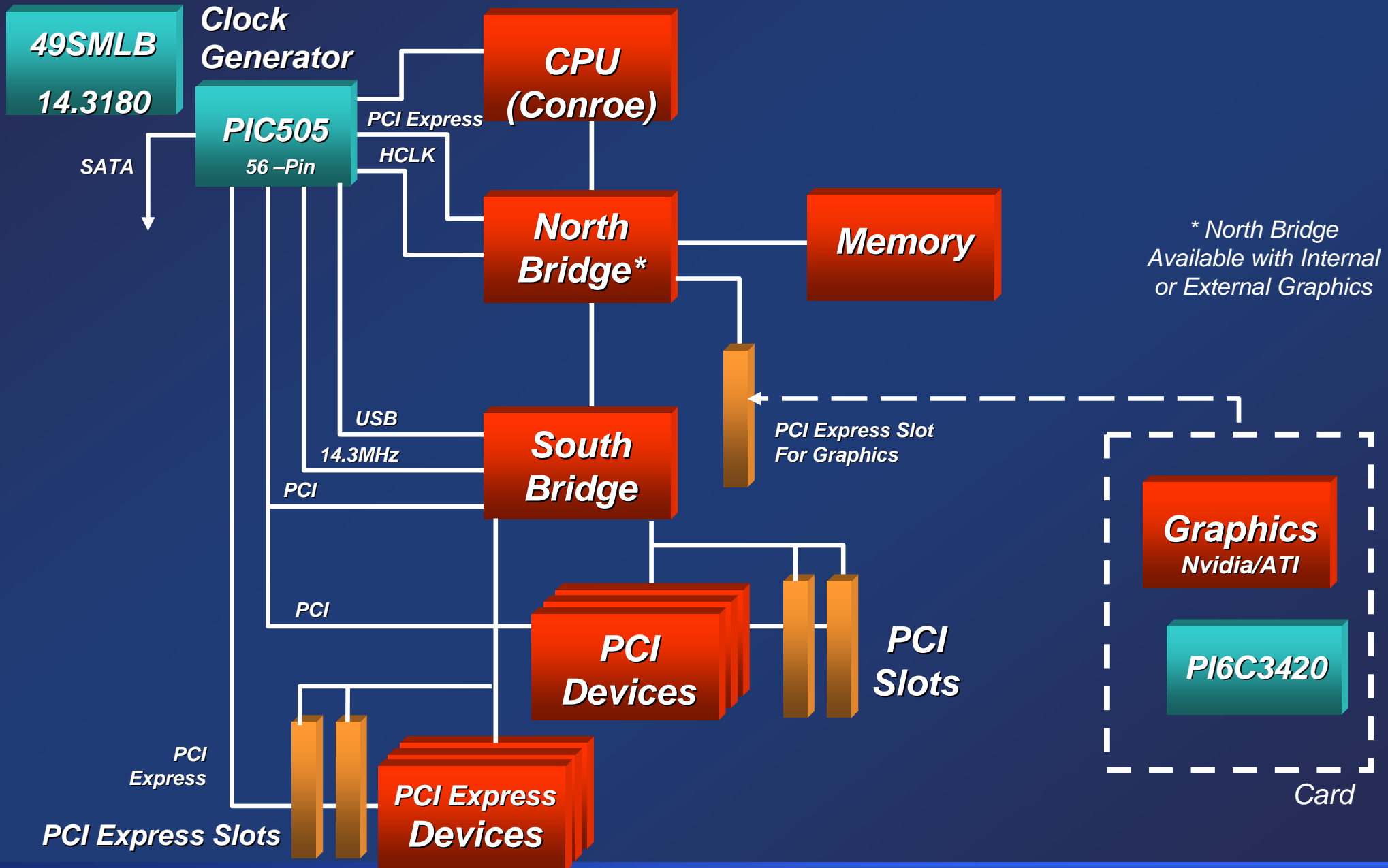
- **Close working relationship with Intel and Major OEMs**
 - Intel Desktop/Notebook/Server clock specification/reference design teams in Folsom and Portland
- **Desktop**
 - CK410 in production status. Production order with major OEM.
 - CK505 in pilot production with major OEM
- **Notebook**
 - CK410M successfully qualified at major OEMs. Shipped production orders to several major accounts.
- **Server**
 - CK410B, DB400, DB800, DB1200 successfully qualified at major OEMs. Production order with major OEM.

Timing Solutions for Intel PC/Server

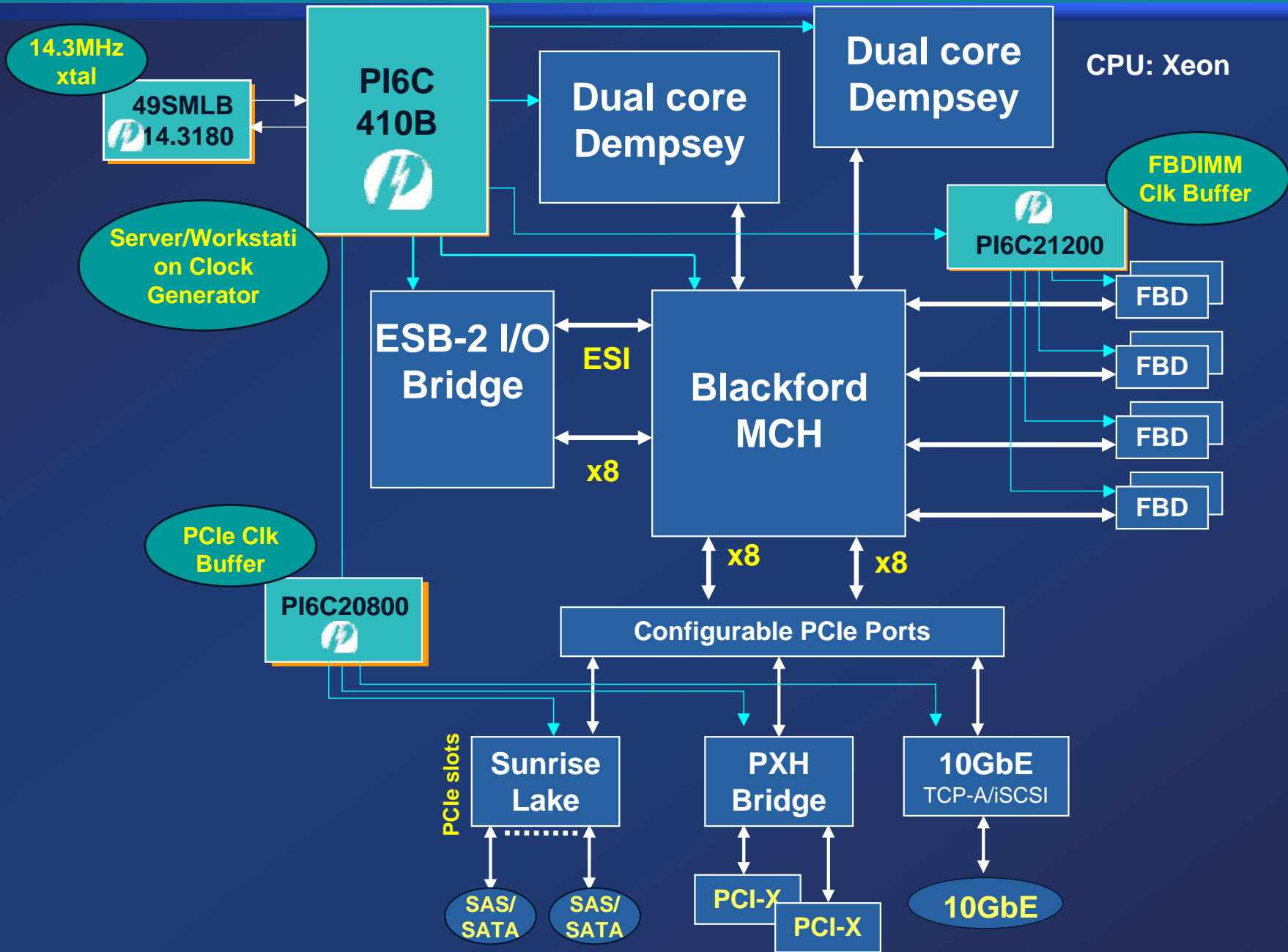
- **14.31818 MHz Reference Clock**
 - Pericom's SaRonix 49SMLB Series Crystal
- **PI6C505 PCI Express Clock Generator**
 - PLL for Intel Broadwater Desktop Platform
- **PI6C410B Clock Generator (CK410B)**
 - PLL for Intel Server PCIe chipset
 - Dual Channel DDR/DDR2 Memory
 - PCI Express and legacy PCI devices
 - SATA drives
- **PI6C20400, PI6C20800, PI6C21200 PCIe Clock Buffers (DB400, DB800, DB1200)**
 - Available with 4, 8, or 12 Outputs
 - With or without PLL's
 - DB1200 supports FBDIMM



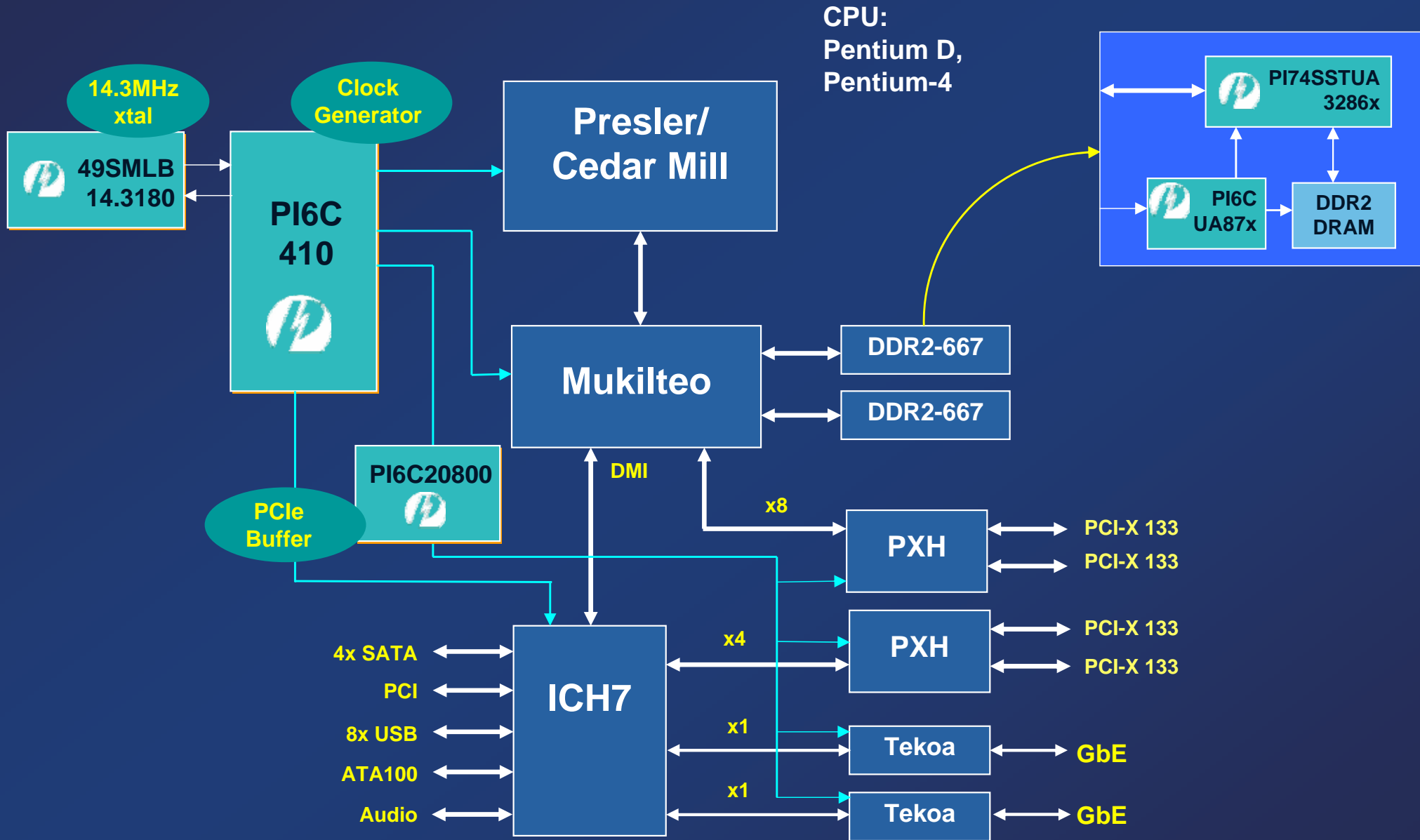
Desktop – Intel (Broadwater)



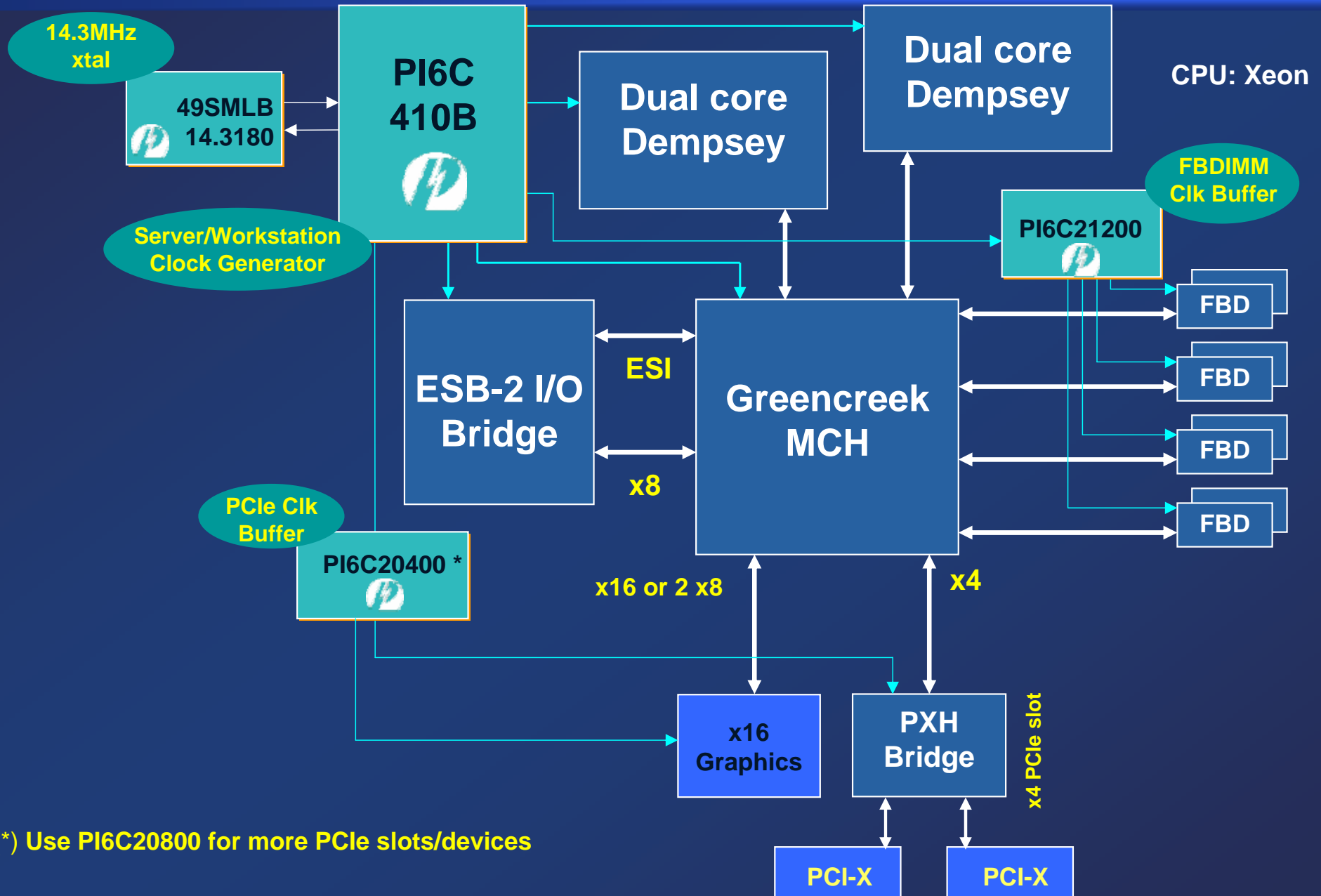
Volume DP Server (Bensley)



Volume UP Server Platform

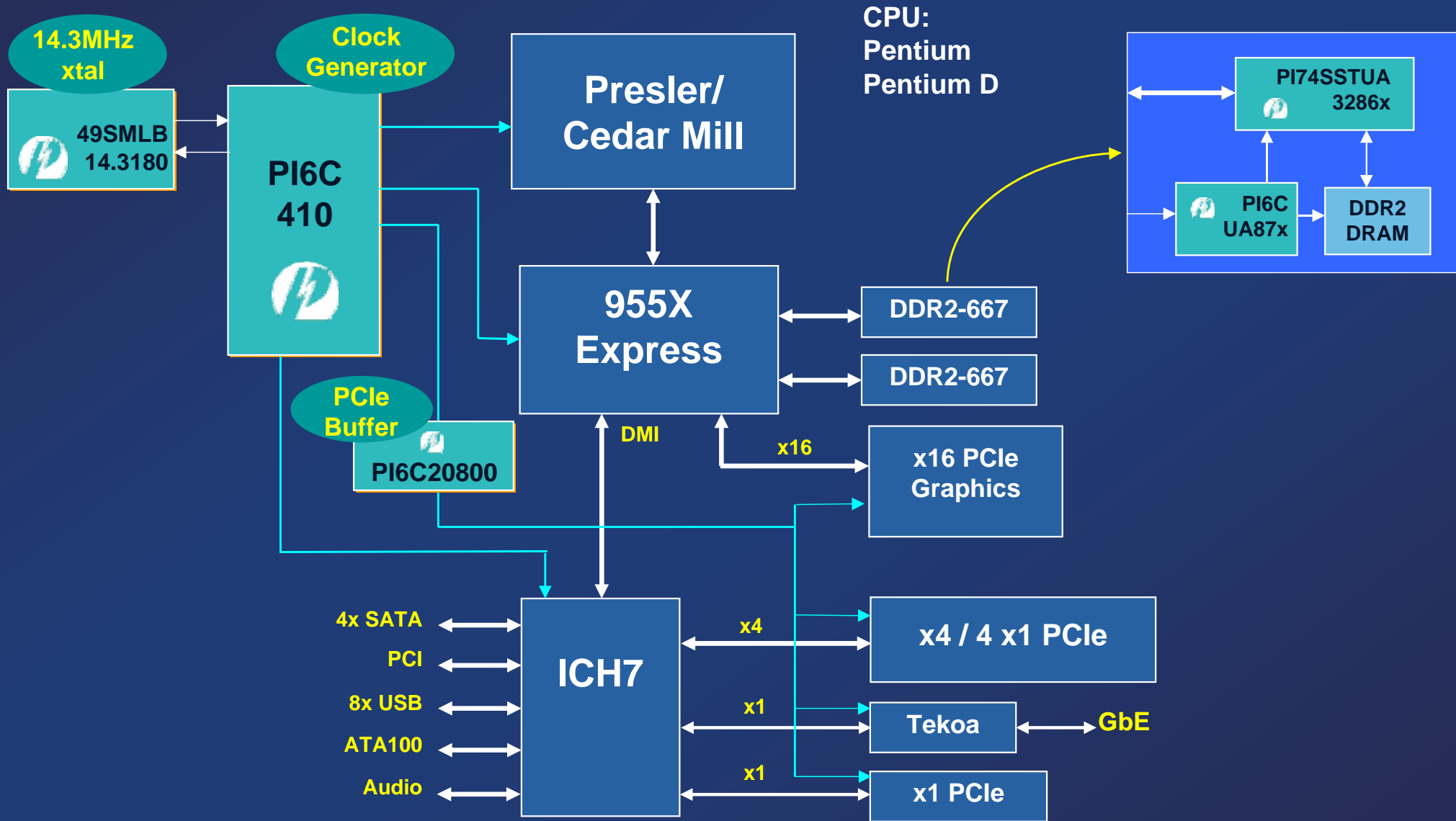


Volume DP Workstation (Glidewell)

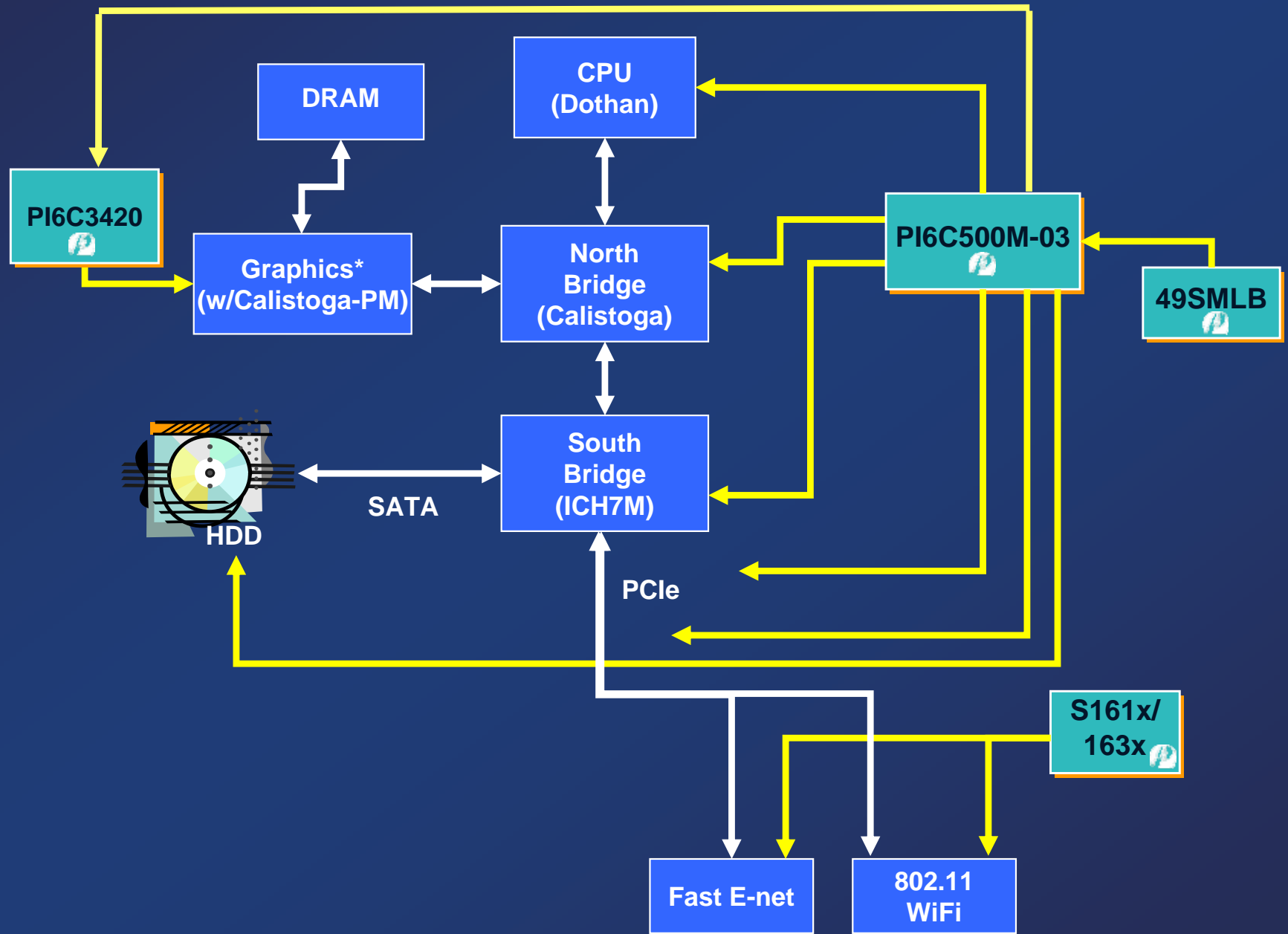


(*) Use PI6C20800 for more PCIe slots/devices

Volume UP Workstation Platform



Pericom Clock Solution – NAPA Platform





Pericom PCIe Applications

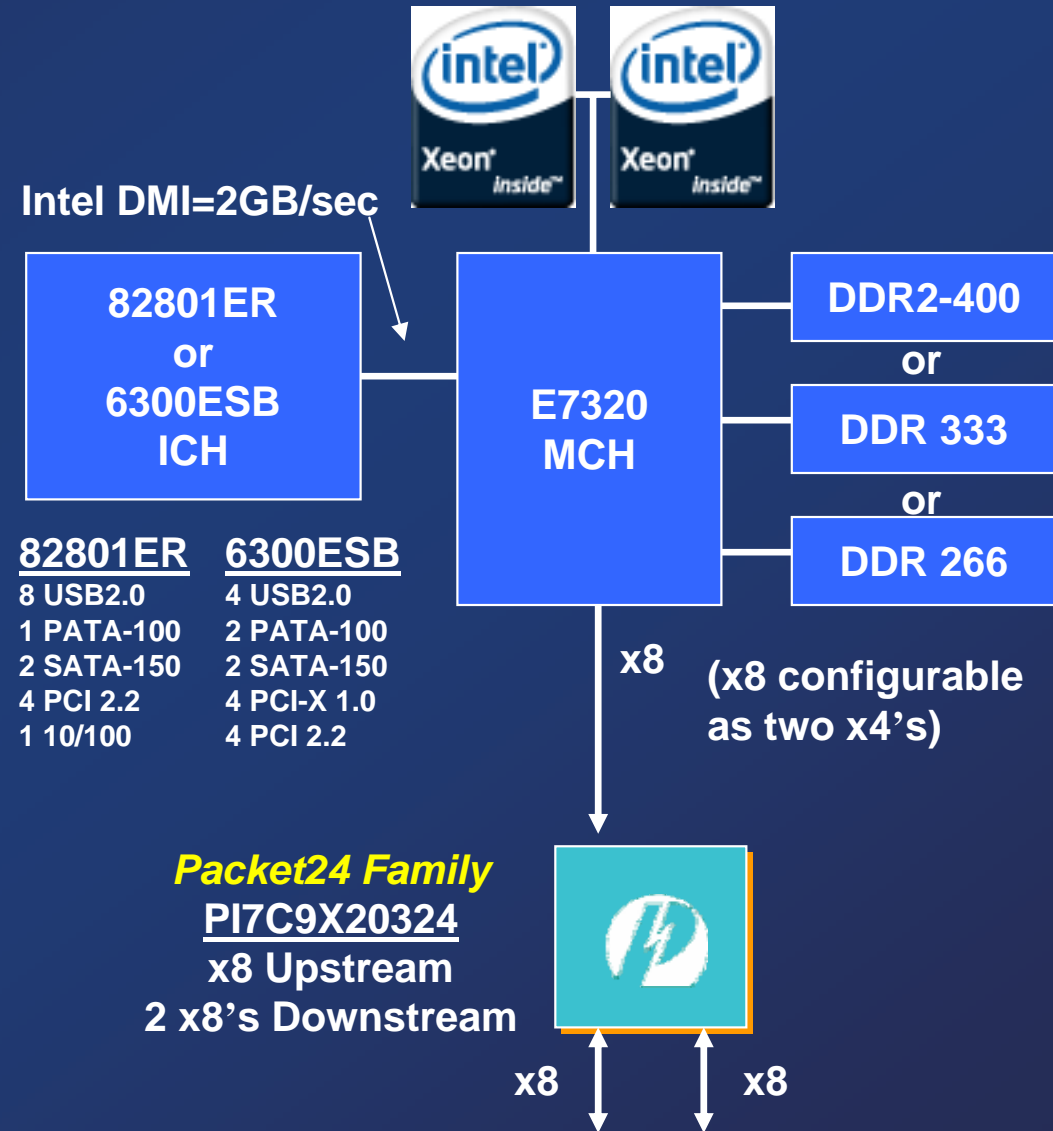
August 2006



Server – Intel Chipset

→ Intel E7320 MCH

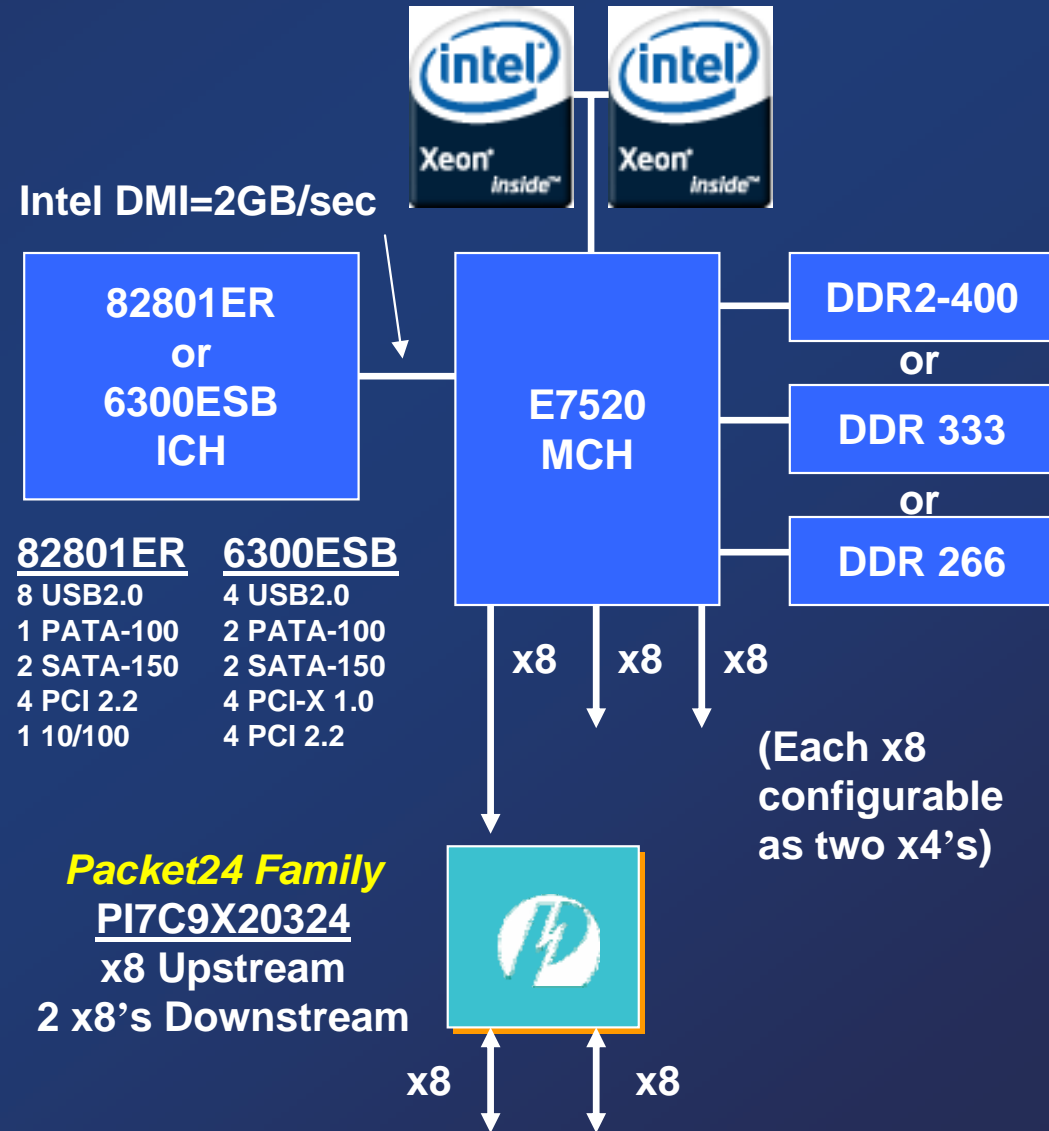
- Dual Processor support
- Single x8 PCIe port
 - Configurable to two x4's
- *Packet24* used to increase PCIe port count
 - Support more devices
 - Gigabit Ethernet
 - Fiber Channel
 - Other I/O?
- Application – mid to high end MB server



Server – Intel Chipset

→ Intel E7520 MCH

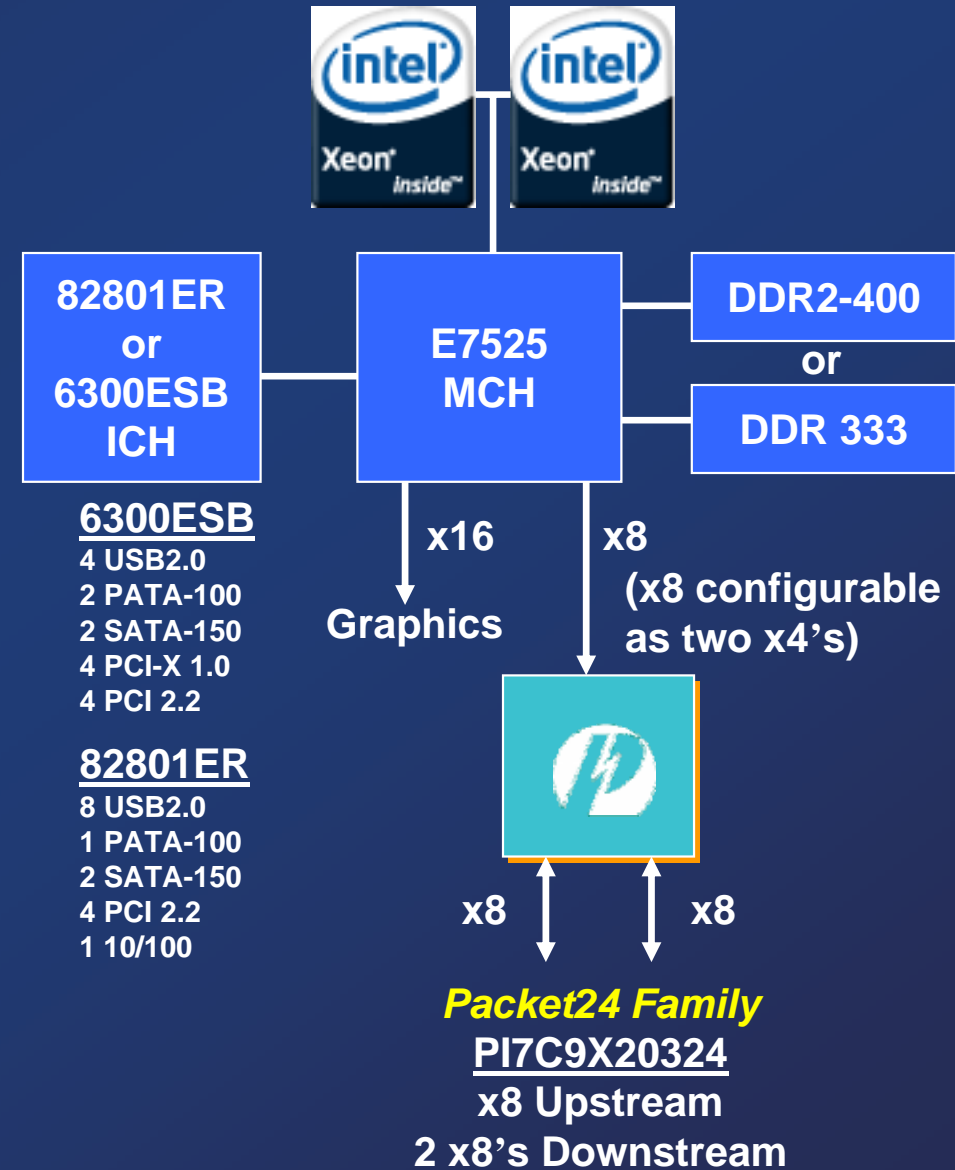
- Dual Processor support
- Three x8 PCIe ports
 - Each x8 configurable to two x4's
- *Packet24* used to increase PCIe port count
 - Support more devices
 - Gigabit Ethernet
 - SATA
- Application – mid to high end MB server



Server – Intel Chipset

→ Intel E7525 MCH

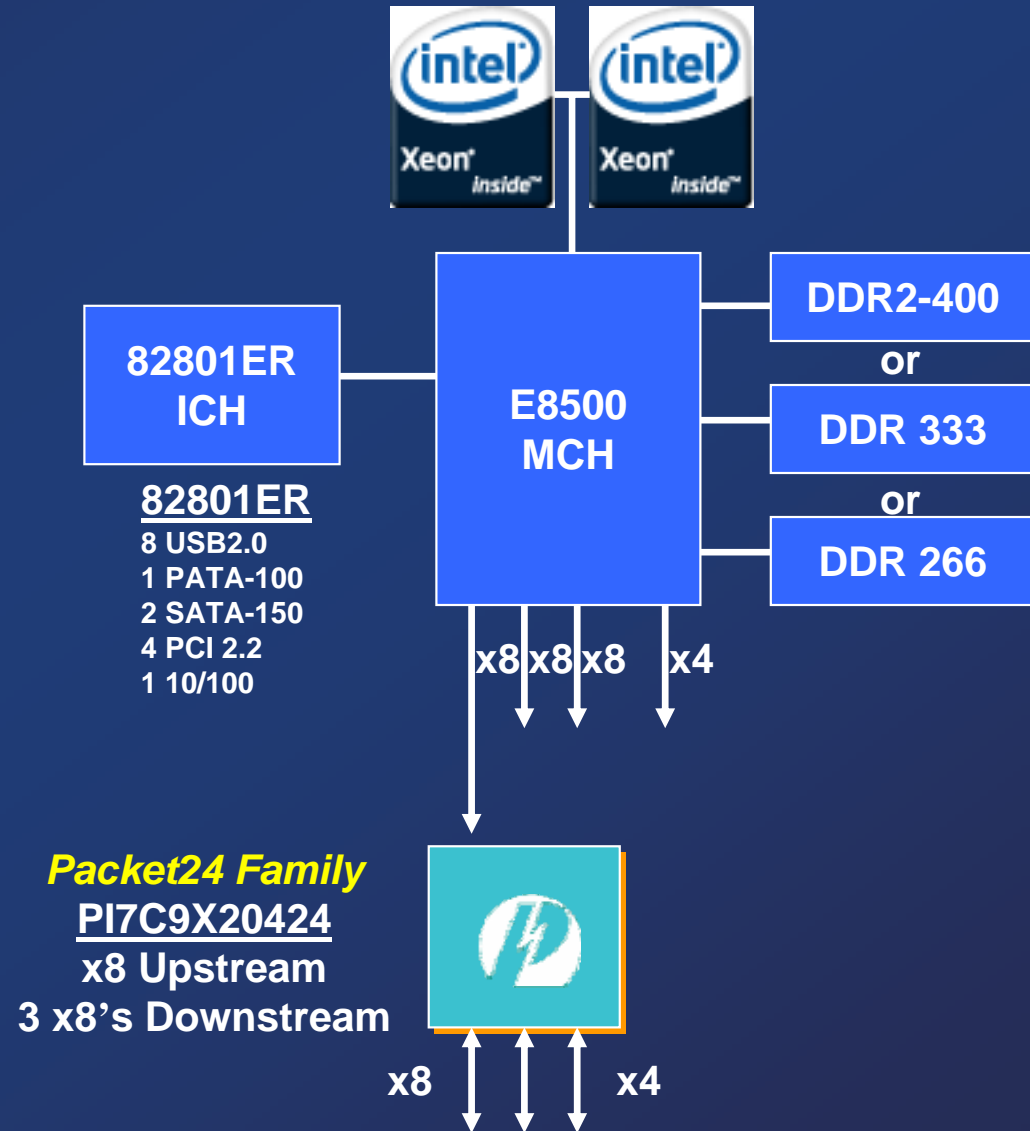
- Dual Processor support
- x8 PCIe port
 - Configurable to two x4's
- x16 PCIe port
 - Graphics
- *Packet24* used to increase PCIe port count
 - Support more devices
 - Gigabit Ethernet
 - SATA



Server – Intel Chipset

→ Intel E8500 MCH

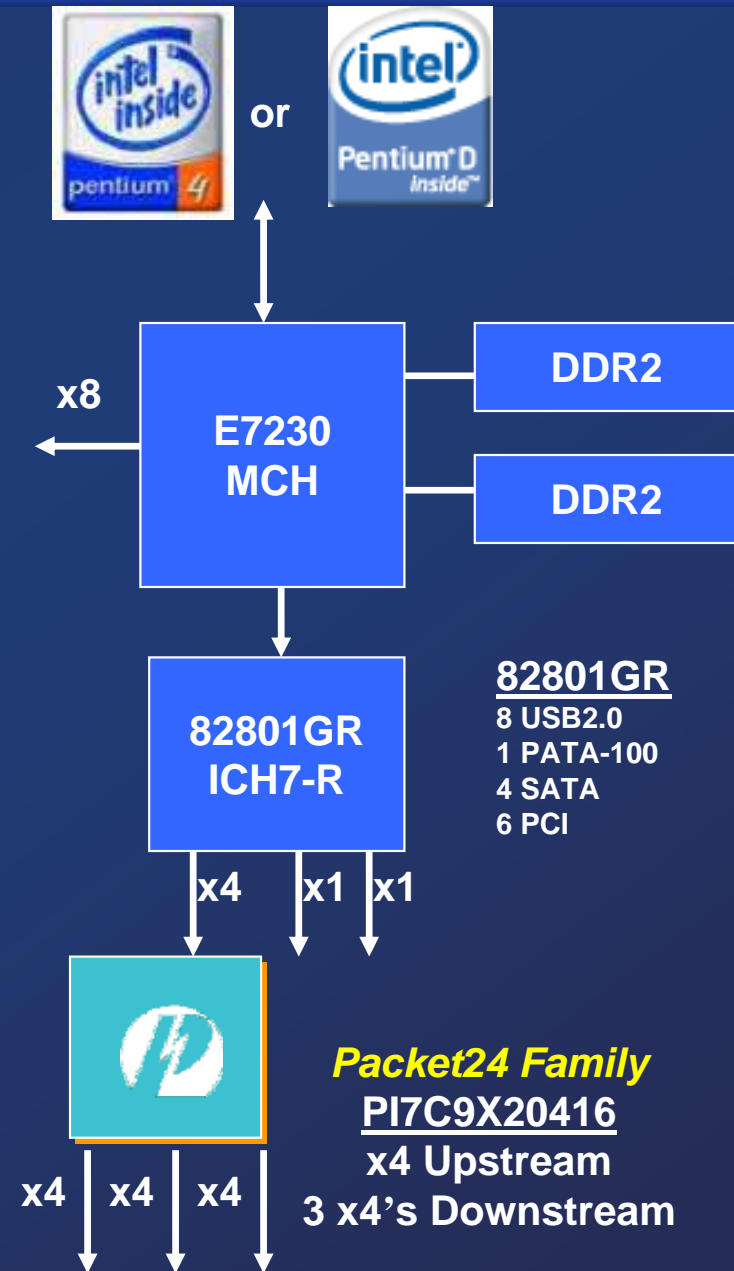
- Multi 64-bit processor support
 - Three x8 and one x4 PCIe ports
 - Unclear if x8's are configurable (assume they are as in previous generations)
- *Packet24* may be used to increase PCIe port count
 - Support for more PCIe endpoints/devices



Server – Intel Chipset

→ E7230 – Entry Level Server

- x8 port on MCH
- x4 and two x1 ports on ICH7R
 - x4 configurable to four x1's
- Packet24 Family may be used to expand PCIe port count
 - Support for more PCIe endpoints/devices
 - Gigabit Ethernet



Server – PCIe Packet Switch

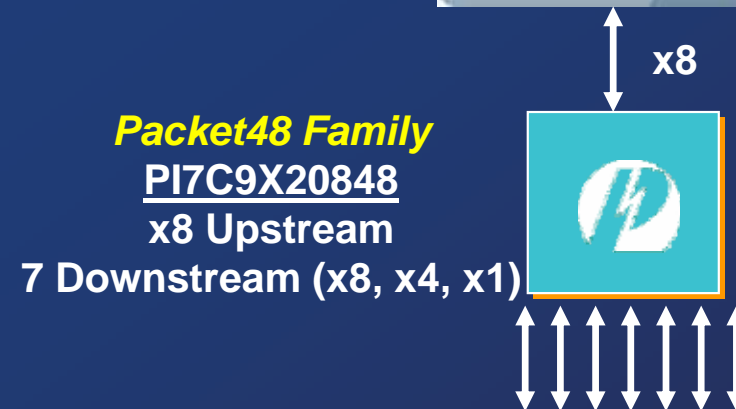
→ Port Expansion

- Embedded Design with limited PCIe ports
- PI7C9X20848 – 8 Port, 48 Lane PCIe Packet Switch

→ Customers

- In Discussion with
 - Sun – high end server
 - Unisys

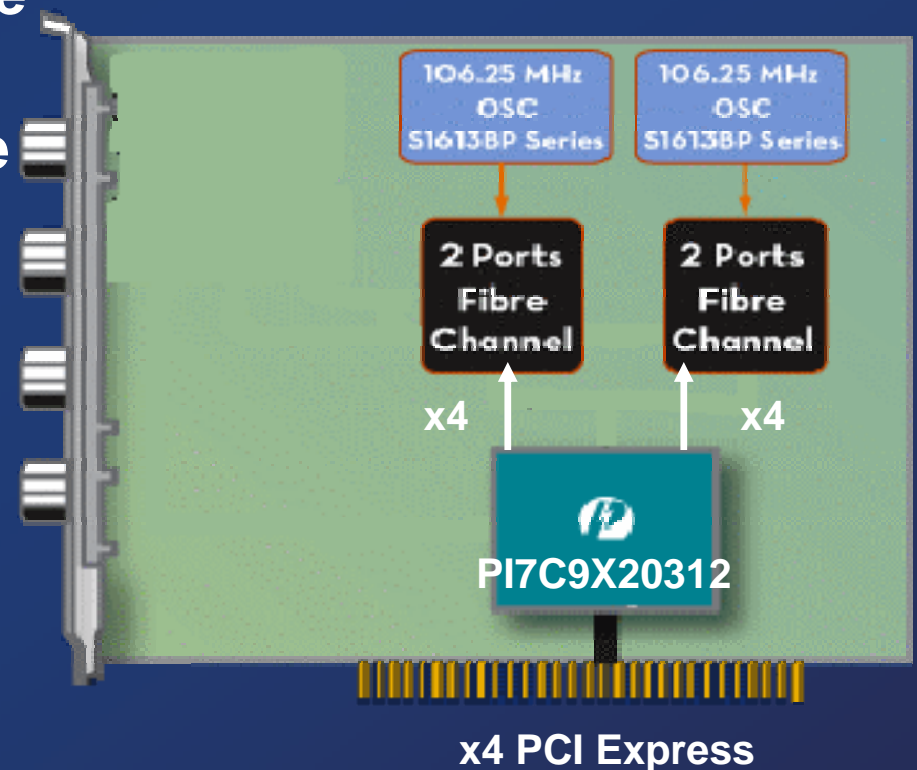
UltraSPARC T1
“Niagra”



HBA - Quad Fibre Channel (Future)

→ Fibre Channel Adopting PCI Express Interface

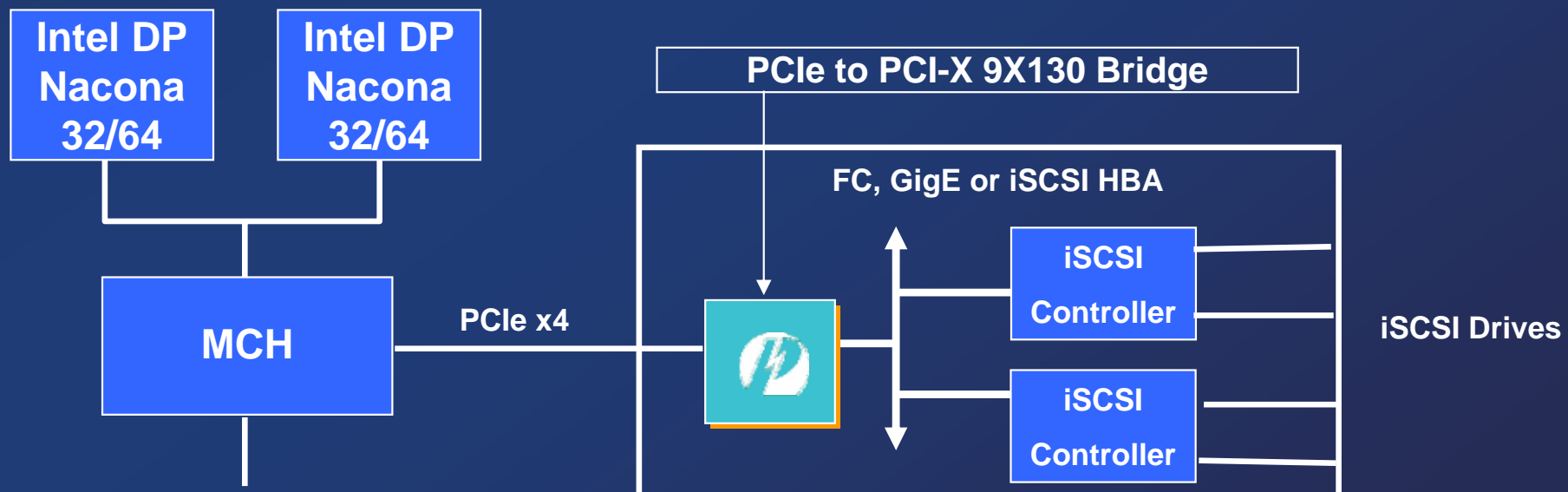
- Fibre Channel Controllers move to PCIe native
- PCIe Packet Switch will replace PCI-X Bridge
- Intel – Kirkwood
- Intel – 3 more in future



9x130 PCIe to PCI-X Application Example

iSCSI HBA

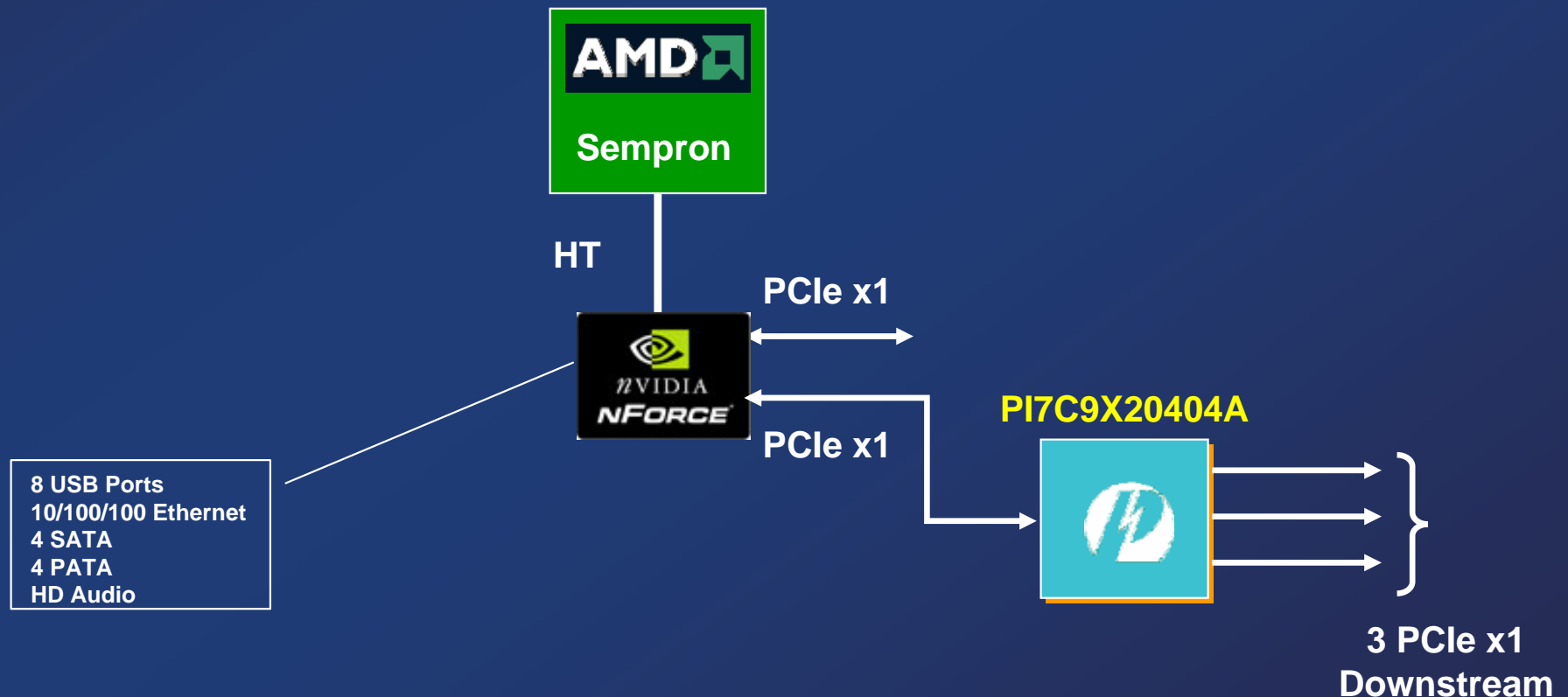
- Application - HBA for GigE, Fibre Channel, Graphics and iSCSI or I/O IC
- Features - Performance, Low Latency , 6 PCI/PCIX Master Support



Notebook – Chipset

→ nVidia – nForce Go 430 MCP

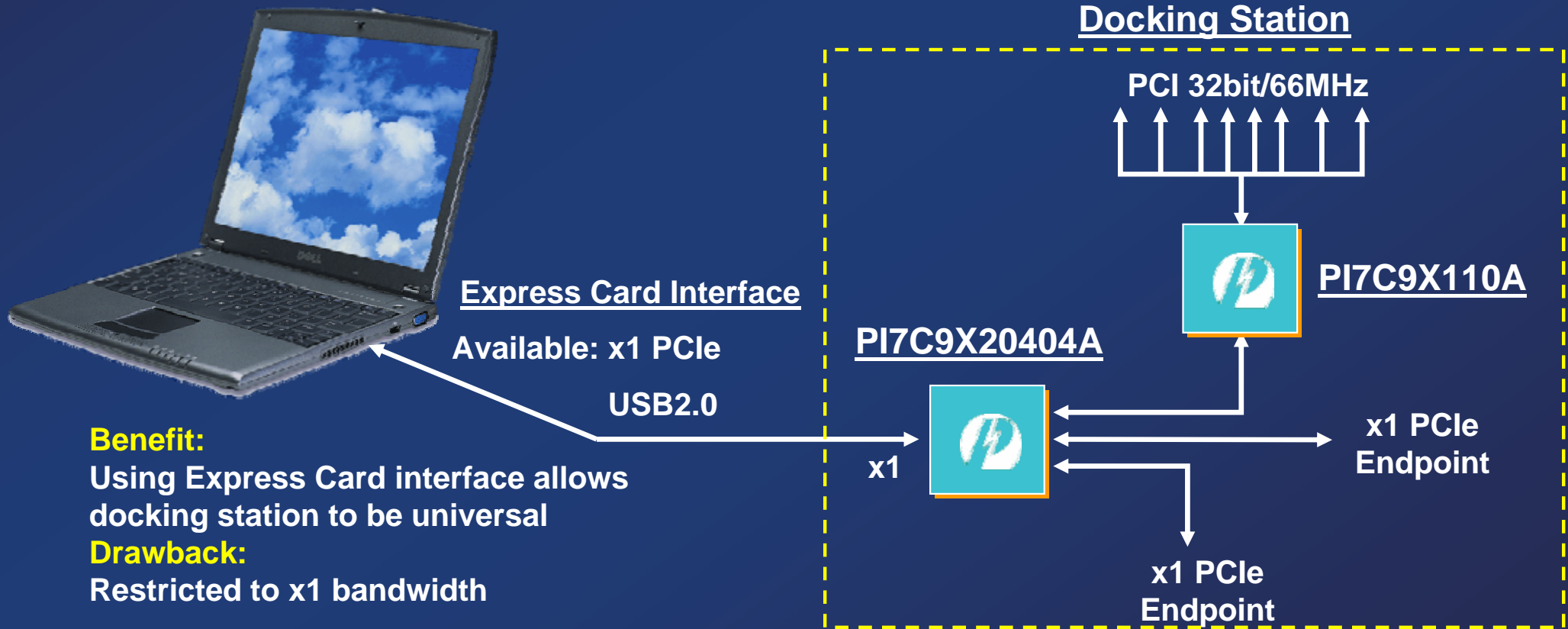
- MCP (South Bridge) only has two x1 PCIe Ports
- Investigating into using the PI7C9X20404A for more PCIe ports (fanout capability) to a docking station



Notebook – Docking Station

→ Utilize PCI Express to Interface Docking Station

- First Approach – Phase 1 - 2 Chip Solution
 - Use Express card interface (x1 PCIe and USB 2.0)



Benefit:

Using Express Card interface allows docking station to be universal

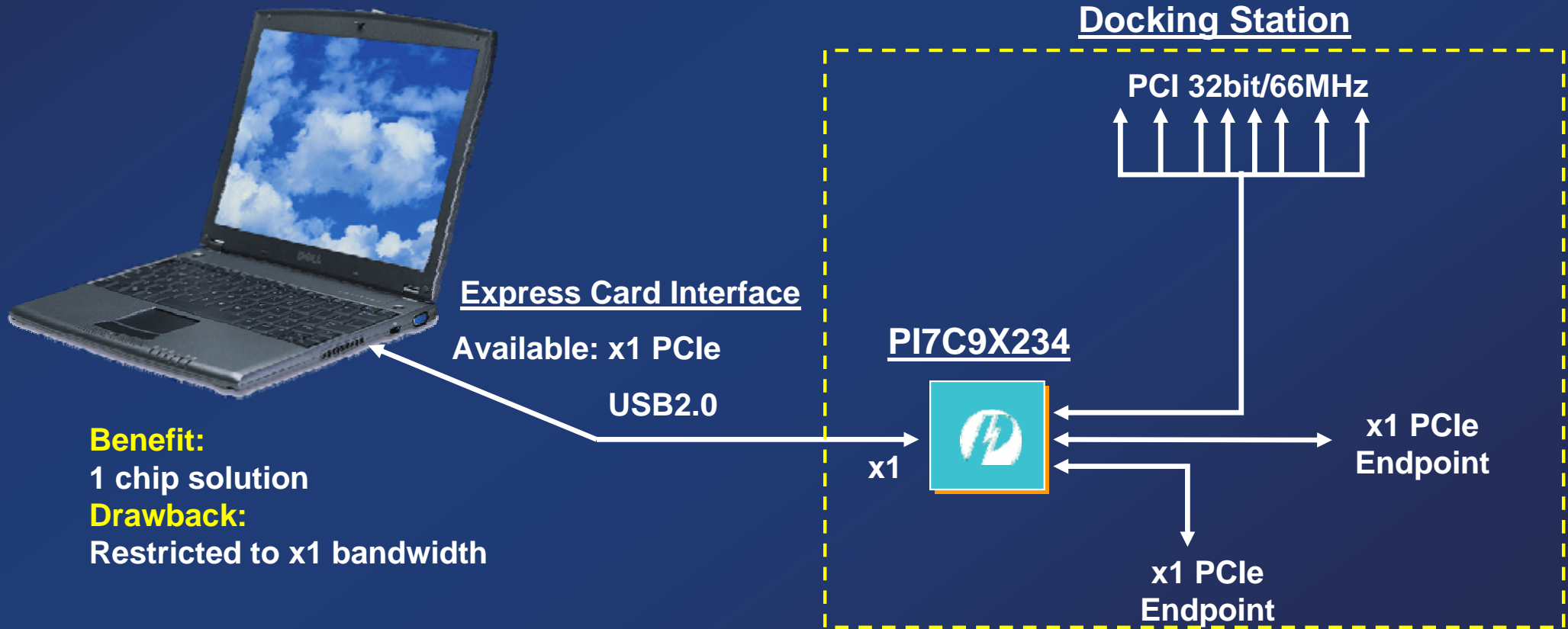
Drawback:

Restricted to x1 bandwidth

Notebook – Docking Station

→ Utilize PCI Express to Interface Docking Station

- Second Approach – Phase 2 - 1 Chip Solution
 - Use Express card interface (x1 PCIe and USB 2.0)



Benefit:

1 chip solution

Drawback:

Restricted to x1 bandwidth

Notebook – Docking Station

→ Utilize PCI Express to Interface Docking Station

- Third Approach
 - Use Custom Connector (not restricted to x1)



Custom Interface

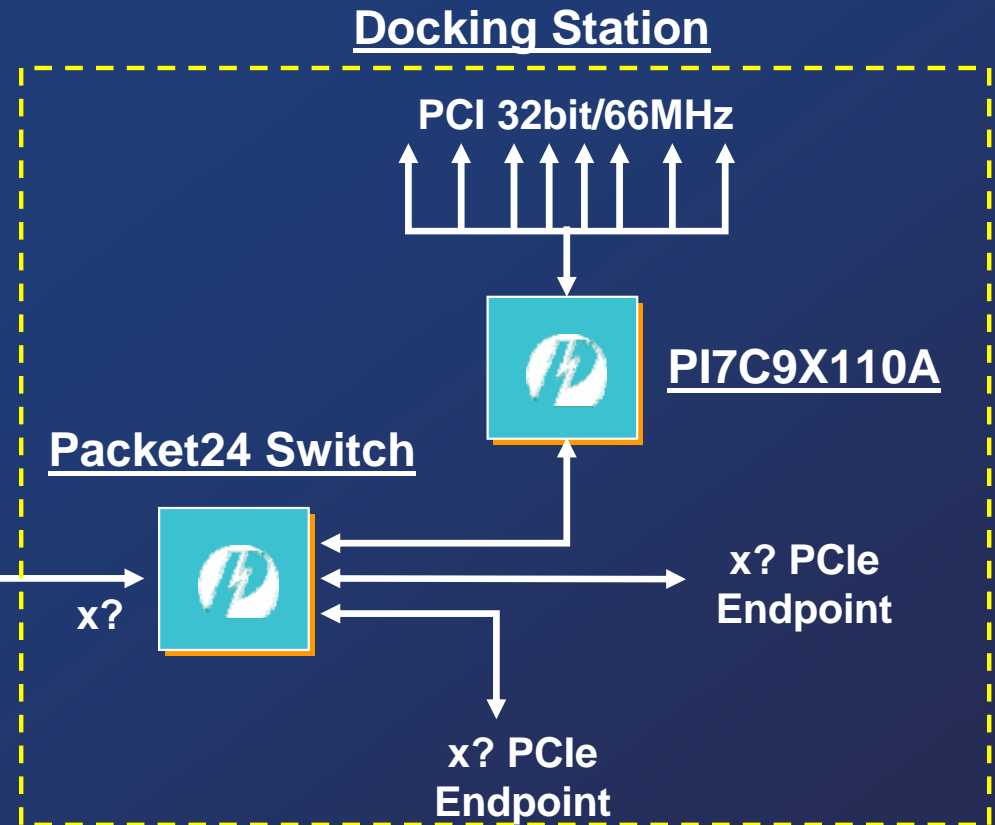
Available: x1, x4, x8, or whatever customer designs

Benefit:

Allows bigger bandwidth interface

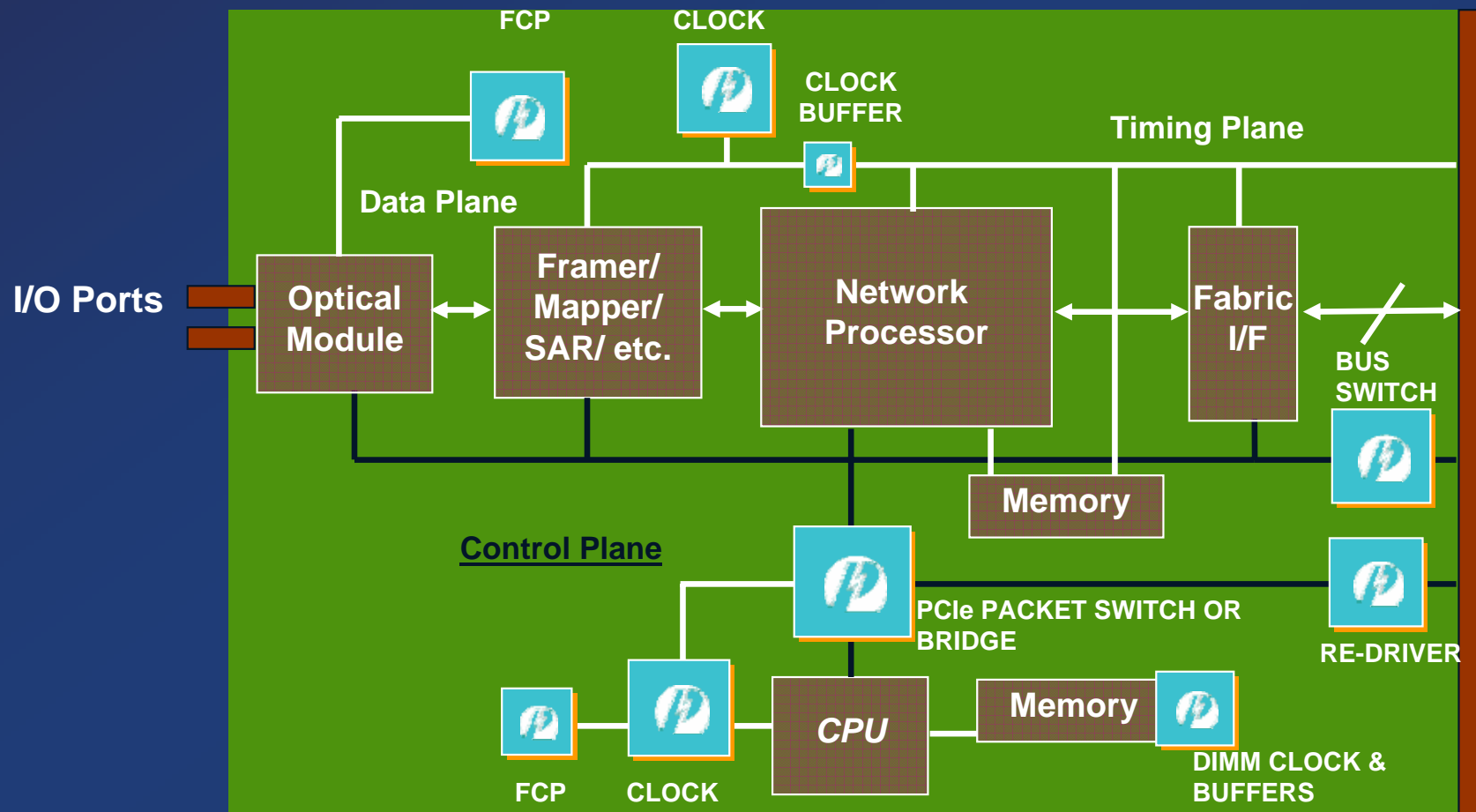
Drawback:

Require a different dock for each model notebook



Focusing on Networking PCIe

- Multiple PCIe Solutions for Networking Applications
 - Pericom Solutions in the Control & Timing Planes



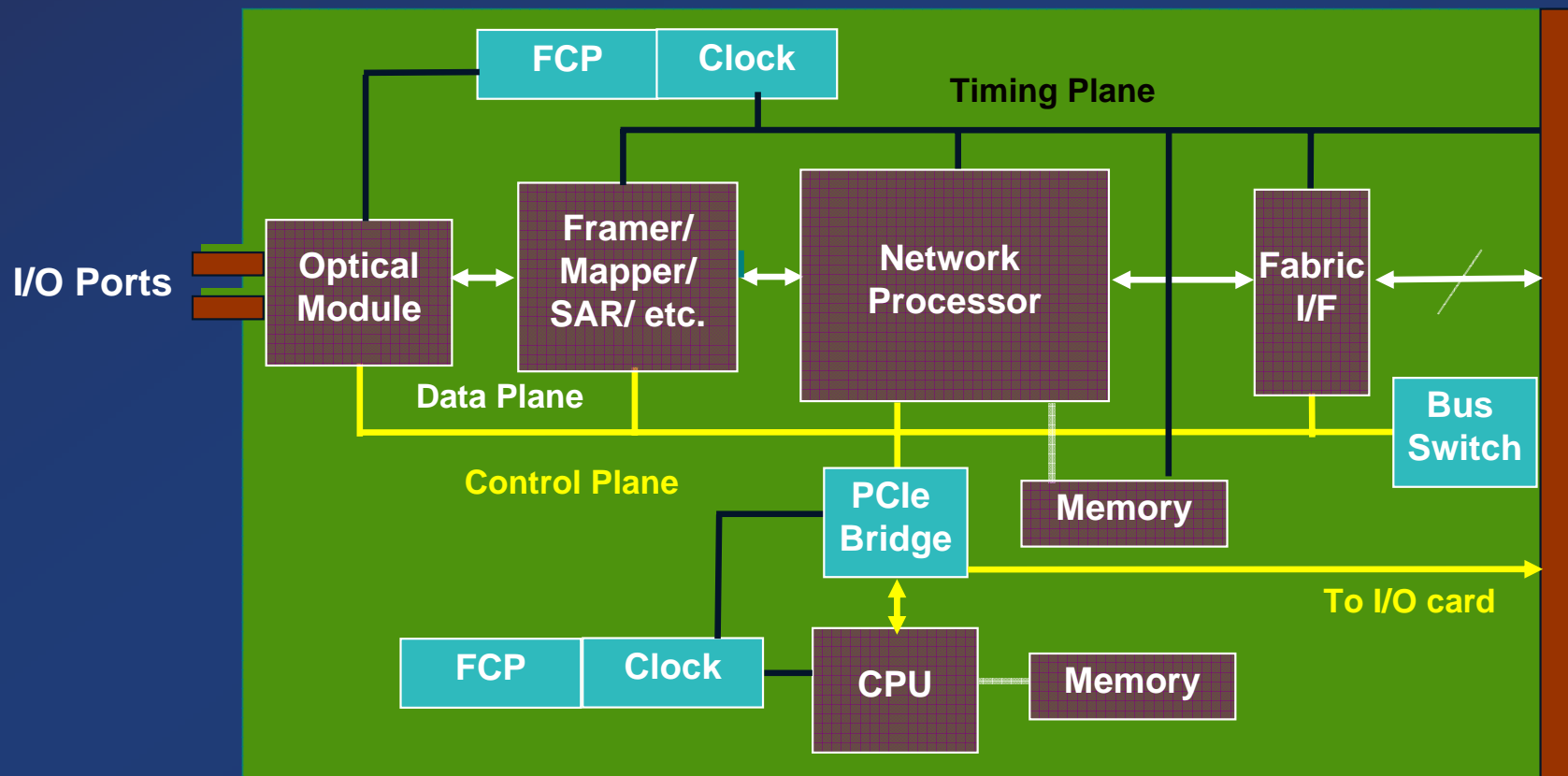
PCIe in Control Plane

→ PCIe Bridges used for:

- Bridge from PCIe CPU to PCI data plane processors / elements
- Bridge to daughter or I/O card across midplane

→ Bus Switches used for:

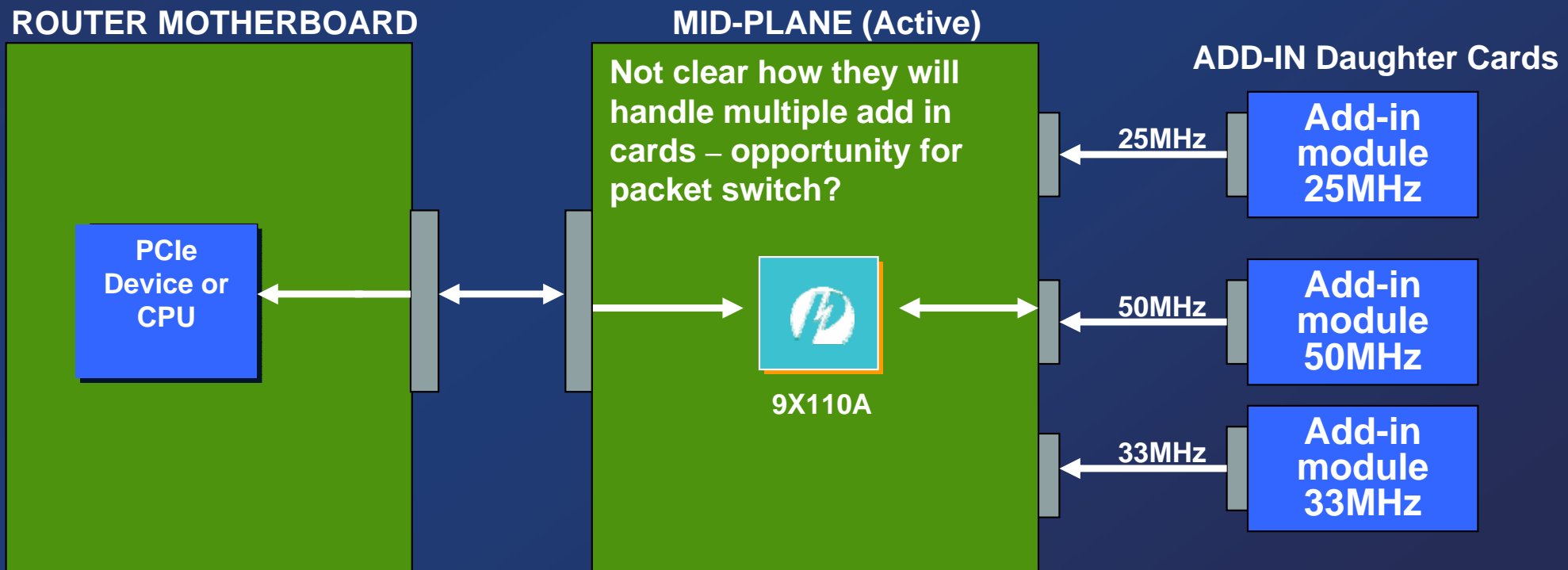
- Switching data or control plane signals across back/midplane



PCIe Applications Example

→ Cisco 38xx series Access Router –Next Generation

- Next generation chassis transition to PCIe, but mid plane and daughter cards are still PCI. Opportunity for 9X110A
- For multiple channel PCIe, can also be opportunity for packet switch

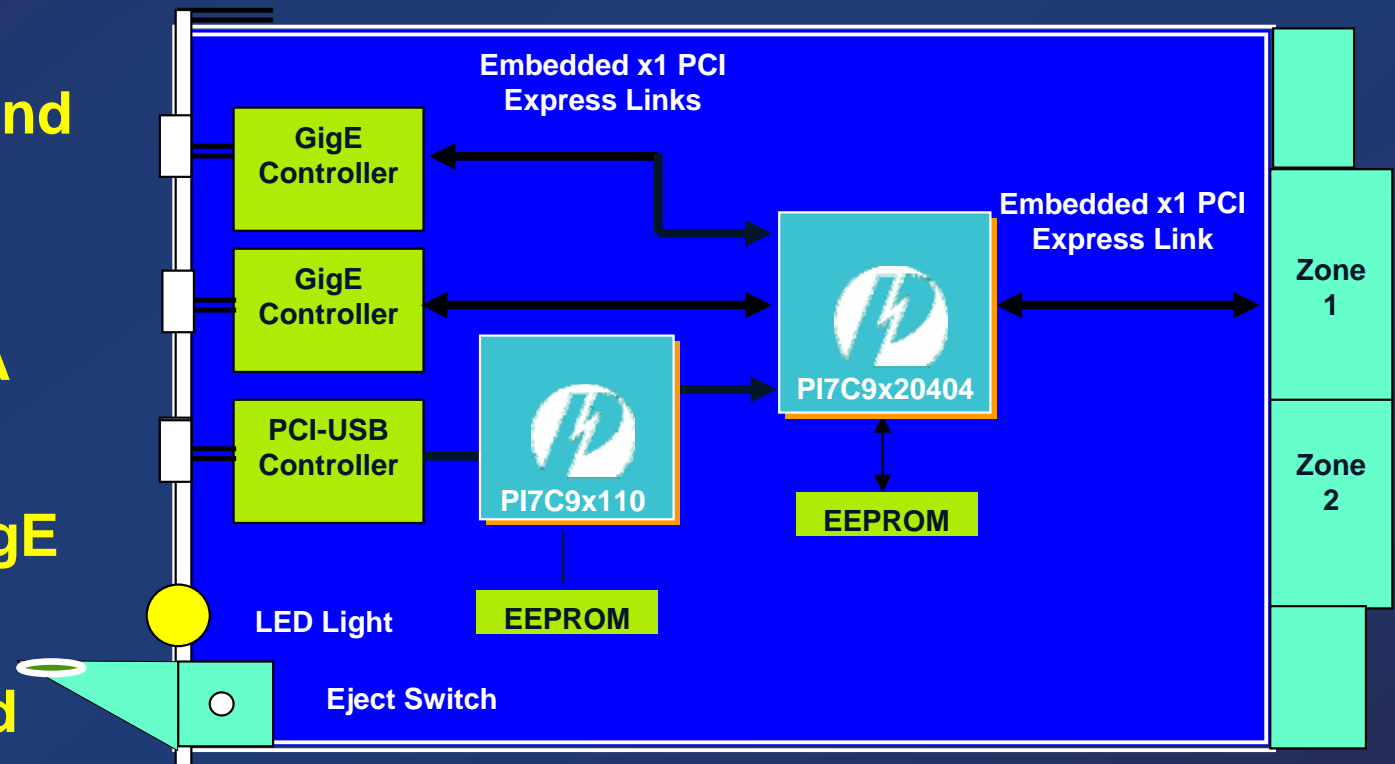


20404A Application Example

CompactPCI Express 3U SBC Card

Rugged CompactPCI Express Chassis

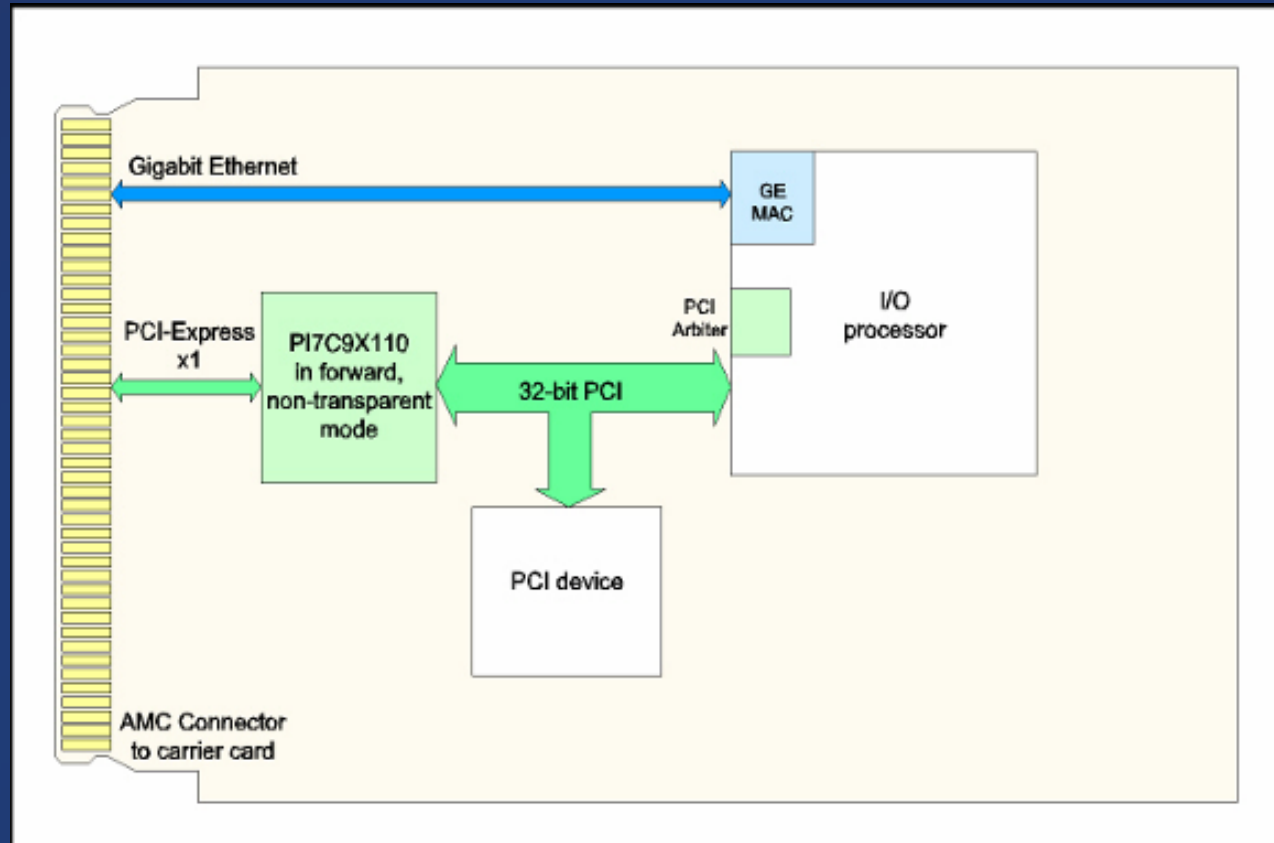
- Comprised of SBC and Dedicated I/O Cards
- SBC System Card designed with 20404A and 9x110A
- I/O Cards provide GigE & SATA ports
- PCI Express adapted for High Speed Serial Interconnect



AMC Module with 9x110A PCIe Bridge

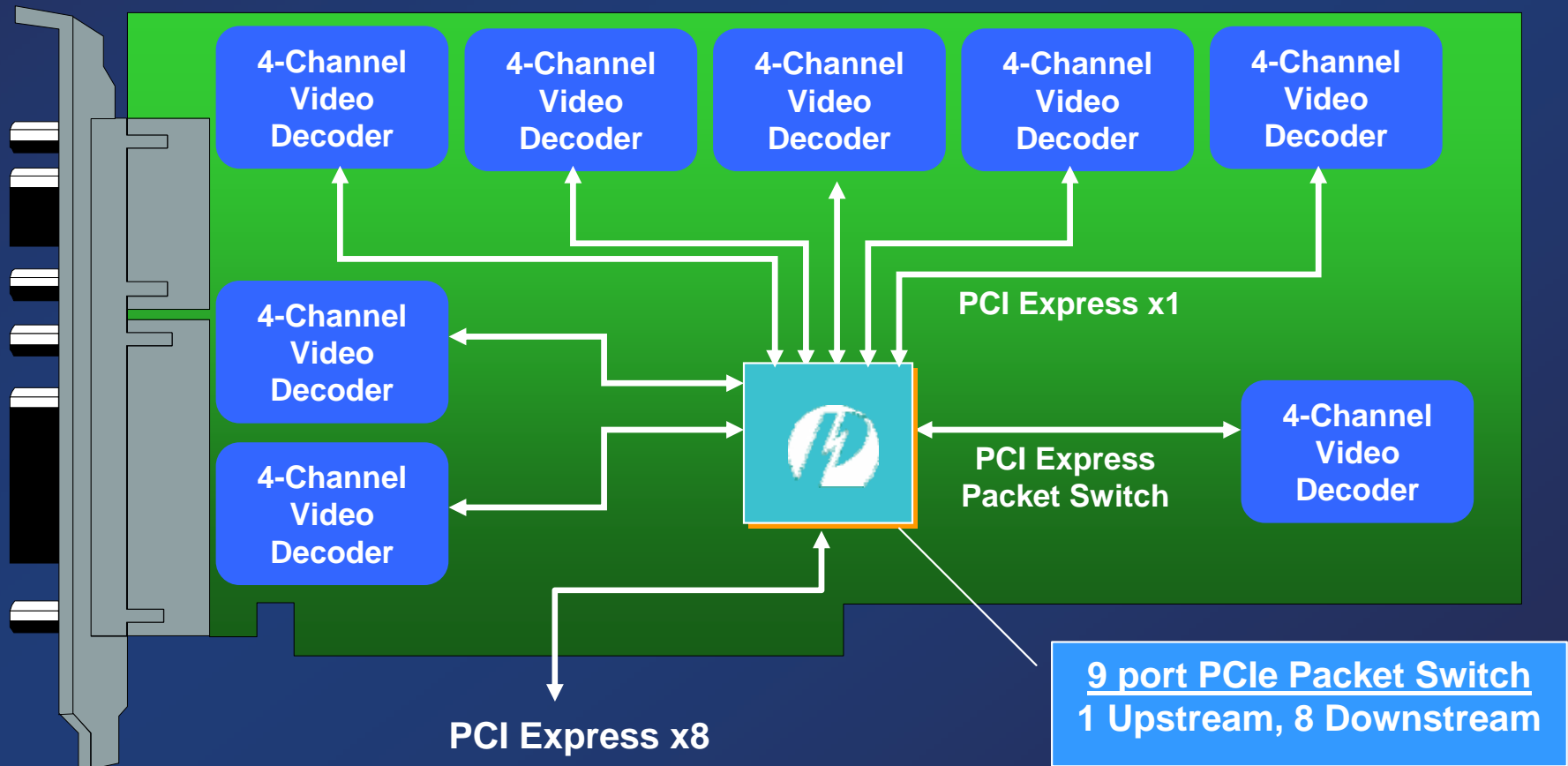
AMC Module

- AMC (Advanced Mezzanine Card) replacing PMC (PCI Mezzanine Card) to offer improved modularity & Scalability
- AMC Modules designed for High Speed Serial Interconnect up to 12.5 Gb/s: PCI Express, GigE, Rapid I/O and InfiniBand
- AMC Card offers front side Loading and supports IPMI (Intelligent Platform Management Interface) for Dynamic configuration



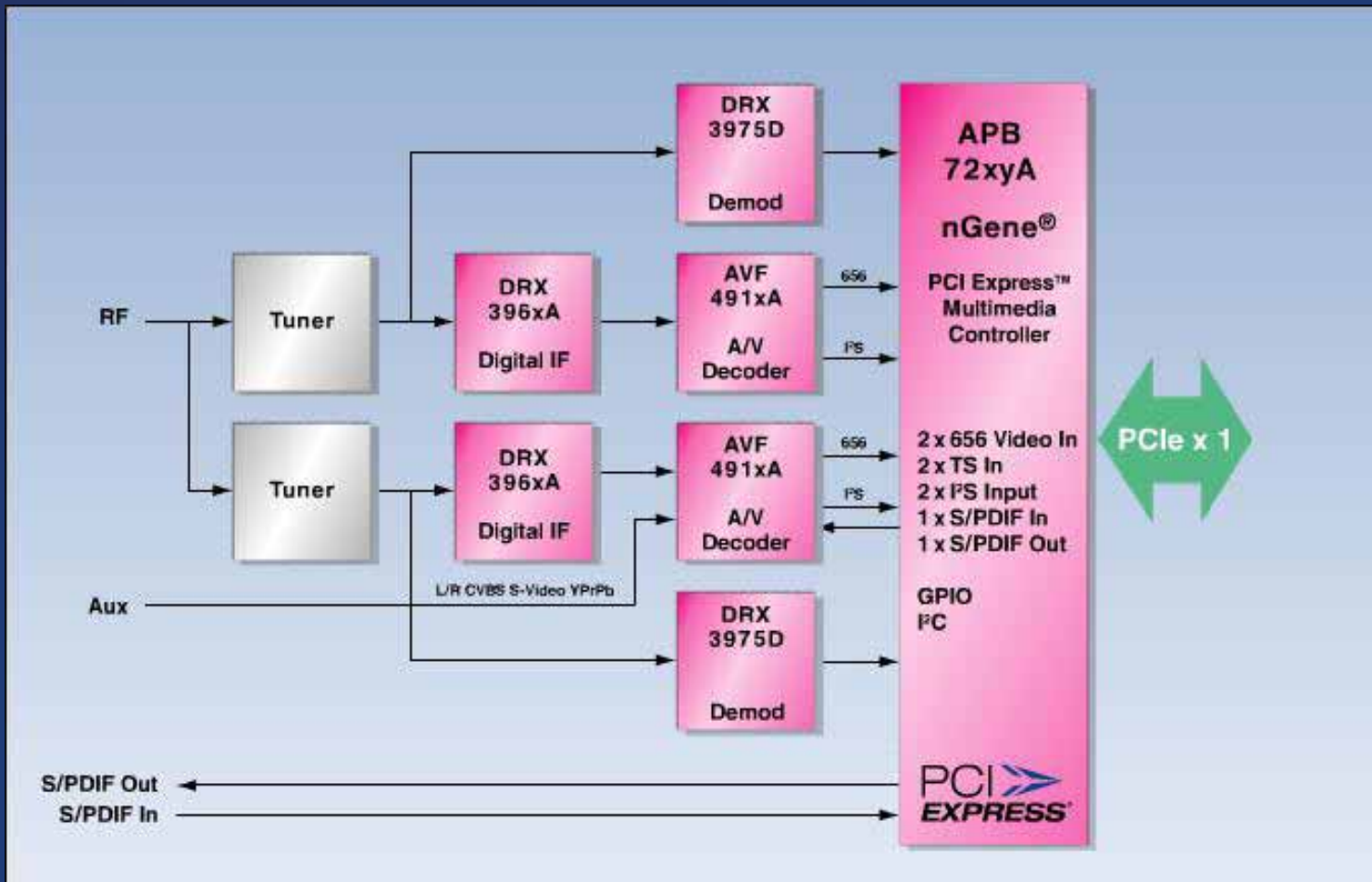
PCIe Video Capture Card

→ 32-channel PCIe Capture Card w/ native PCIe video decoders



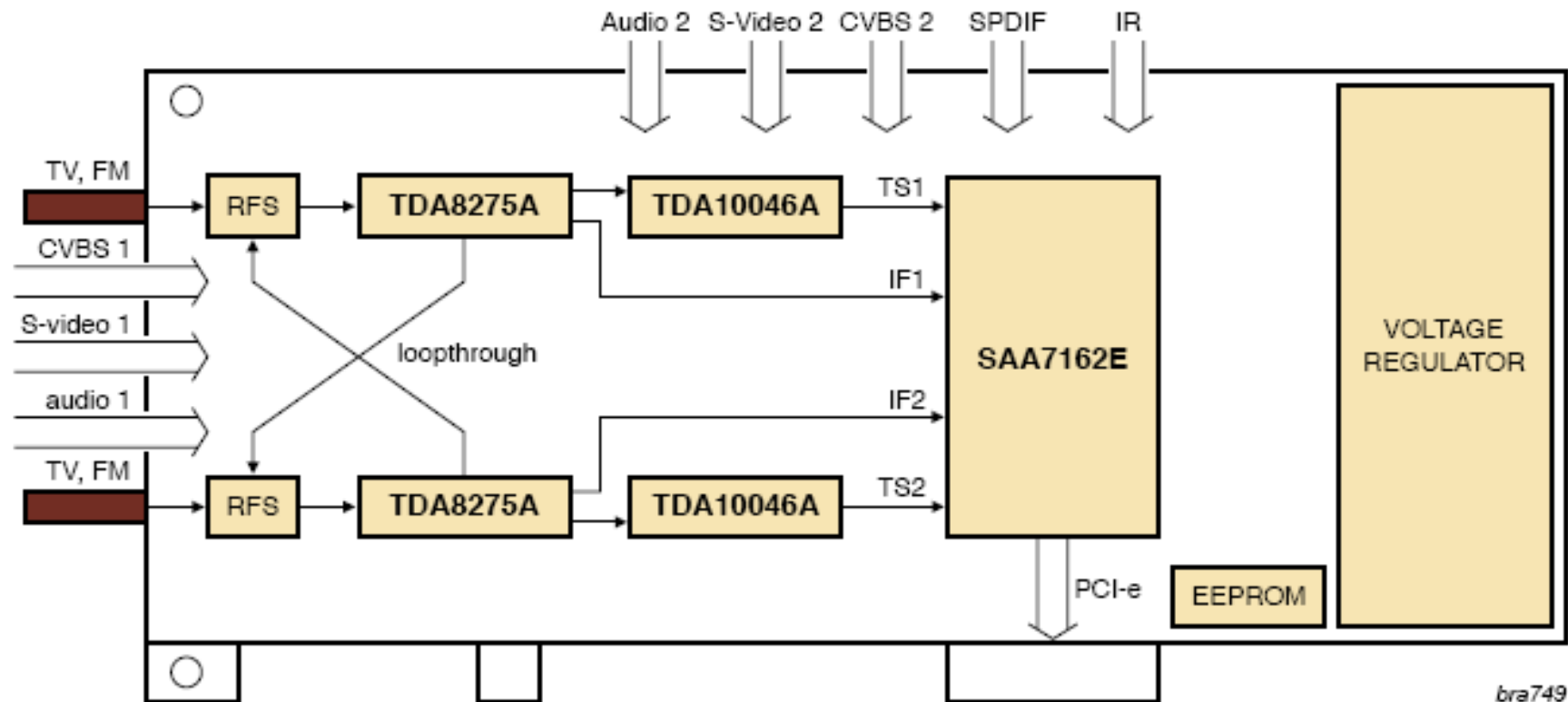
PCIe Integration – TV Tuner

- **Micronas – Dual TV Tuner PCIe Solution**
 - Seen at Shenzhen 10Moons Technology



PCIe Integration

→ Philips – Dual TV Tuner Video Application



SAA7162 dual hybrid block diagram

bra749



End of Presentation

Visit www.pericom.com/pcie for datasheets and more information on Pericom and PCI Express

