



Project Olympus

3U PCIe Expansion Server

1/23/2019

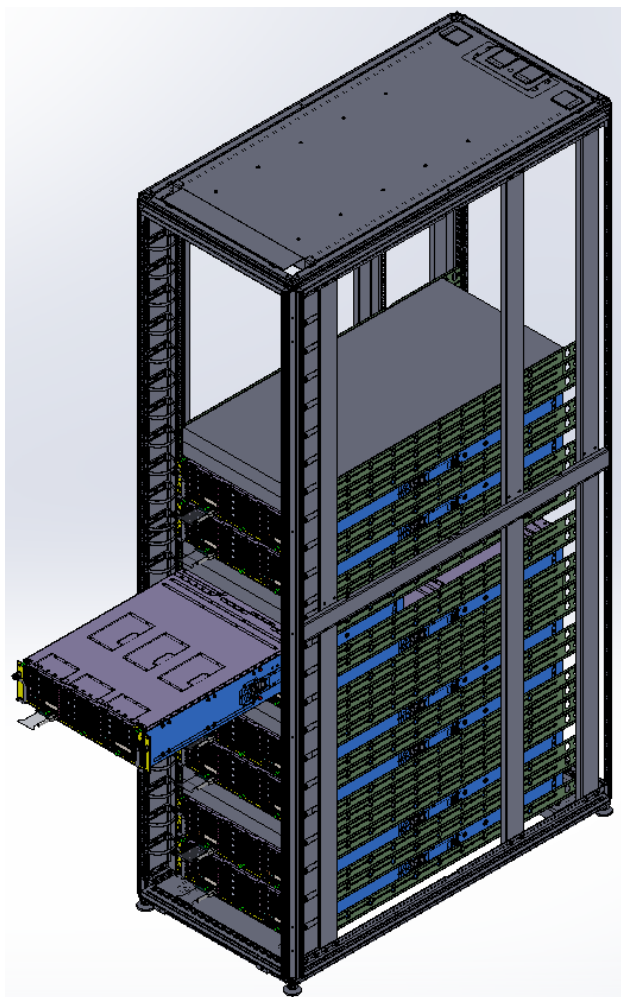
Mark D. Chubb

Project Olympus HW Building Blocks

- **Motherboards:** Flexible expansion
- **Power Supply:** 1KW three-phase
- **Universal PMDU:** AC power cord adaption
- **Rack:** 19" EIA-310 standard
- **Rack Manager:** Restful API or Redfish via Ethernet

3U PCIe Expansion Server

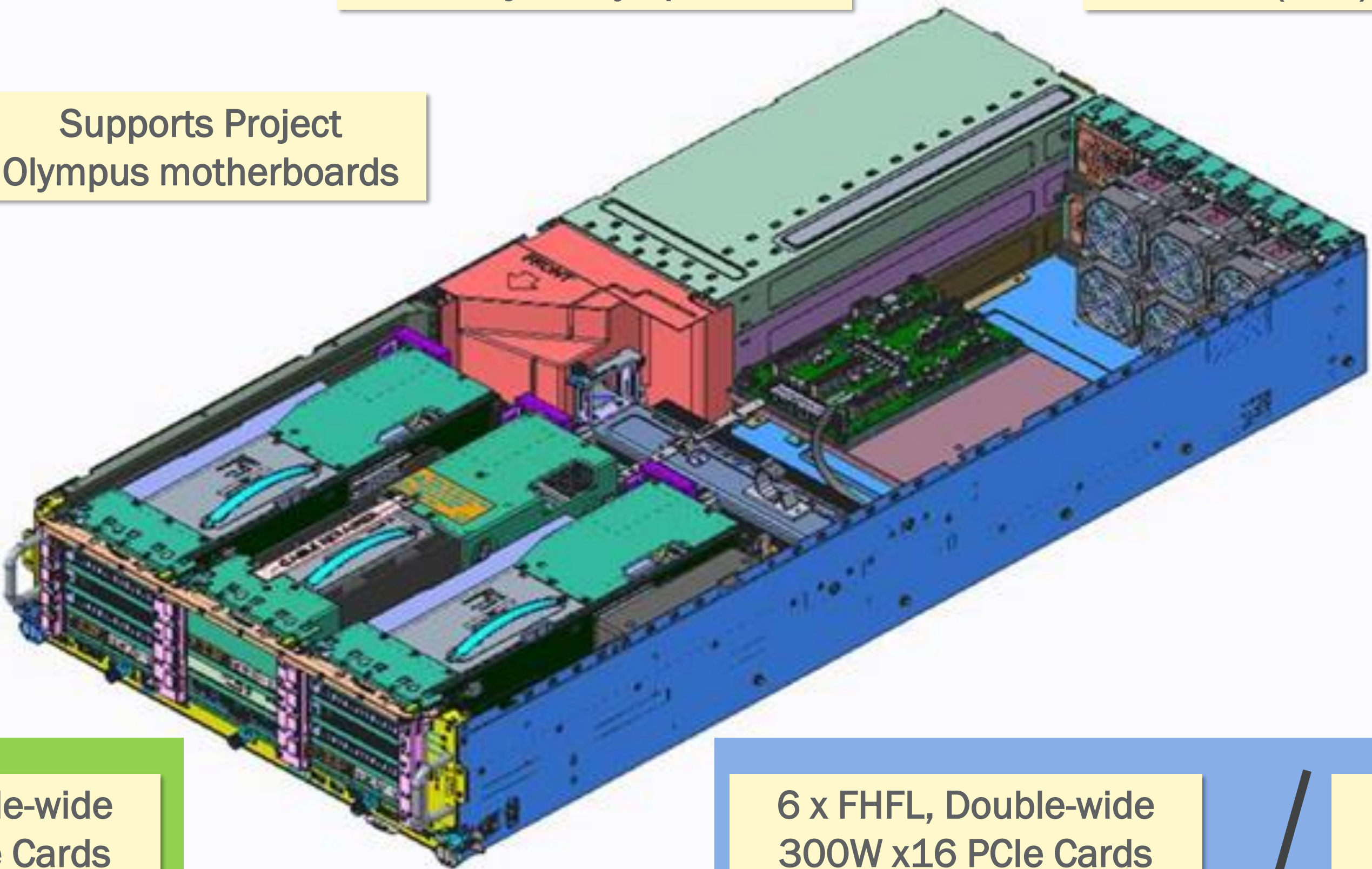
Project Olympus Rack
Fully Compatible



Supports 3 x Load Balanced
1kW Project Olympus PSUs

Power Distribution Board
(PDB)

Supports Project
Olympus motherboards



PSUs Blind mate
into Rack PMDU

6 x 60mm Dual
Rotor Fans
(room for 8 Fans)

2.5"/3.5" SSD or HDD

Supports Slide Rails
for smoother travel

5 x FHFL, Double-wide
300W x16 PCIe Cards
+
1 x FHHL Single-wide 75W
x16 PCIe Card

AMD® SKU

OR

6 x FHFL, Double-wide
300W x16 PCIe Cards
+
1 x FHHL Single-wide 75W
x16 PCIe Card

12 x FHFL, Single-wide
75W x16 PCIe Cards
+
1 x FHHL Single-wide 75W
x16 PCIe Card

Intel® SKU

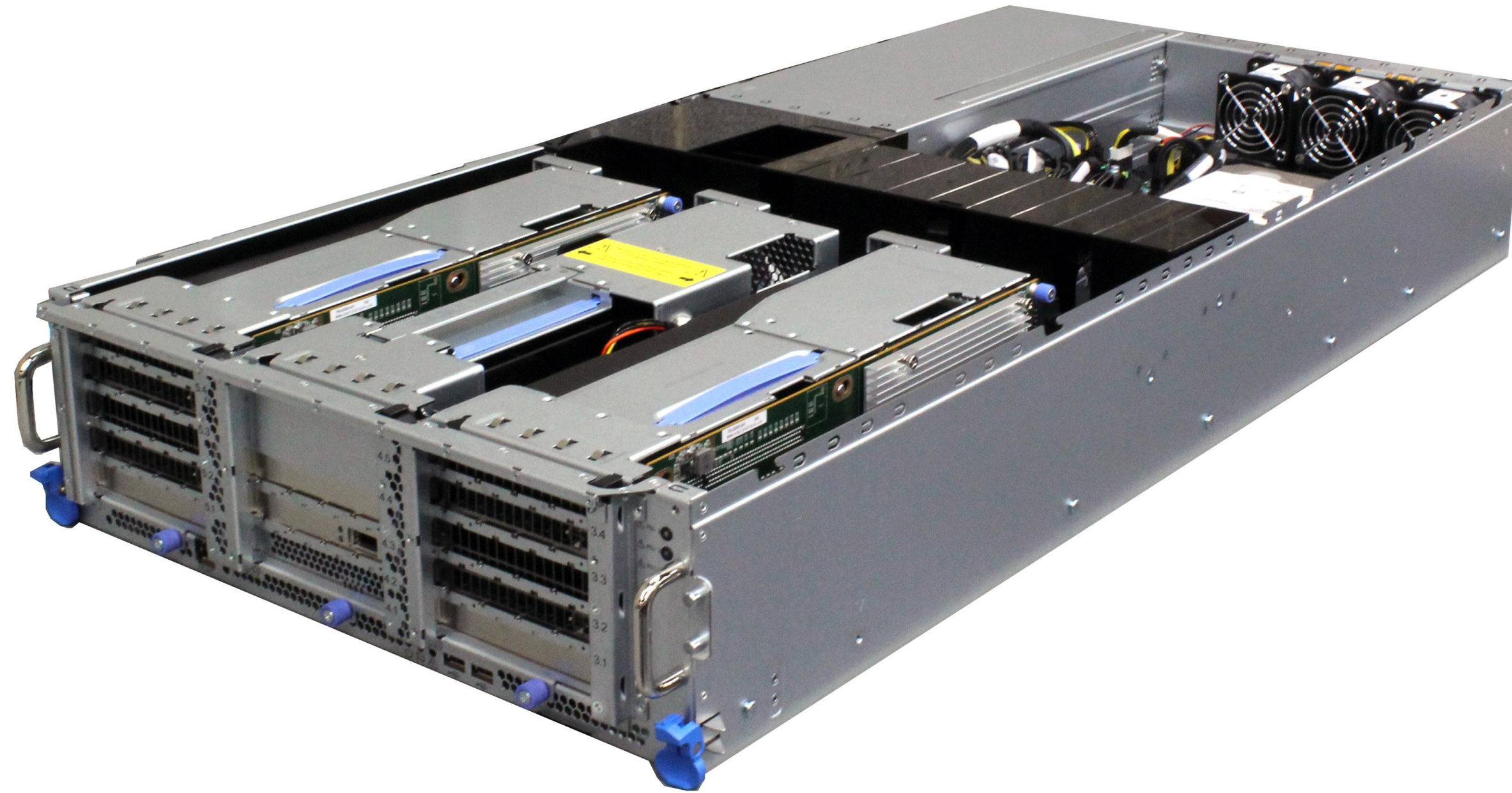


ZT Solution: 3U PCIe Expansion Server

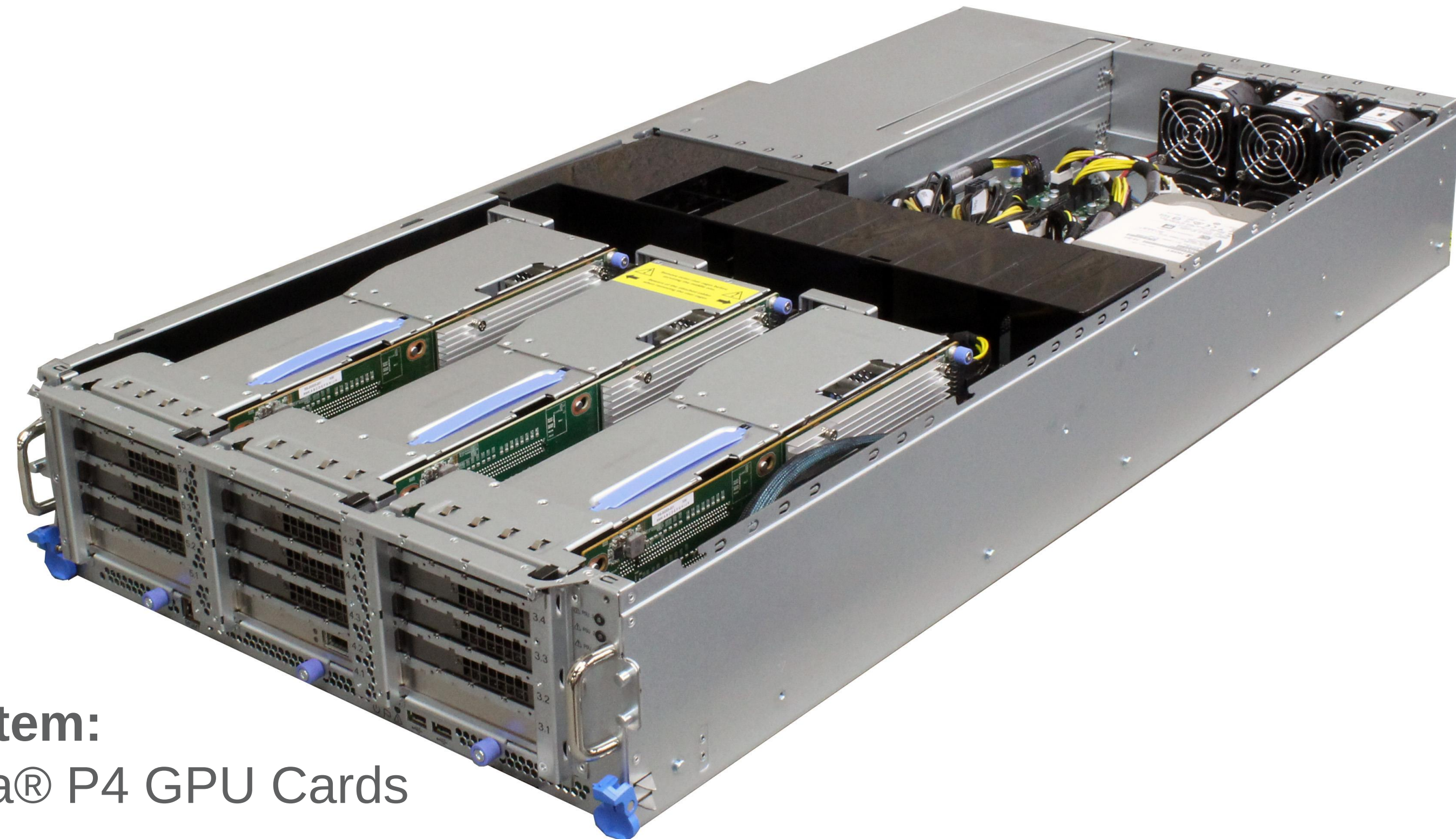
(AMD EPYC™ Based)

Feature	Qty	Description
Chassis	1	3U, 19" EIA310-D Compliant supporting Project Olympus PMDU connections
Motherboard	1	Project Olympus 2-Slot AMD® EPYC™ Motherboard (OCP leveraged)
Processor	2	AMD EPYC 7551 (Naples), 180W, 32C, 2GHz, PS7551BDVIHAFV
Memory	16 (32max)	32GB DDR4, DR (1DPC), 2667 R-DIMMs; Total System Memory: 512GB (Limited to 2400MT/s based on Signal Integrity)
PCIe Riser 3 & 5	2	2-Slot Active PCIe x16 Riser Cards with 48-lane PCIe Switch
PCIe Riser 4	1	2-Slot Passive PCIe x32 Riser Card
GPU Card	4 (5max)	AMD MI25 FHFL, Double-Wide, 300W PCIe x16 Card
Network Card	1	10G Single Port SFP+ PCIe2.0 x8 5GT/s
HDD/SSD	5 (8max)	M.2 960GB NVMe SSDs, PCIe x4 110mm
M.2 Riser	1 (2max)	2-Slot M.2 Riser (in PCIe Slot 1)
Security	1	TPM2.0 SPI Module
System Fans	6	60mmx56mm Dual Rotor Fans
Power Supply	3	P2010 1020W 3-Phase, non-LES PSUs
Power Distribution	1	PDB and Cable Harnesses to support 12V Power to MB, Risers, GPUs, and System Fans

3U PCIe Expansion System Options

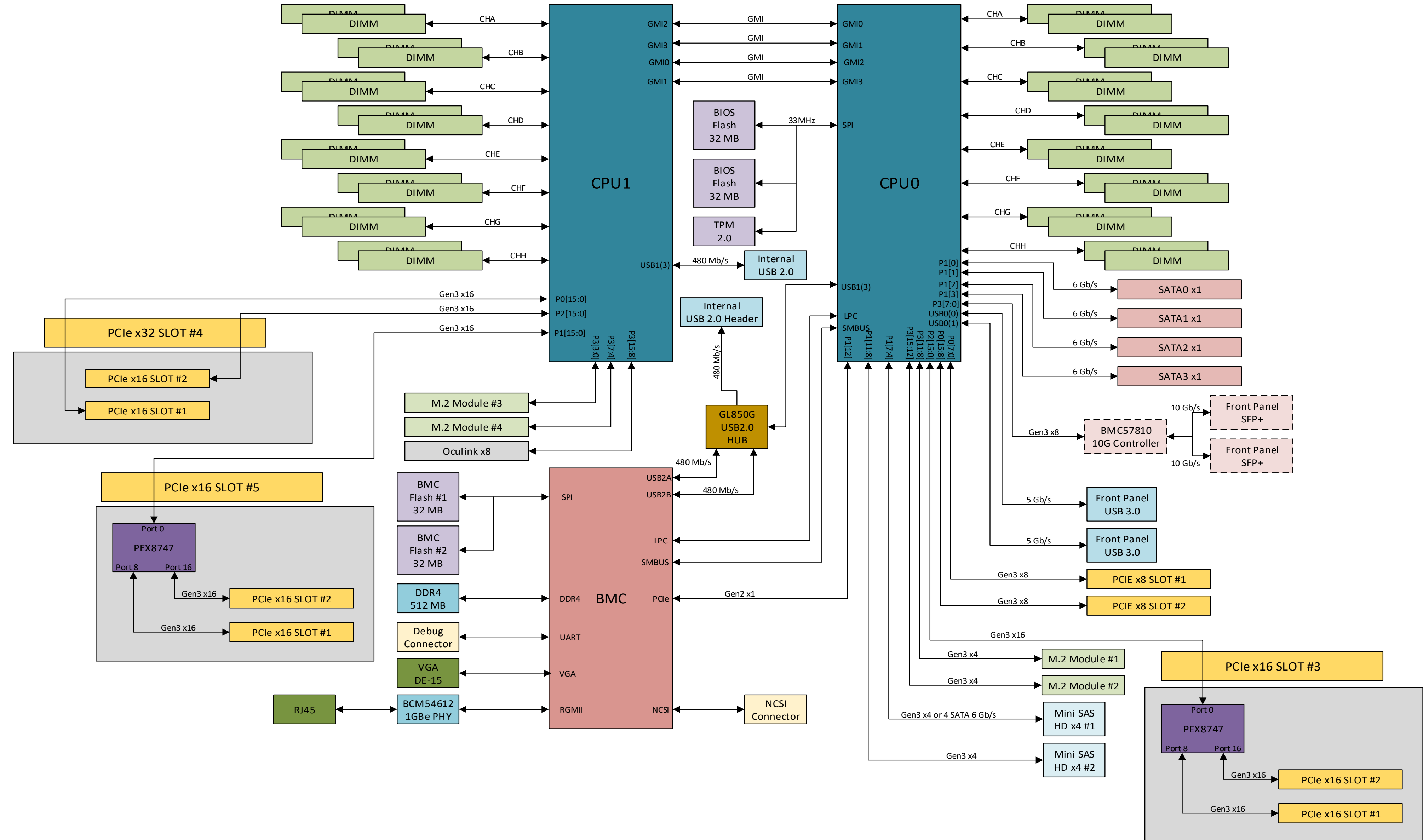


ZT Systems XPO200 3U PCIe Expansion System:
Featuring AMD® EPYC™ Platform with 5 x AMD® MI25 GPU Cards

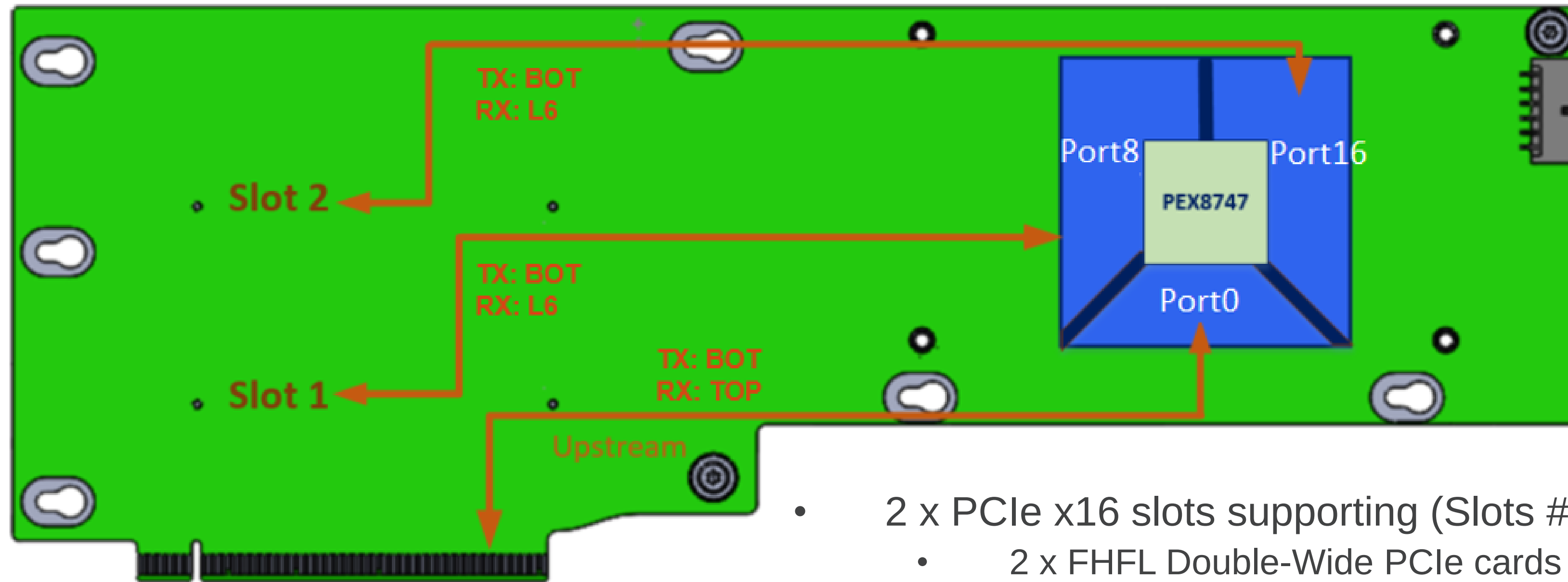


ZT Systems XPO200 3U PCIe Expansion System:
Featuring Intel® Purley Platform with 12 x Nvidia® P4 GPU Cards
or 6 x Nvidia® V100 GPU Cards

System Block Diagram



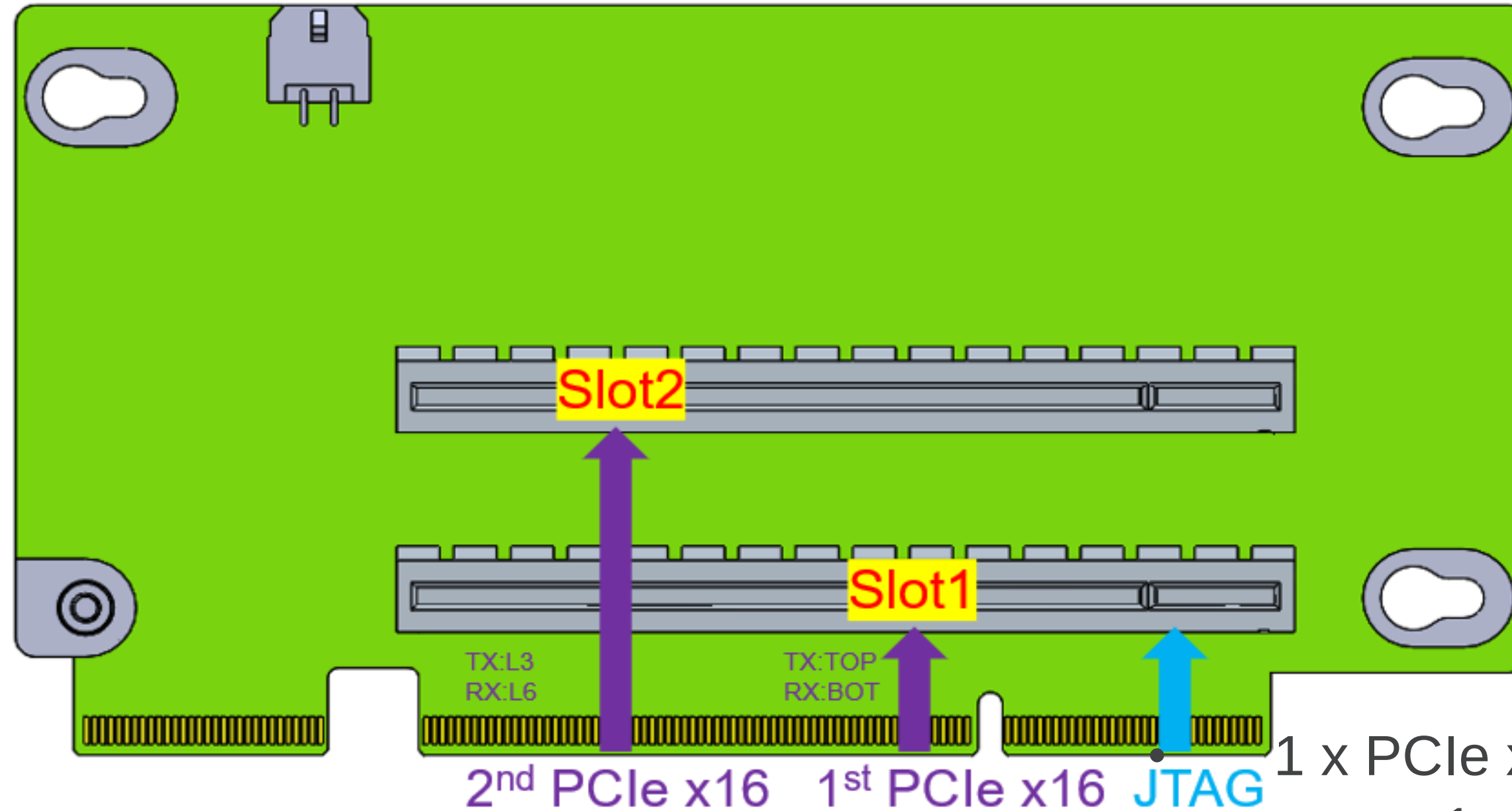
2-Slot Active PCIe x16 Riser Card Layout



PCIe Connectors (not shown) are on Topside

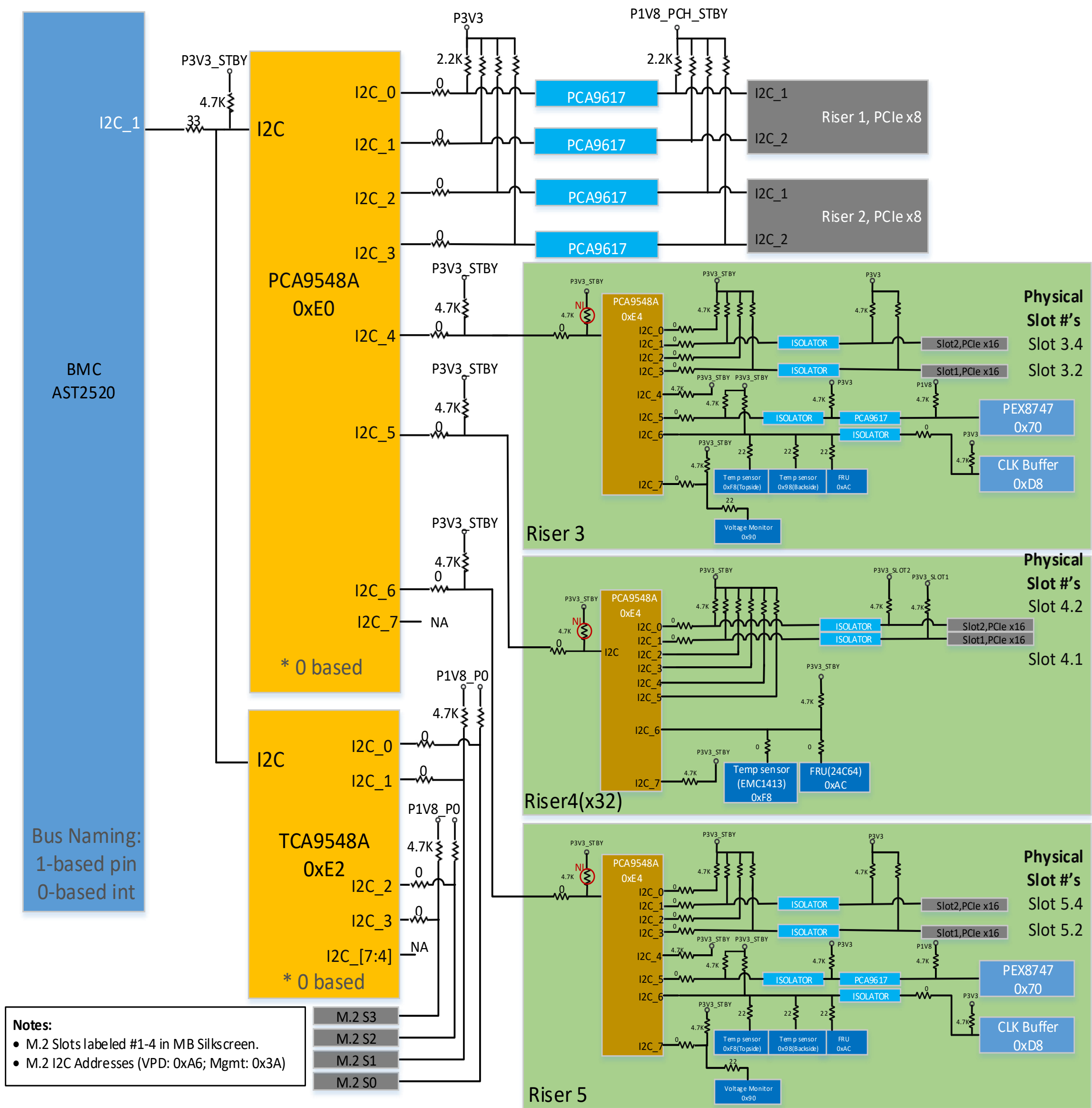
- 2 x PCIe x16 slots supporting (Slots #1-2, Bottom to Top):
 - 2 x FHFL Double-Wide PCIe cards
 - Requires PWRBRK_N (pin B30) signal for High Power PCIe Card throttling
- Broadcom® 48-Lane PCIe Gen3 Switch (PEX8747)
 - Switch Bifurcated into 2 x16 Ports (1 x16 Port to each x16 Slot)
 - Switch is located on Backside as required by Chassis Thermals
 - Use of all 48-lanes and requires 15.5W
 - Heatsink is required
- Differential Clock Buffer on board for additional Clock Fanout
- I2C MUX used to avoid Address contention (see I2C block diagram)
- 8 Layer Stackup, Mid-Loss Material (0.062")

2-Slot Passive PCIe x32 Riser Card Layout

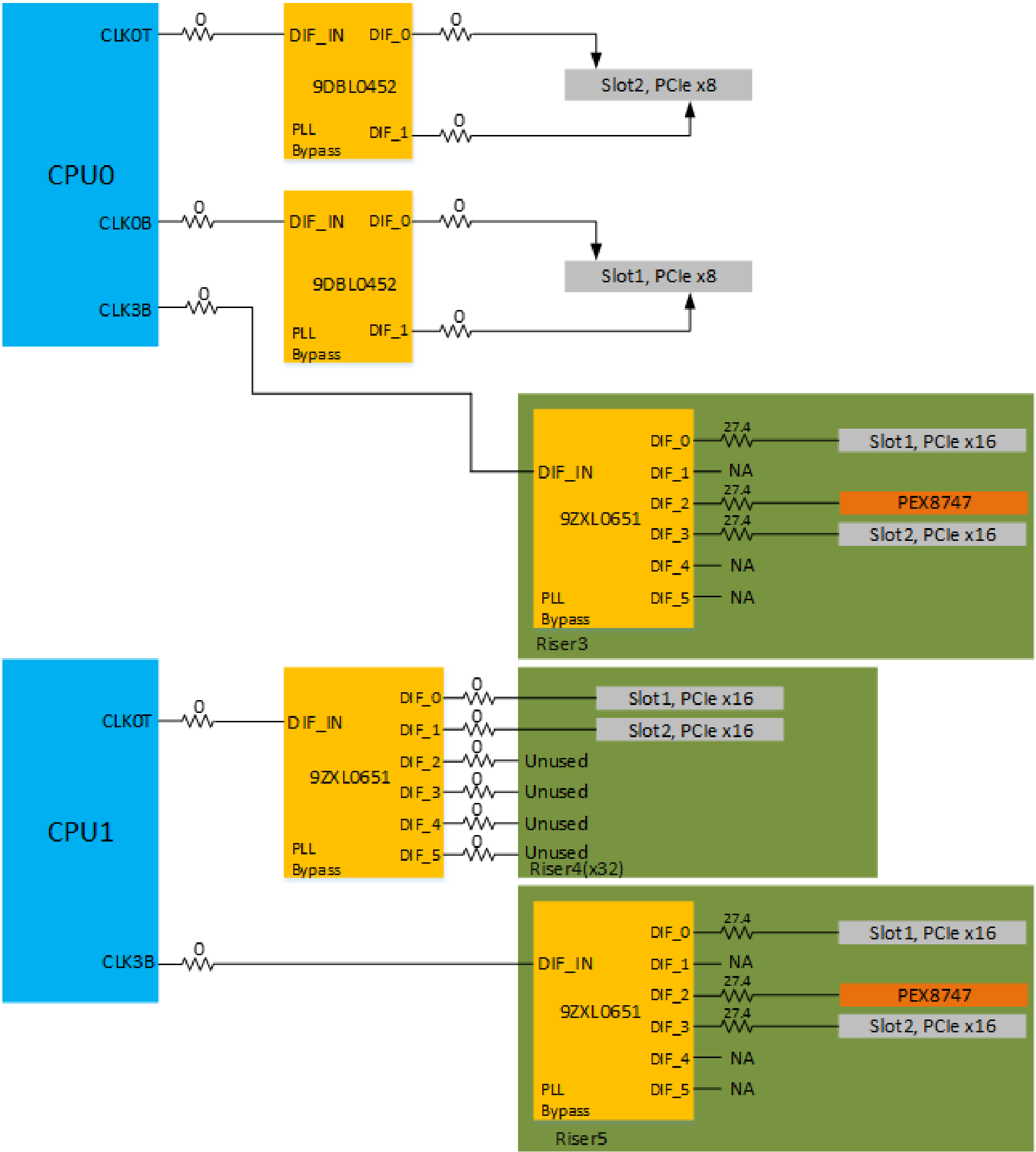


- 1 x PCIe x16 slot supporting (Slot #1, Bottom):
 - 1 x FHHL Single-Wide PCIe card
 - Designated for the Network Card
- 1 x PCIe x16 slot supporting (Slot #2, Top):
 - 1 x FHFL Single-Wide PCIe Card OR
 - 1 x FHFL Double-Wide PCIe Card
 - All x16 PCIe lanes sourced from PCIe Riser Slot #4 (No Switch Required)
 - Requires PWRBRK_N (pin B30) signal for High Power PCIe Card throttling
- I2C MUX used to avoid Address contention (see I2C block diagram)
- 8 Layer Stackup, Mid-Loss Material (0.062")

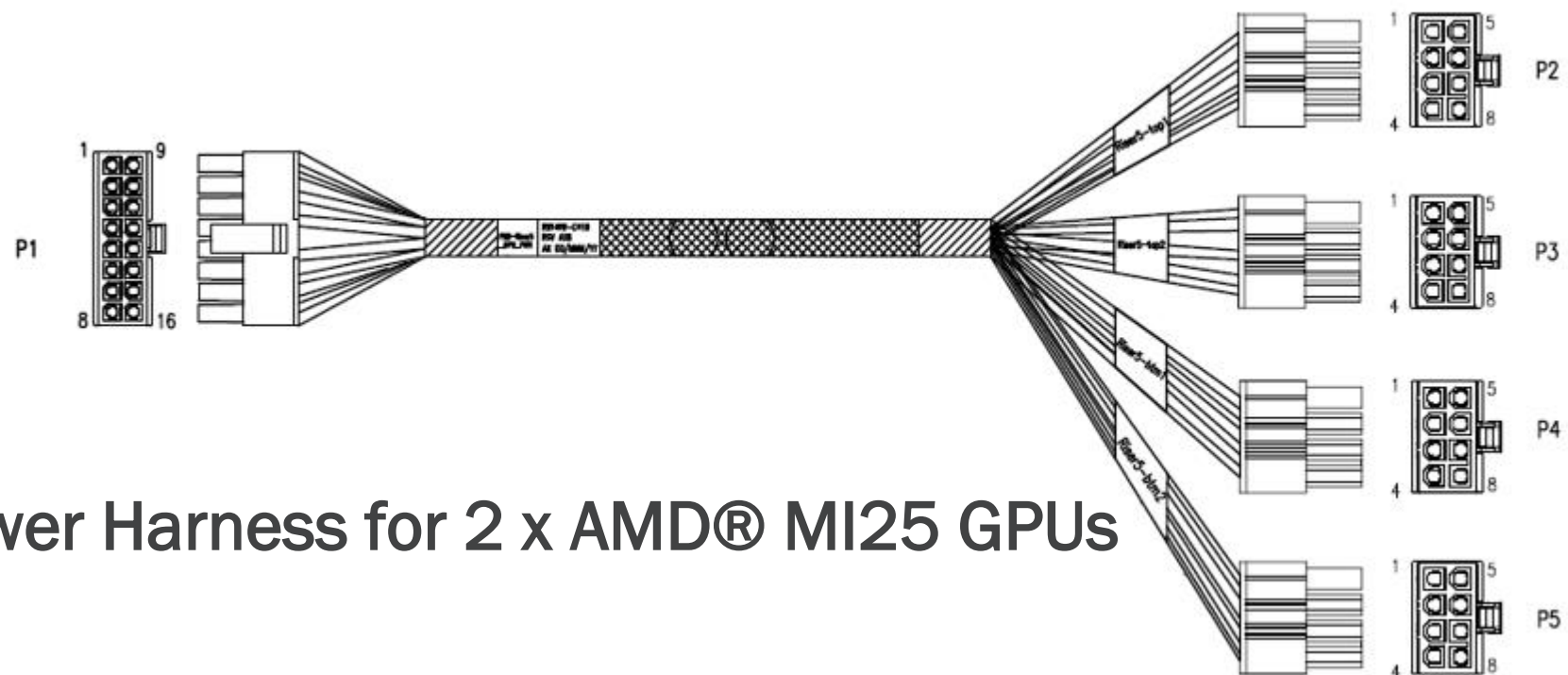
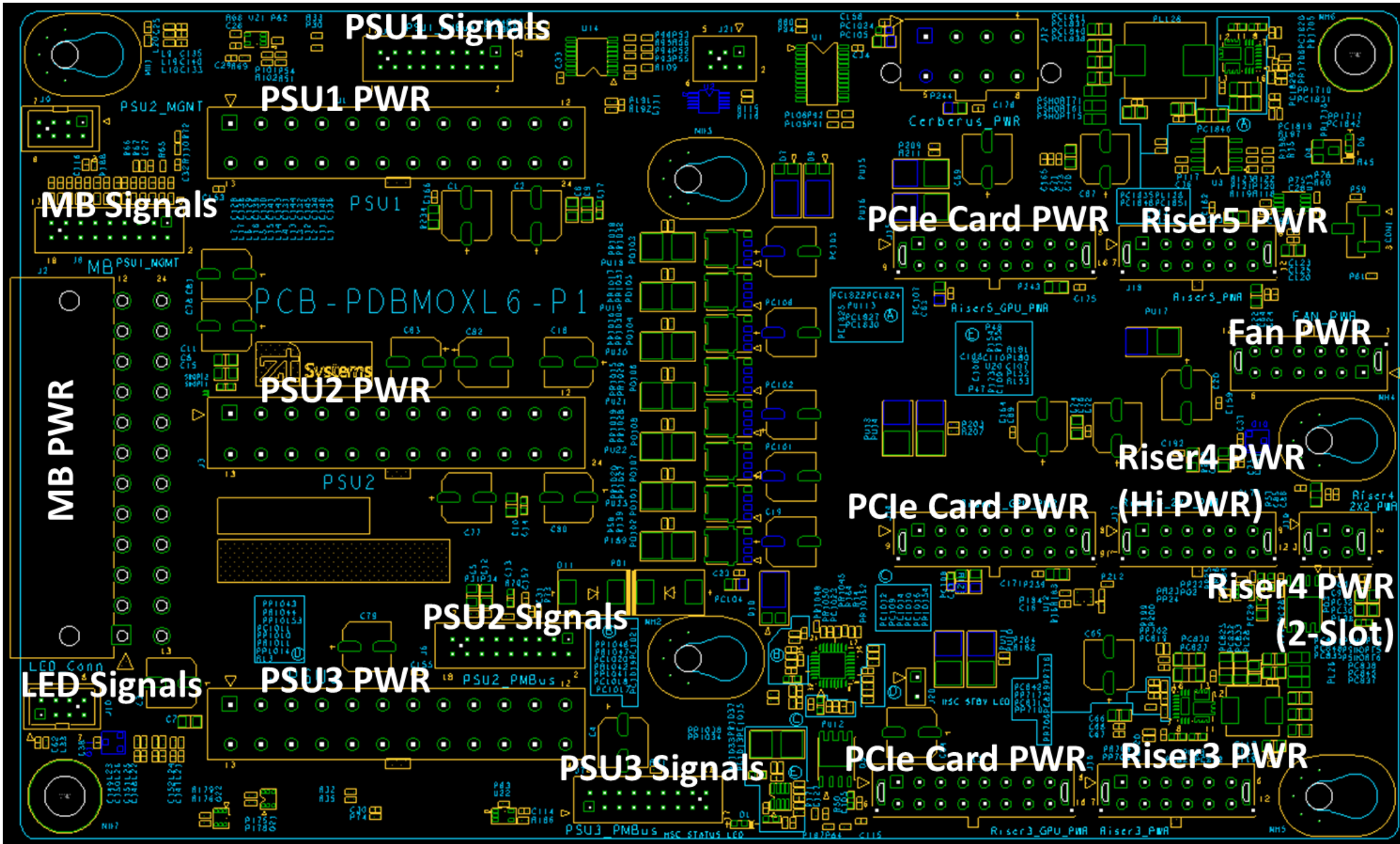
PCIe I2C Block Diagram



PCIe Clock Block Diagram



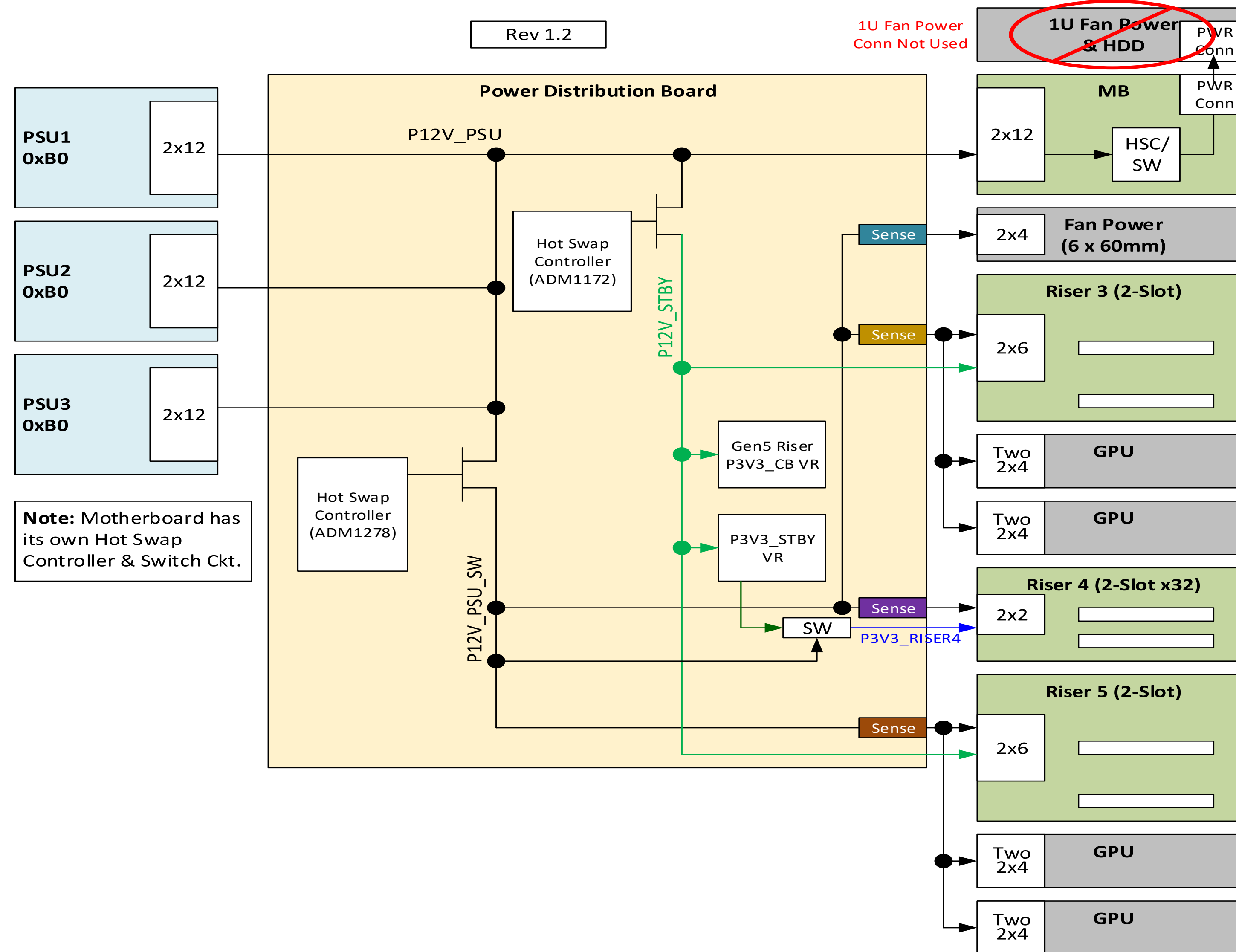
Power Distribution Board Layout



Power Harness for 2 x AMD® MI25 GPUs

- PDB supports single 12V Power Domain from 3 x Project Olympus PSUs
 - Uses Passive Droop Sharing
 - No V_Sense or I_Share signals used
- Power Delivery Requirements
 - Hot Swap Controller for Power Monitoring and Isolation
 - 12V Current Sense Ckts used for each branch
 - Supports Power to entire System (MB, Risers, PCIe Cards)
 - Fan Power also comes from PDB (none from MB)
- Provides passthrough of PMDU signals between MB and RM
- 6 Layer Stackup (0.093"), 2oz copper planes
- Different power harnesses can be used for different Cards

PDB Power Distribution Block Diagram



PDB Misc Signal Block Diagram

Rev 1.4

