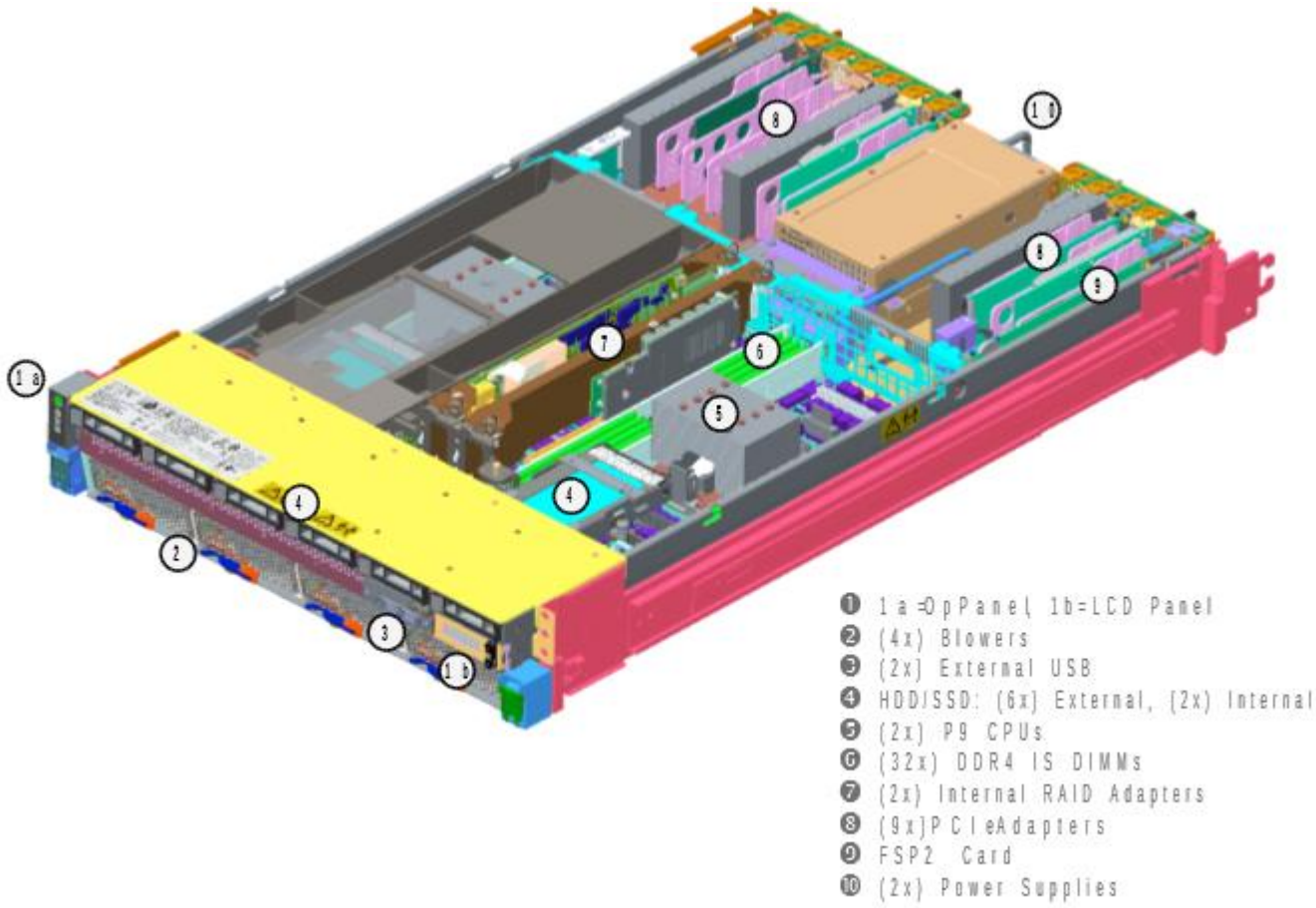
P9 MFG Handbook

ZZ 2S2U (9009-22A) ZZ2S2U-L (9009-22L)

The Cognitive Supply Chain

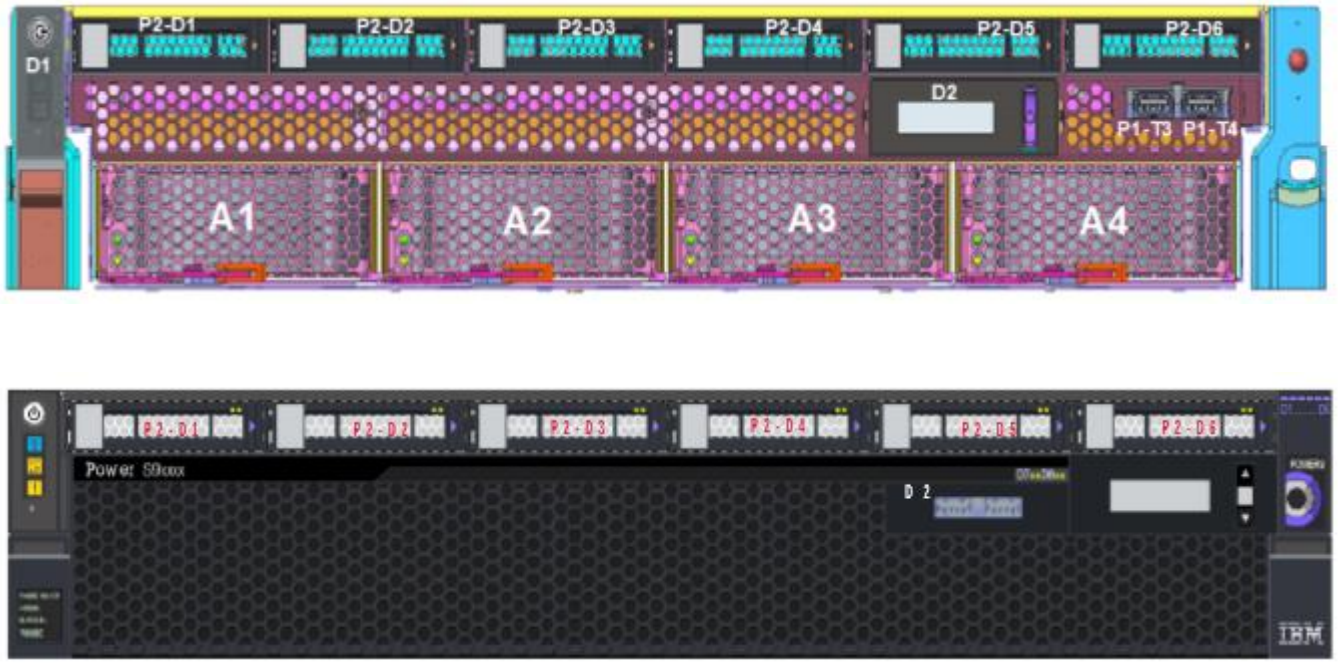
Isometric, top and front view of ZZ

ZZ PHYSICAL LOCATIONS

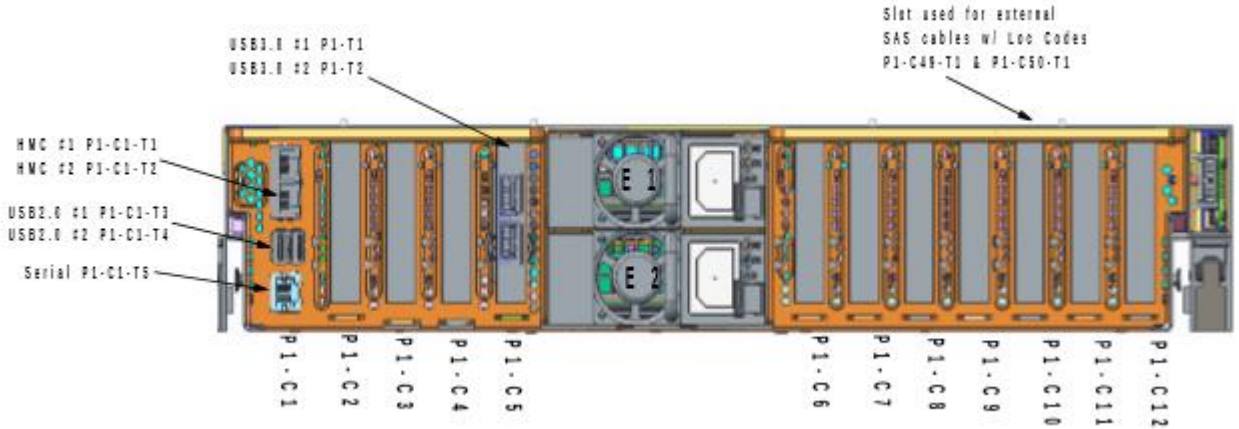


1. 1a=Op Panel, 1b=LCD Panel
2. (4x) Blowers
3. (2x) External USB
4. HDD/SSD: (6x) External, (2x) Internal
5. (2x) P9 CPUs
6. (32x) DDR4 IS DIMMs
7. (2x) Internal RAID Adapters
8. (9x) PCIe Adapters
9. FSP2 Card
10. (2x) Power Supplies

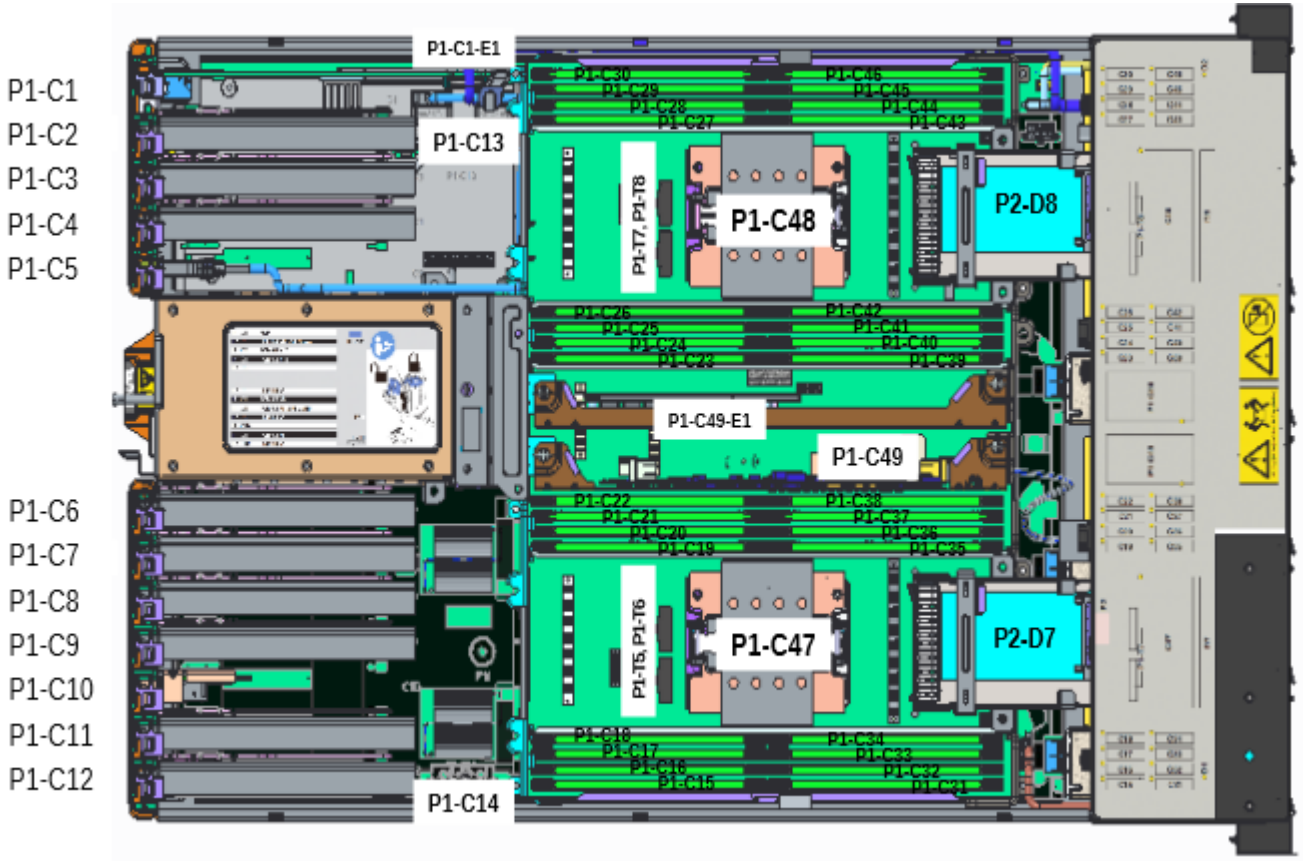
ZZ 2S2U Front Isometric View



ZZ Front View


USB3.0 #1 P1-T1
USB3.0 #2 P1-T2
Slot used for external
SAS cables w/ Loc Codes
P1-C48-T1 & P1-C50-T1
HMC #1 P1-C1-T1
HMC #2 P1-C1-T2
USB2.0 #1 P1-C1-T3
USB2.0 #2 P1-C1-T4
Serial P1-C1-T5
E 1
E 2
P1-C1
P1-C2
P1-C3
P1-C4
P1-C5
P1-C6
P1-C7
P1-C8
P1-C9
P1-C10
P1-C11
P1-C12

ZZ Rear View


P1-C1
P1-C2
P1-C3
P1-C4
P1-C5
P1-C6
P1-C7
P1-C8
P1-C9
P1-C10
P1-C11
P1-C12
P1-C1-E1
P1-C13
P1-C14
P1-C48
P1-T7, P1-T8
P2-D8
P1-C49-E1
P1-C49
P1-C47
P1-T5, P1-T6
P2-D7

ZZ Top View

Block Diagrams and One Pagers

ZZ SYSTEM DIAGRAMS, LABELS

ZZ 2S2U

- **Processor**
  - 1x 4 BC 130W (see note), or
  - 1x 8 BC 190W, or
  - 1x 10 BC 190W, or
  - 2x 8 BC 190W, or
  - 2x 10 BC 190W, or
  - 2x 12 BC 190W
- **Memory**
  - Total 32 DDR4 IS DIMM slots
  - 8,16,32,64,128GB IS DIMM @ 2133-2400 Mbps
  - 4TB capacity, 306GB/s bandwidth max
  - Memory compression capable
  - Transactional memory capable
- **Storage (select 1 @ order)**
  - 1 Solstice RAID feature
    - JBOD, RAID 0,10,5,6
    - 8 SFF bays
  - 1 or 2 Futura NVMe features
    - 2 or 4 NVMe M.2 sockets
  - 1 Futura feature & 1 Solstice RAID feature
  - Split disk feature (2 Solstice RAID)
    - JBOD, RAID 0,10,5,6
    - 4+4 SFF bays
  - High performance RAID feature (1 Coupe RAID)
    - RAID 0,5,6,10 with Write Cache
    - 8 SFF bays
    - 1 SAS 4x port for 1 disk drawer expansion
    - AIX (GA2 3Q18), no IBMi
- **4 NVLink 1-brick ports (not supported w/ 4 BC)**
  - 4 OpenCAPI adapters in CEC
  - MEX Accelerator module (GA3 2Q19)
- **PCIe Slots**
  - 3 PCIe x16 G4 LP slots
    - ✓ CAPI2.0 & IO drawer capable
  - 2 PCIe x8 G4 LP slots with x16 connector
    - ✓ x8 G4 LP slot driven by SCM0 is CAPI2.0 capable
  - 2 PCIe x8 G3 LP slots with x16 connector
  - 1 PCIe x8 G3 LP slot
  - 1 PCIe x8 G3 LP slot for default LAN adapter

MTM 9009-22A
Power S922
(GA1 2/2018)

MEX Accelerator Module
(GA3 2Q19)
CAPI & GPU adapters
Afterburner/EI Loco Card

IO Drawer
MEX IO 4U Drawer
BearPaw Card

Disk Drawer
Slider HDD/SSD 2U Drawer
Homerun HDD/SSD 2U Drawer

Note: IO and Disk Drawers are NOT supported with 4 BC feature

- **OS**
  - AIX, Linux, IBMi (require VIOS)
- **Hypervisor**
  - PowerVM
- **RAS**
  - P9 Nimbus RAS
  - Concurrent maintenance on HDD/SSD
  - Concurrent maintenance on PCI adapters
  - Concurrent maintenance & redundant cooling
  - Concurrent maintenance & redundant power supply
    - ✓ 1+1 1400W PS, 200-240 VAC
  - Customer setup, install & repair
- **Energy Efficiency**
  - 80+ Platinum Power Supply Compliant
  - EPA Energy Star Compliant
  - Built-in Advanced Thermal & Power Mgt
- **Service Interface**
  - FSP2 service processor
  - Light-Path op-panel & FRU LEDs
- **Native I/O**
  - Host USB 3.0: 2 front, 2 rear
  - System Management 1GE (2 rear)
  - Serial (rear), USB 2.0 (2 rear)
- **System management**
  - NovaLink, PowerVC, HMC (optional)
- **Certifications**
  - FCC: Class A for Servers
  - Acoustics: Data Center Category 1A
  - Environment: ASHRAE A2
    - 10-35C, 20-80% RH, 3050m max

ZZ 2S2U

ZZ-L 2S2U-L

- **Processor**
  - 1x 16 SC or 1x 8 BC 190W, or
  - 1x 20 SC or 1x 10 BC 190W, or
  - 2x 16 SC or 2x 8 BC 190W, or
  - 2x 20 SC or 2x 10 BC 190W, or
  - 2x 24 SC or 2x 12 BC 190W
- **Memory**
  - Total 32 DDR4 IS DIMM slots
  - 8,16,32,64,128GB IS DIMM @ 2133-2400 Mbps
  - 4TB capacity, 306GB/s bandwidth max
  - Transactional memory capable
- **Storage (select 1 @ order)**
  - 1 Solstice RAID feature
    - JBOD, RAID 0,10,5,6
    - 8 SFF bays
  - 1 or 2 Futura NVMe features
    - 2 or 4 NVMe M.2 sockets
  - 1 Futura feature & 1 Solstice RAID feature
  - Split disk feature (2 Solstice RAID)
    - JBOD, RAID 0,10,5,6
    - 4+4 SFF bays
  - High performance RAID feature (1 Coupe RAID)
    - RAID 0,5,6,10 with Write Cache
    - 8 SFF bays
    - 1 SAS 4x port for 1 disk drawer expansion
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  - 2 PCIe x8 G4 LP slots with x16 connector
    - ✓ x8 G4 LP slot driven by SCM0 is CAPI2.0 capable
  - 2 PCIe x8 G3 LP slots with x16 connector
  - 1 PCIe x8 G3 LP slot
  - 1 PCIe x8 G3 LP slot for default LAN adapter

MTM 9008-22L
Power S922L
(GA1 2/2018)

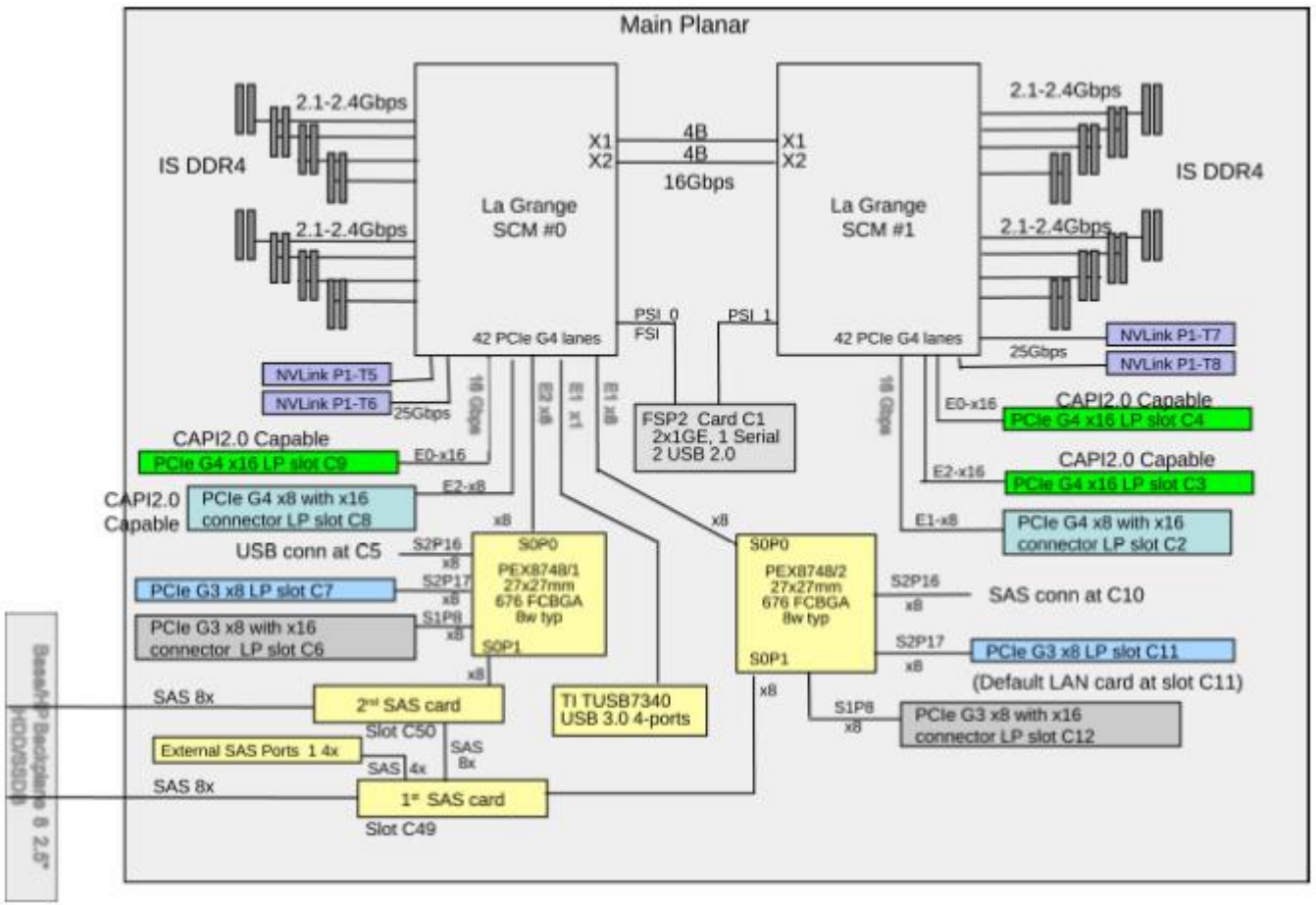
MEX Accelerator Module
(GA3 2Q19)
CAPI & GPU adapters
Afterburner/El Loco Card

IO Drawer
MEX IO 4U Drawer (PVM only)
BearPaw Expansion Card

Disk Drawer
Slider HDD/SSD 2U Drawer
Homerun HDD/SSD 2U Drawer

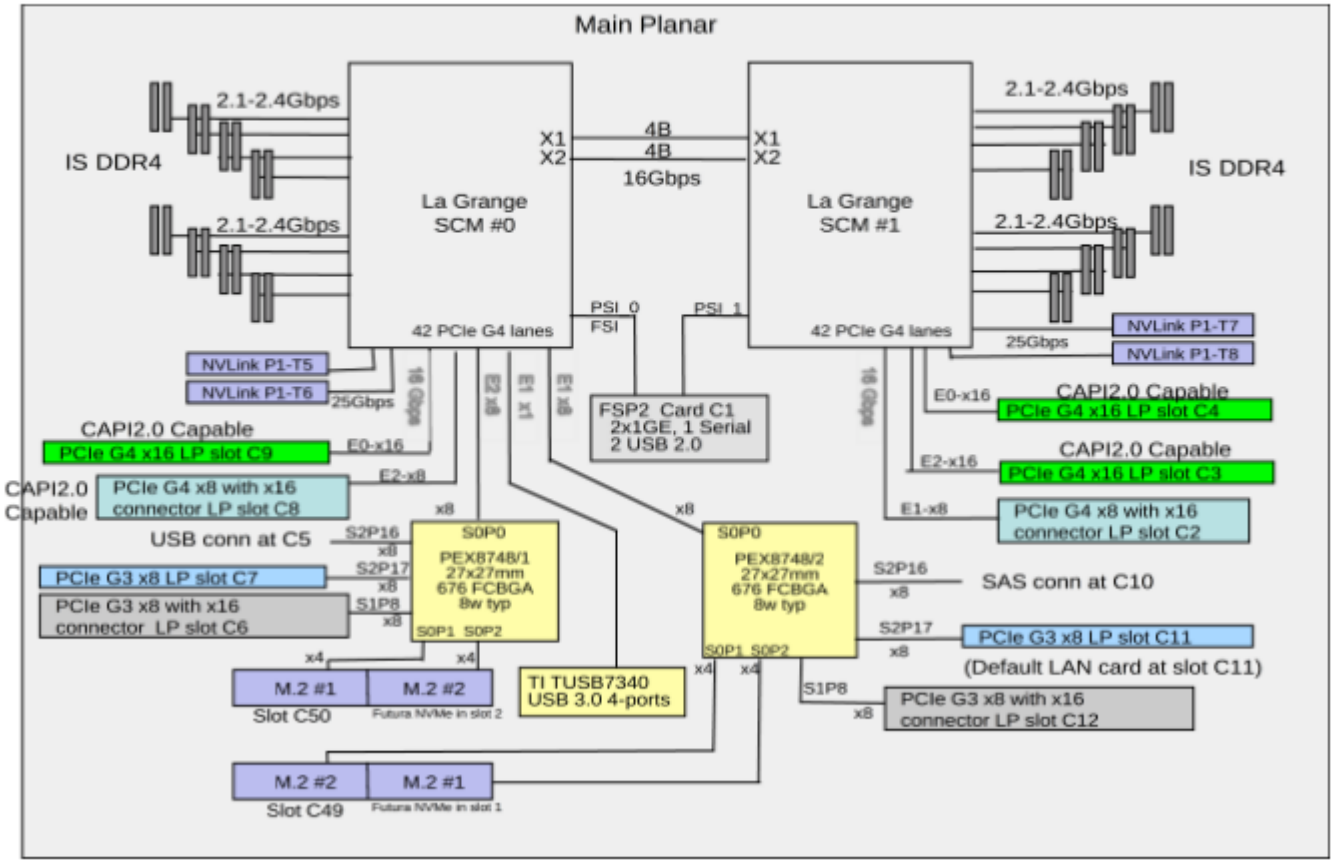
- **OS**
  - Linux
- **Hypervisor**
  - PowerVM for BC
  - OPAL/BM or KVM with Linux & SC (GA2 3Q18)
- **RAS**
  - P9 Nimbus RAS
  - Concurrent maintenance on HDD/SSD
  - Concurrent maintenance on PCI adapters (PowerVM only)
  - Concurrent maintenance & redundant cooling
  - Concurrent maintenance & redundant power supply
    - ✓ 1+1 1400W PS, 200-240 VAC
  - Customer setup, install & repair
- **Energy Efficiency**
  - 80+ Platinum Power Supply Compliant
  - EPA Energy Star Compliant
  - Built-in Advanced Thermal & Power Mgt
- **Service Interface**
  - FSP2 service processor
  - Light-Path op-panel & FRU LEDs
- **Native I/O**
  - Host USB 3.0 (2 front, 2 rear)
  - System Management 1GE (2 rear)
  - Serial (rear), USB 2.0 (2 rear)
- **System management**
  - PowerVM: NovaLink, PowerVC, HMC (optional)
  - PowerKVM: Kimchi/Ginger, PowerVC
- **Certifications**
  - FCC: Class A for Servers
  - Acoustics: Data Center Category 1A
  - Environment: ASHRAE A2
    - 10-35C, 20-80% RH, 3050m max

ZZ 2S2U-L



ZZ 2S2U with SAS RAID Cards - PLX G3 Switch

ZZ 2S2U Block Diagram
(with PLX G3 Switch)



ZZ 2S2U with NVMe Cards - PLX G3 Switch

Bulleted Description of ZZ System

ZZ SYSTEM DESCRIPTION

ZZ Parts Codenames

Card Name	Description
Gibbons	System Planar
Beard	Service Processor Card (FSP2)
Tejas	TPM Card
Deguello	4U Low Function DASD BP - 12 SFF HDD/SSD, w/ or w/o RDX
Eliminator	4U Hi Function DASD BP - 18 SFF HDD/SSD w/ SAS Expanders
Dusty	Power On/Off Card
Hill	LCD Display Card
Futura	NVMe Adapter Card
Fandango	2U Low Function / Split DASD BP - 8 SFF HDD/SSD
Antenna	4U Hi Function DASD BP w/ RDX - 12 SFF HDD/SSD w/ SAS Expander
Afterburner	LP PCI-Like NV Link Cable Paddle Card
El Loco	LP PCI-Like NV Link Sideband Signal Card
3 Hobmres	FFHL PCI-Like NV Link Cable & Sideband Signal Card
Recycler 2U/4U	Jasper (RAID SuperCap) Interposers 2U & 4U

The ZZ 2U server will be positioned as an entry-level SMP (Symmetric Multi-Processor) server based on the POWER9 superscalar microprocessor. Each POWER9 processor module can provide up to 12 cores (n-ways).

The 22A/22H will be offered in a 2U 19” rack mount drawer.

The 22A/22H CEC unit will contain/support the following:

- One system planar board
  - Up to two P9 processor modules
  - Two PCIe switch chips
  - 1 or 2 Crocodile SAS controller(s) (Solstice or GXP) or 1 or 2 NVMe M.2 SSD cards (Futura)
  - One FSP service chip
  - Two NVLink cards
  - 32 DDR4 Industry Standard (IS) DIMM slots (w/ 2 processors) (quantity 16 DIMM slots w/ 1 processor)
- No memory riser cards are used with a 22A/22H 2U server.
- One DASD backplane (optional)
  - Which supports 8 SFF disk bays
  - No 1.8” SSD module cage is offered/supported on ZZ servers.
  - No RDX bay is available on a ZZ 2U server
  - No DVD bay
  - No tape bay is supported/provided on ZZ servers
  - Hardware RAID 0,10 or RAID 5/6 (with hot spare) (depending on the backplane type)

- PCIe slots with two processors present:
  - Three PCIe x16 Gen4, half height, half length slots
    - These slots can contain CAPI capable card or an I/O drawer interface card
  - Two PCIe x8 Gen4, half height, half length slots (with x16 connectors) (CAPI)
  - Two PCIe x8 Gen3, half height, half length slots (with x16 connectors)
  - Two PCIe x8 Ge34, half height, half length slots (1 of these is used for the required base LAN adapter)
- PCIe slots with one processor present:
  - One PCIe x16 Gen4, half height, half length slot
    - This slot can contain CAPI capable card or an I/O drawer interface card
  - One PCIe x8 Gen4, half height, half length slot (with x16 connectors) (CAPI)
  - Two PCIe x8 Gen3, half height, half length slots (with x16 connectors)
  - Two PCIe x8 Gen3, half height, half length slots (1 of these is used for the required base LAN adapter)
- All PCIe slots are concurrently maintainable.
- Four blowers
- A 22A/22H requires two power supplies (AC).

The ZZ-L 2U server will be positioned as an entry-level SMP (Symmetric Multi-Processor) server based on the POWER9 superscalar microprocessor. Each POWER9 processor module can provide up to 24 “small” cores (n-ways).

The 22L will be offered in a 2U 19” rack mount drawer.

The 22L CEC unit will contain/support the following:

- One system planar board
  - Up to two P9 processor modules
  - Two PCIe switch chips
  - 1 or 2 Crocodile SAS controller(s) (Solstice or GXP) or 1 or 2 NVMe M.2 SSD cards (Futura)
  - One FSP service chip
  - Two NVLink cards
  - 32 DDR4 Industry Standard (IS) DIMM slots (w/ 2 processors) (quantity 16 DIMM slots w/ 1 processor)
- No memory riser cards are used with a 22L 2U server.
- One DASD backplane (optional)
  - Which supports 8 SFF disk bays
  - No 1.8” SSD module cage is offered/supported on ZZ servers.
  - No RDX bay is available on a ZZ 2U server
  - No DVD bay
  - No tape bay is supported/provided on ZZ servers
  - Hardware RAID 0,10 or RAID 5/6 (with hot spare) (depending on the backplane type)

- PCIe slots with two processors present:
  - Three PCIe x16 Gen4, half height, half length slots
    - These slots can contain CAPI capable card or an I/O drawer interface card
  - Two PCIe x8 Gen4, half height, half length slots (with x16 connectors) (CAPI)
  - Two PCIe x8 Gen3, half height, half length slots (with x16 connectors)
  - Two PCIe x8 Ge34, half height, half length slots (1 of these is used for the required base LAN adapter)
- PCIe slots with one processor present:
  - One PCIe x16 Gen4, half height, half length slot
    - This slot can contain CAPI capable card or an I/O drawer interface card
  - One PCIe x8 Gen4, half height, half length slot (with x16 connectors) (CAPI)
  - Two PCIe x8 Gen3, half height, half length slots (with x16 connectors)
  - Two PCIe x8 Gen3, half height, half length slots (1 of these is used for the required base LAN adapter)
- All PCIe slots are concurrently maintainable.
- Four blowers
- A 22L requires two power supplies (AC).

Side-by-side Comparison of ZZ and Tuleta

ZZ VS. TULETA

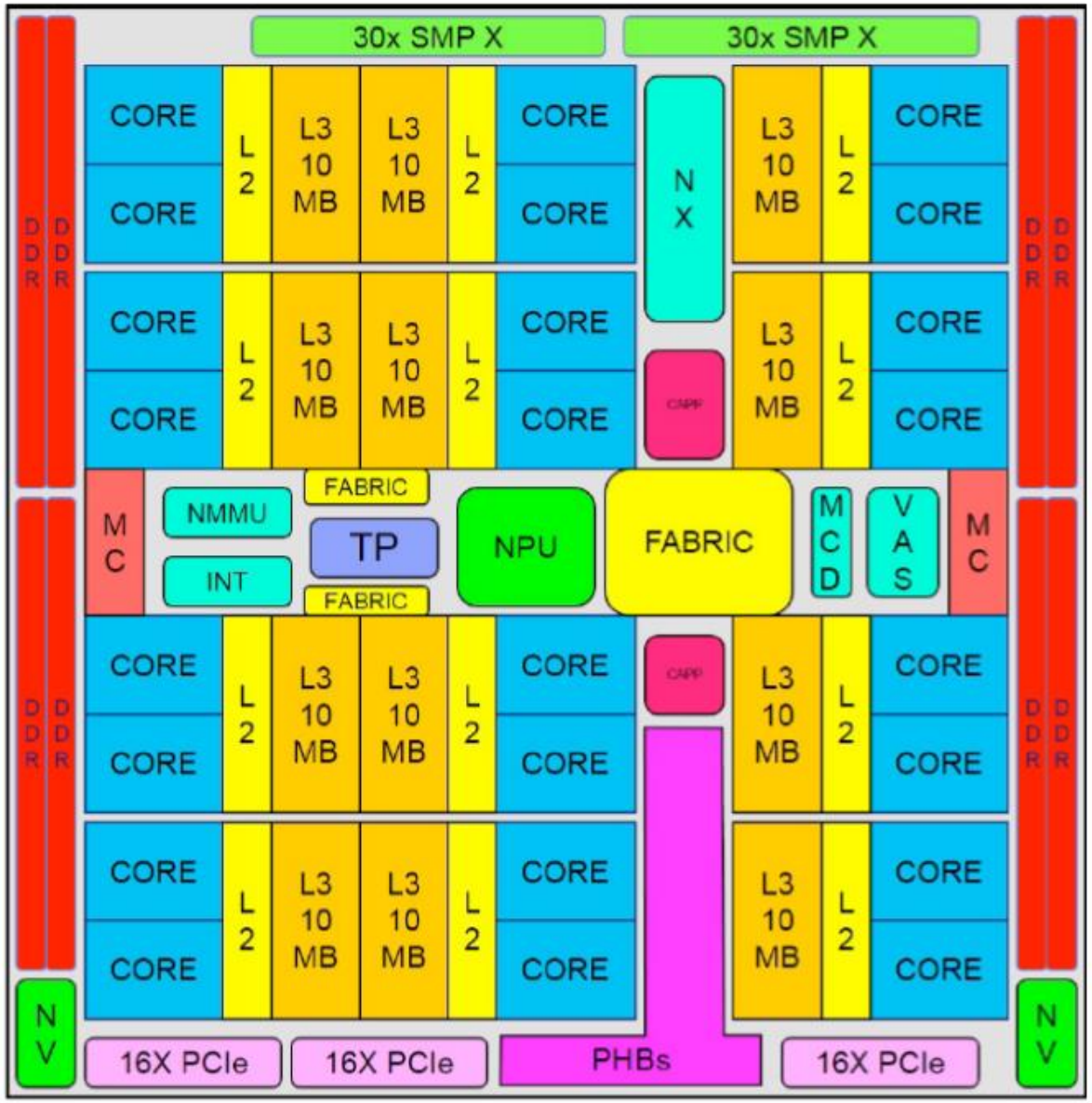
Description	ZZ 2S2U	Tuleta 2S2U
*** Processor & Cache ***		
Processor	2 P9 SCM sockets up to 12 fused cores per socket	2 Murano DCM Sockets up to 12 cores per socket
Pluggable Processor Module	Yes	
Max N-Way	24	
L3 Cache	10MB/core	8MB/core
Threads	8/core	
LPAR max	480	
Capacity on Demand	Available (not offered in entry server)	
*** Memory ***		
Memory Slots & Type	32 IS RDIMM 2133/2400 MHz	16 Centaur DIMM 1600 MHz
DIMM Offerings	IS RDIMM DDR4 8,16,32,64,128GB	CDIMM DDR3 16,32,64GB
Memory Capacity (max)	4TB	1TB
Memory Bandwidth (100% DRAM utilization)	153 GB/s per socket	192 GB/s per socket
Memory Cache	N/A	16MB/buffer
Memory Chipkill	No	Yes
Memory Spare	No	Yes (more spared DRAM)
Memory Mirroring	No	Yes
Memory Compression	Yes	
RA/CIE/UIRA (per field data)	Meets compliance targets	better
Memory Hot-Plug	No	
*** Storage (DAS) ***		
Storage (DAS)	Crocodile Gen2 6Gb SAS	
Storage (DAS default)	JBOD, RAID 0,10,5,6 8 SFF (2.5") HDD/SSD	JBOD, RAID 0,10,5,6 12 SFF (2.5") HDD/SSD

Description	ZZ 2S2U	Tuleta 2S2U
Concurrent Maintenance Cooling Fans	Yes	
CRU/FRU LEDs	Yes	
Op-Panel	Yes, Light Path	
Service Processor	FPS2	
System management Console	Optional	
*** Mechanical Packaging ***		
System Package	Rack Drawer	
Rack Drawer Dimension		427.5W x 86.5H x 747.5D mm
Tower Dimension		
Weight		

Description	ZZ 2S2U	Tuleta 2S2U
Split Disk Feature	Yes (4+4)	Yes (6+6)
Storage High Performance RAID (optional)	Single Controller, Write Cache RAID 0,5,6,10 (High Performance)	Dual Controller, dual Write Cache RAID 0,5,6,10,5T2,6T2,10T2 (High Performance)
	8 SFF (2.5") HDD/SSD	8 SFF (2.5") HDD/SSD and 6 1.8" SSD
	1 SAS 4x port	2 SAS 4x ports
Concurrent Maintenance Disk	Yes / Yes	
DVD Bay	No	1 Slimline
Tape Drive Bay	No	No
*** LAN ***		
LAN (default)	Austin Broadcom 5719 4x1Gb	
		No SRIOV
*** I/O Expansion ***		
I/O Bandwidth (total)	320 GB/s	192 GB/s
PCIe Slots	3 PCIe x16 G4 LP slots 2 PCIe x8 G4 LP slots 2 PCIe x8 G3 LP slots w/ x16 connector 2 PCIe x8 G3 LP slots	4 PCIe x16 G3 LP slots 6 PCIe x8 G3 LP slots
PCIe Concurrent Maintenance	Yes	
CAPI Mode	C8: PCIe x8 G4 slot (1st socket) C9: PCIe x16 G4 slot (1st socket) C3: PCIe x16 G4 slot (2nd socket) C4: PCIe x16 G4 slot (2nd socket)	C7: PCIe x16 G3 slot (1st socket) C3: PCIe x16 G3 slot (2nd socket)
I/O Expansion Slot	3 PCIe x16 G4 slots	4 PCIe x16 slots
Host USB Port	4 USB 3.0	
*** Energy Management ***		
Integrated AEM	OCC (inside P9 Chips)	OCC (inside Murano Chips)
*** Native I/O ***		
FSP Ports	2 HMC, 1 Serial, 2 USB 2.0	
UPS	Via USB 2.0 port	
*** Reliability / Serviceability / Service Management ***		
Redundant Power	Yes	
Concurrent Maintenance Power	Yes	
Redundant Cooling	Yes	

In-depth View of ZZ Systems

ZZ INTERNALS



POWER 9 Processor Block Diagram

ZZ P9 DD2.21 Attributes (v11-Final 12/21/2017)

Model	P9 Cores & Type	P9 Target CLY	Nominal Fixed Freq	Nominal Power	Turbo Freq	Turbo Power	Max Freq	CCIN	Feature Code
ZZ 2S4U - S924 9009-42A (2S or 1S upgradeable) SC w/ BM or KVM	12 BC 10 BC 8 BC 20 SC	50% 70% 50% 70%	2.75 GHz 2.9 GHz 3.3 GHz 2.9 GHz	225W 225W 225W 225W	3.4 GHz 3.5 GHz 3.8 GHz 3.5 GHz	325W 300W 300W 300W	3.9 GHz 3.9 GHz 4.0 GHz 3.9 GHz	5C29 5C25 5C28 TBD	EP1G EP1F EP1E EP1K
ZZ 1S4U - S914 9009-41A (Tower)	6 BC 4 BC	100% 100%	2.3 GHz 2.3 GHz	130W 130W	2.8 GHz 2.8 GHz	160W 160W	3.8 GHz 3.8 GHz	5C23 5C22	EP11 EP10
ZZ 1S4U - S914 9009-41A (Rack)	8 BC 6 BC 4 BC	100% 100% 100%	2.8 GHz 2.3 GHz 2.3 GHz	190W 130W 130W	3.15 GHz 2.8 GHz 2.8 GHz	225W 160W 160W	3.8 GHz 3.8 GHz 3.8 GHz	5C31 5C23 5C22	EP12 EP11 EP10
ZZ 2S2U - S922 9009-22A (2S or 1S upgradeable)	10 BC 8 BC 4 BC	100% 50% 100%	2.5 GHz 3.0 GHz 2.3 GHz	190W 190W 130W	2.9 GHz 3.4 GHz 2.8 GHz	225W 225W 160W	3.8 GHz 3.9 GHz 3.8 GHz	5C24 5C27 5C22	EP19 EP18 EP16
ZZ 2S2U - S922L 9008-22L (2S or 1S upgradeable) with BM or KVM	24 SC 20 SC 16 SC	100% 100% 50%	2.3 GHz 2.5 GHz 3.0 GHz	190W 190W 190W	2.7 GHz 2.9 GHz 3.4 GHz	225W 225W 225W	3.8 GHz 3.8 GHz 3.9 GHz	TBD TBD TBD	ELPS ELPR ELPQ
ZZ 2S2U - S922L 9008-22L (2S or 1S upgradeable) with PowerVM	12 BC 10 BC 8 BC	100% 100% 50%	2.3 GHz 2.5 GHz 3.0 GHz	190W 190W 190W	2.7 GHz 2.9 GHz 3.4 GHz	225W 225W 225W	3.8 GHz 3.8 GHz 3.9 GHz	5C26 5C24 5C27	ELPX ELPW ELPV

POWER 9 Processor Attributes

3.2 IS RDIMM Features

RDIMM Size	DRAM Density	DIMM Physical Rank	DRAM Type	RDIMM Height	Stack DRAM	# DRAM	Data Rate (1 RDIMM per Channel) (Mbps)	Data Rate[1] (2 RDIMMs per Channel) (Mbps)
8GB[1]	4Gb	1Rx4	1.2V	30mm	NA	18	2400	2133
16GB[2]	4Gb	2Rx4	1.2V	30mm	NA	36	2400	2133
16GB	8Gb	1Rx4	1.2V	30mm	NA	18	2400	2133
32GB	8Gb	2Rx4	1.2V	30mm	NA	36	2400	2133
64GB	8Gb	2Rx4	1.2V	30mm	2H 3DS	36	2400	2133
128GB	8Gb	2Rx4	1.2V	30mm	4H 3DS	36	2400	2133

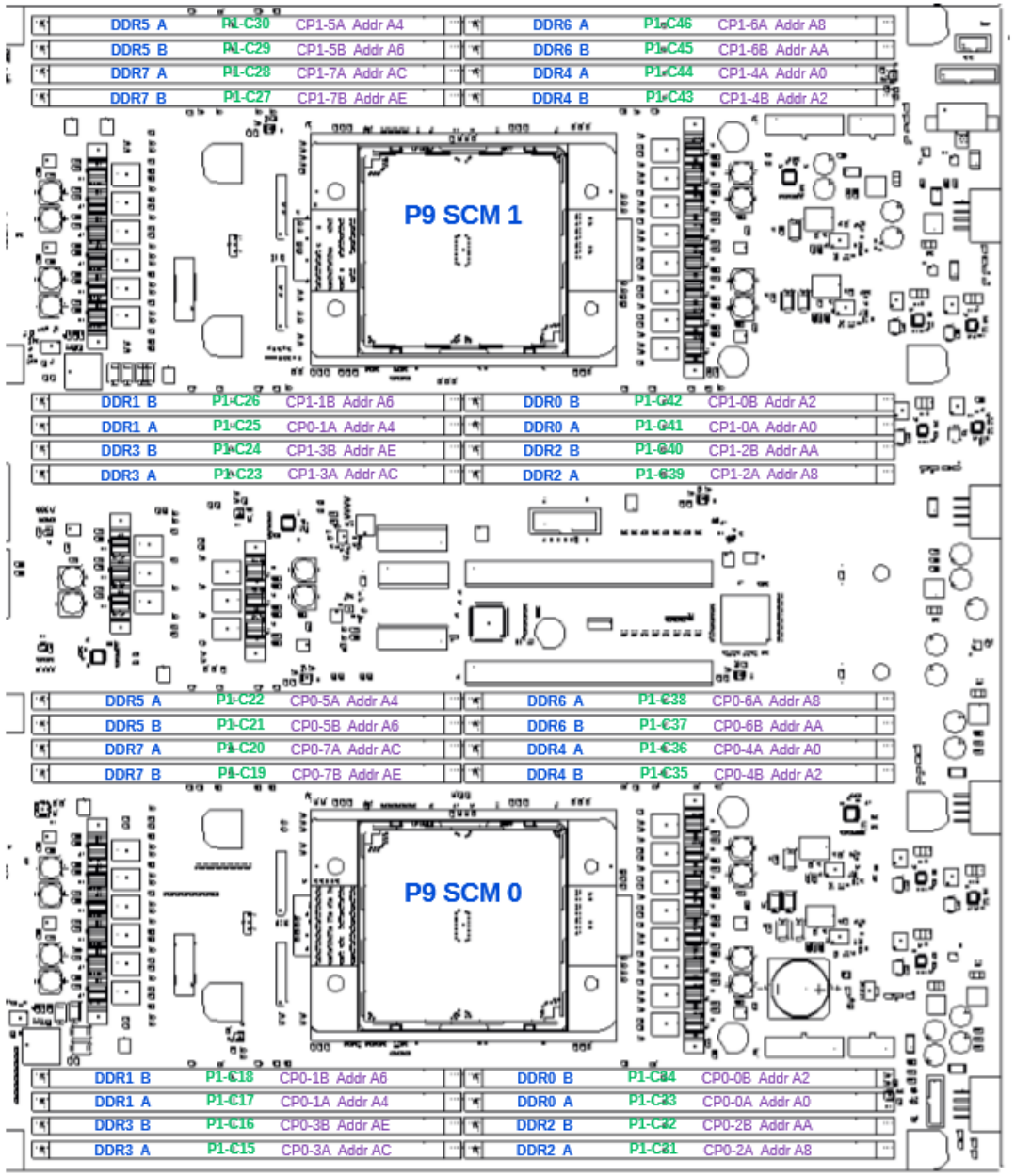
3.3 Minimum Memory Mainstore

ZZ 1S4U	ZZ 2S4U	ZZ 2S4U w/ 1 Socket Populated	ZZ 2S2U w/ 1 Socket Populated	ZZ 2S2U	ZZ-L 2S2U w/ 1 Socket Populated	ZZ-L 2S2U
2x8 GB	4x8 GB	2x8 GB	2x8 GB	4x8 GB	2x8 GB	4x8 GB

ISDIMM Configurations

DIMM Layout on Gibbons Planar

REAR



FRONT

Memory DIMM Ordering/Plugging Rules

- A 22A/22H and 22L with two processors installed has 32 available DIMM slots.

General DIMM placement rules are listed as follows:

- Each 22L and 22A/22H DIMM feature code equates to a single physical DIMM.

- Model 22L and 22A/22H
  - ❑ All 22A/22H and 22L memory features must be ordered in even quantities.
  - ❑ All physical DIMMs must be placed/installed in pairs (DIMM pairs).

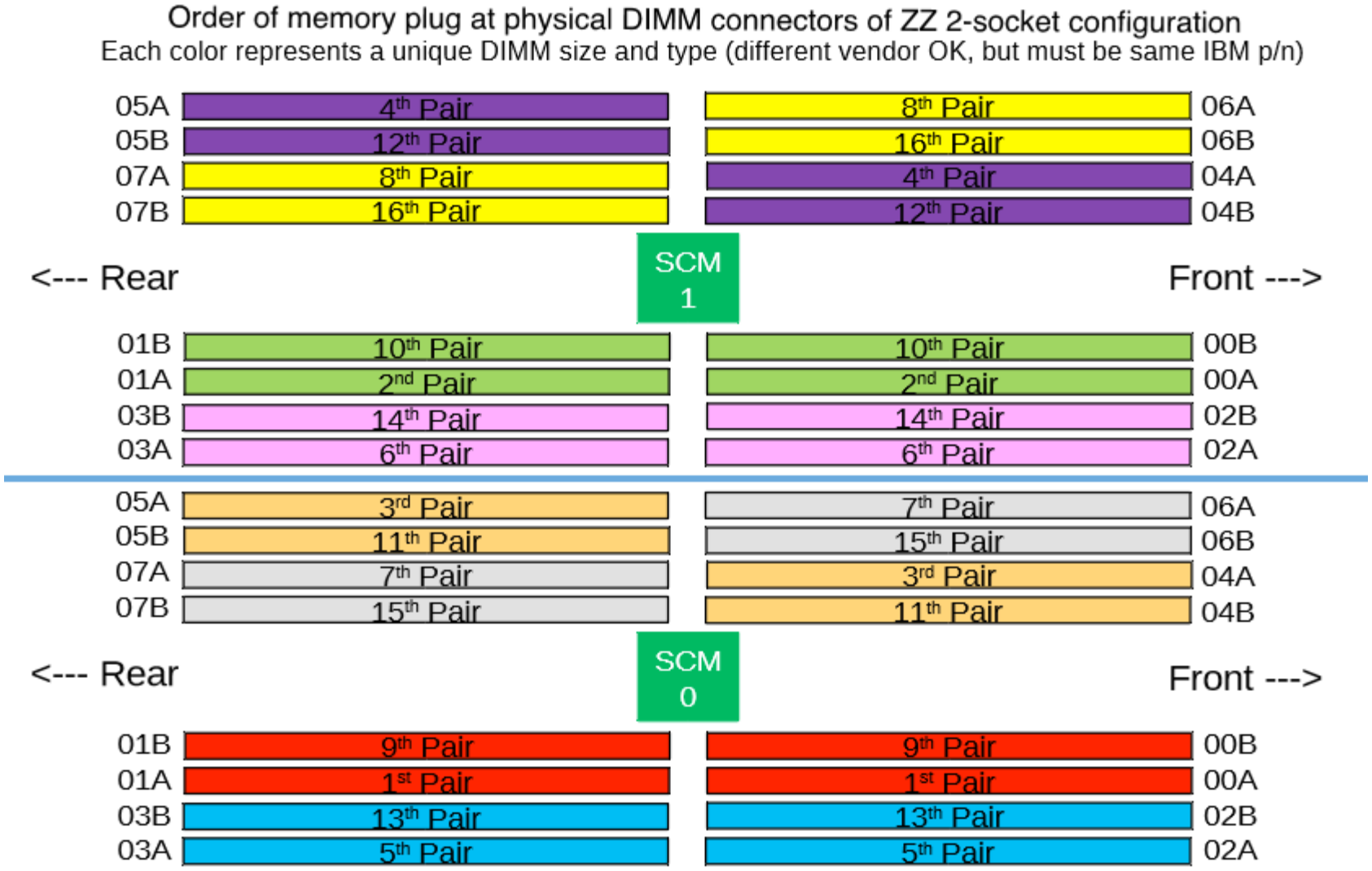
- Each DIMM within a DIMM pair must be of the same capacity and same type.

- There ARE DIMM quading placement rules for the 22L or the 22A/22H.

- No mixing of 1R DIMMs and 2R DIMMs on single drop within a MCU Group because they run at different DIMM data rates.

- Supported DIMM plug orders of each P9 SCM module are 2, 4, 6, 8, 12, 16. Note: No support of 10 and 14 DIMMs behind each P9 SCM module

Memory DIMM Ordering/Plugging Rules (2S2U)



ZZ Storage Options

Features	ZZ 1S4U & 2S4U	ZZ 2S2U	Use Case
Storage (OS Boot)	1 or 2 NVMe SSD card (2 M.2 modules on each card)	1 or 2 NVMe SSD card (2 M.2 modules on each card)	OS Boot (AIX & Linux)
Storage	1 Solstice Crocodile 6Gb adapter JBOD, RAID 0,5,6,10	1 Solstice Crocodile 6Gb adapter JBOD, RAID 0,5,6,10	Low cost RAID for OS or OS and local data
	12 SFF bays + 1 RDX bay (Deguello backplane)	8 SFF bays (Fandango backplane)	
Storage – split	2 Solstice Crocodile 6Gb adapters JBOD, RAID 0,5,6,10	2 Solstice Crocodile 6Gb adapters JBOD, RAID 0,5,6,10	Redundant OS, dual partitions with or without an external storage system for large remote data
	6+6 SFF bays + 1 RDX bay (Deguello backplane)	4+4 SFF bays (Fandango backplane)	
Storage – high function	2 GXP Crocodile 6Gb adapters RAID 0,5,6,10,5T2,6T2,10T2 + 2 ext SAS ports	1 Coupe Crocodile 6Gb adapter RAID 0,5,6,10 + 1 ext SAS port	4U: local data resilience and high availability with easy tier RAID arrays
	18 SFF bays (Eliminator backplane)	8 SFF bays (Fandango backplane)	
Storage – high function w/ RDX	2 GXP Crocodile 6Gb adapters RAID 0,5,6,10,5T2,6T2,10T2 + 2 ext SAS ports	n/a	
	12 SFF bays + 1 RDX bay (Antenna backplane)	n/a	

- Resilience & high availability
- An internal RDX drive option in 4U provides local data backup for IBM i customers
  - ✓ the RDX drive utilizes one of the USB3.0 ports from the Gibbons-embedded USB3.0 controller.
- Reuse Tuleta 6Gb RAID adapters
  - ✓ NOTE: Coupe single cache single controller RAID feature. Linux support is at GA1 2/2018. AIX support at GA2 9/2018. No IBM i support.

Default Storage Using Solstice RAID Adapter

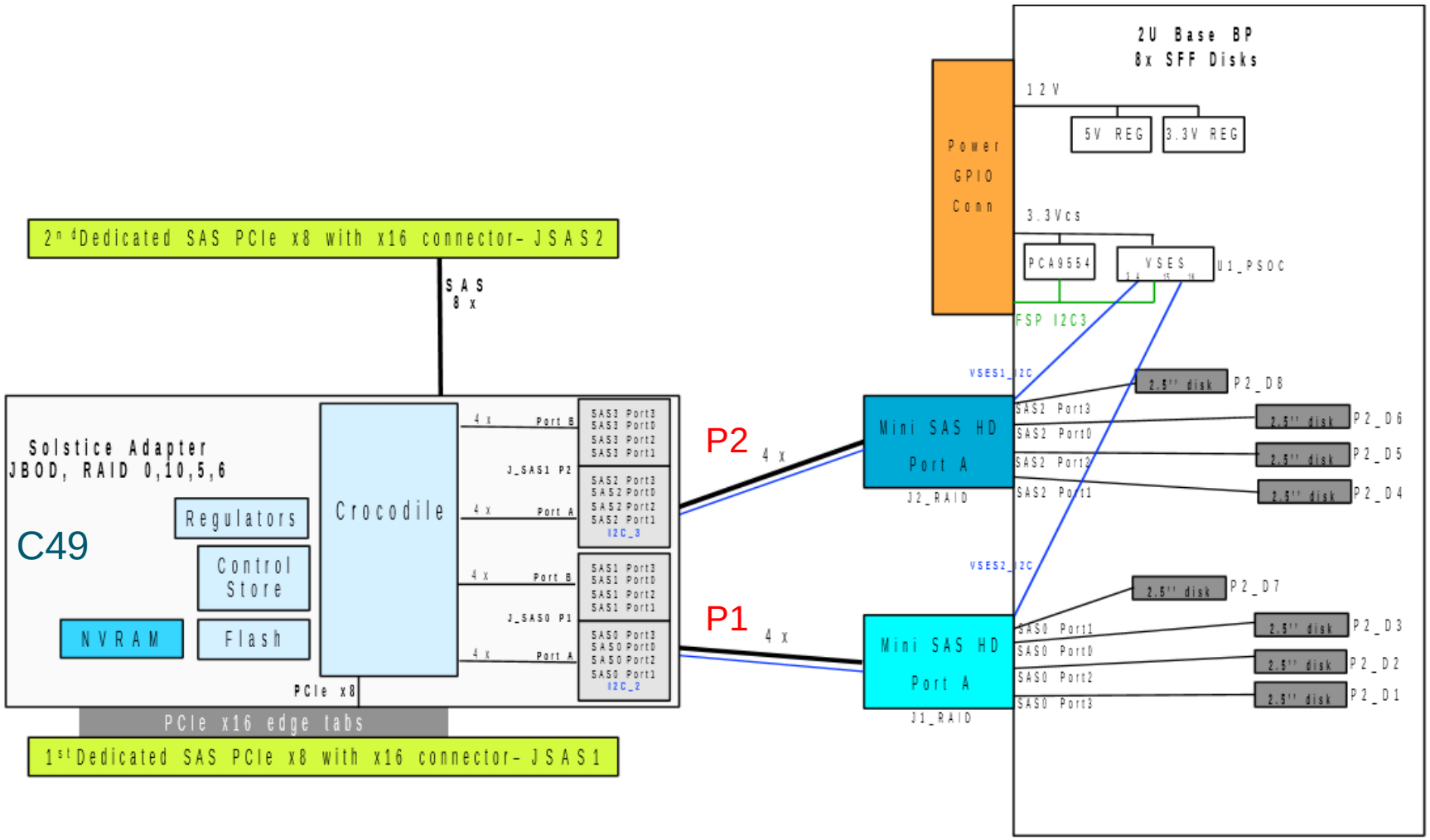


Illustration 32: ZZ 2U Default Storage Feature Using the Solstice Adapter

- One Solstice Crocodile 6Gb JBOD & RAID 0,10,5,6 adapter
- One Fandango default disk backplane which supports 8x SFF (2.5") bays
- Two 8x miniSAS HD cables

Note: The PSOC module on the Fandango backplane is segmented into three parts:

- Slot map information #1
- Slot map information #2
- FRU VPD

Split Disk 4+4 Feature using Solstice Adapters

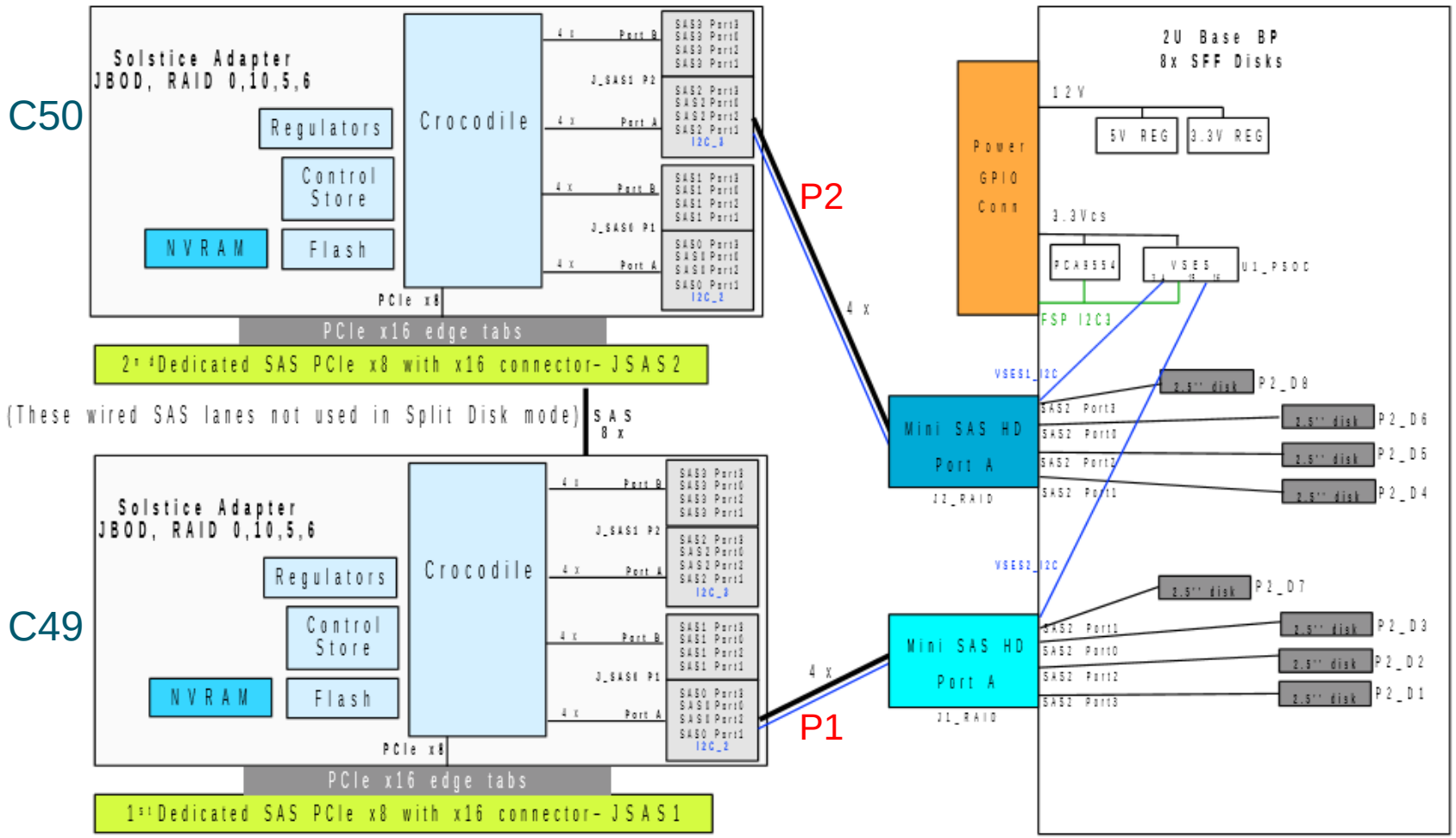


Illustration 35: ZZ 2U Split Disk 4+4 Feature Using the Solstice Adapter

- Two Solstice Crocodile 6Gb RAID adapters
- One Fandango default disk backplane which supports 8x SFF (2.5") bays
- Two 8x miniSAS HD cables

Note: The PSOC module on the Fandango backplane is segmented into three parts:

- Slot map information #1
- Slot map information #2
- FRU VPD

High Performance RAID 0, 5, 6, 10, 5T2, 6T2, 10T2 Using Coupe

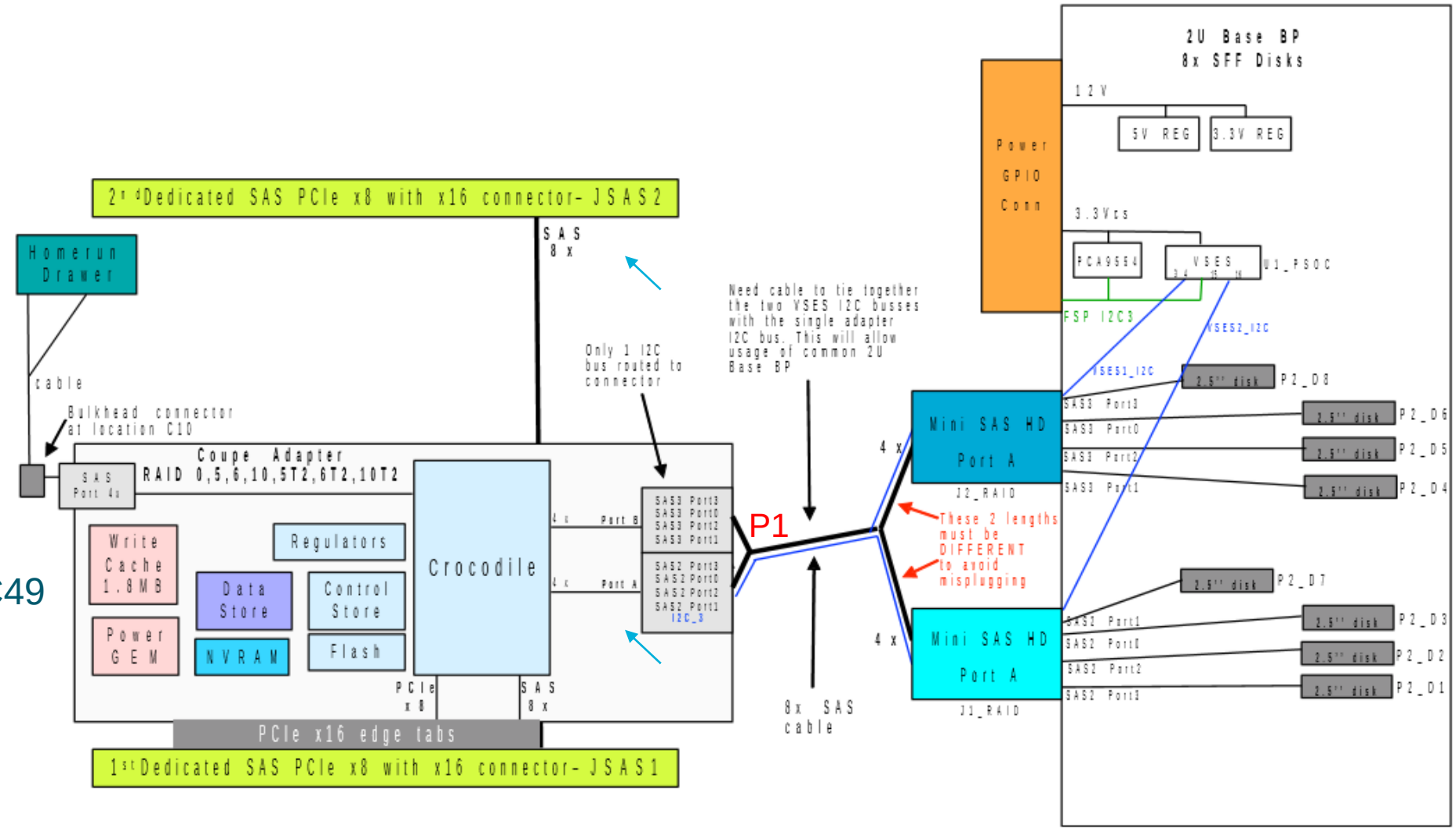
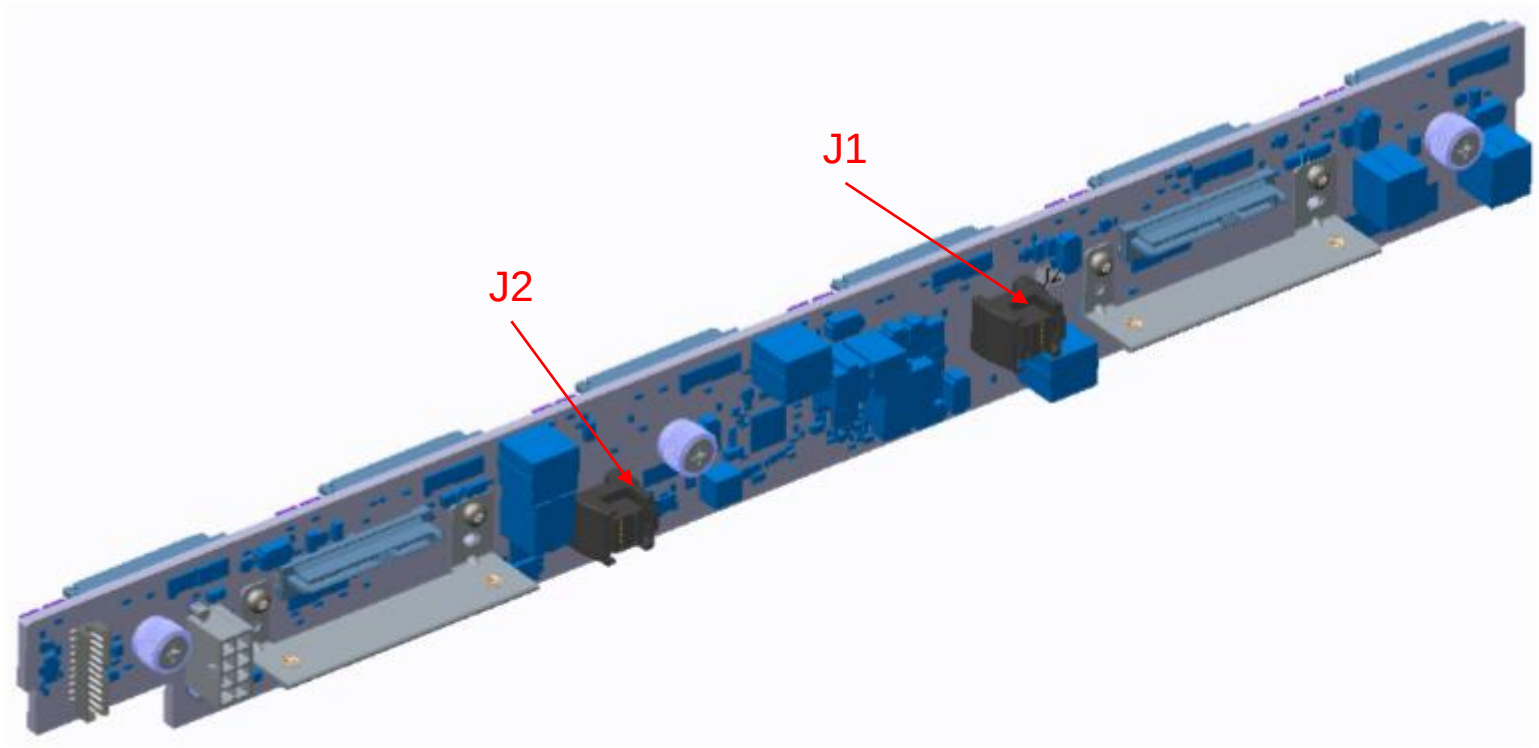
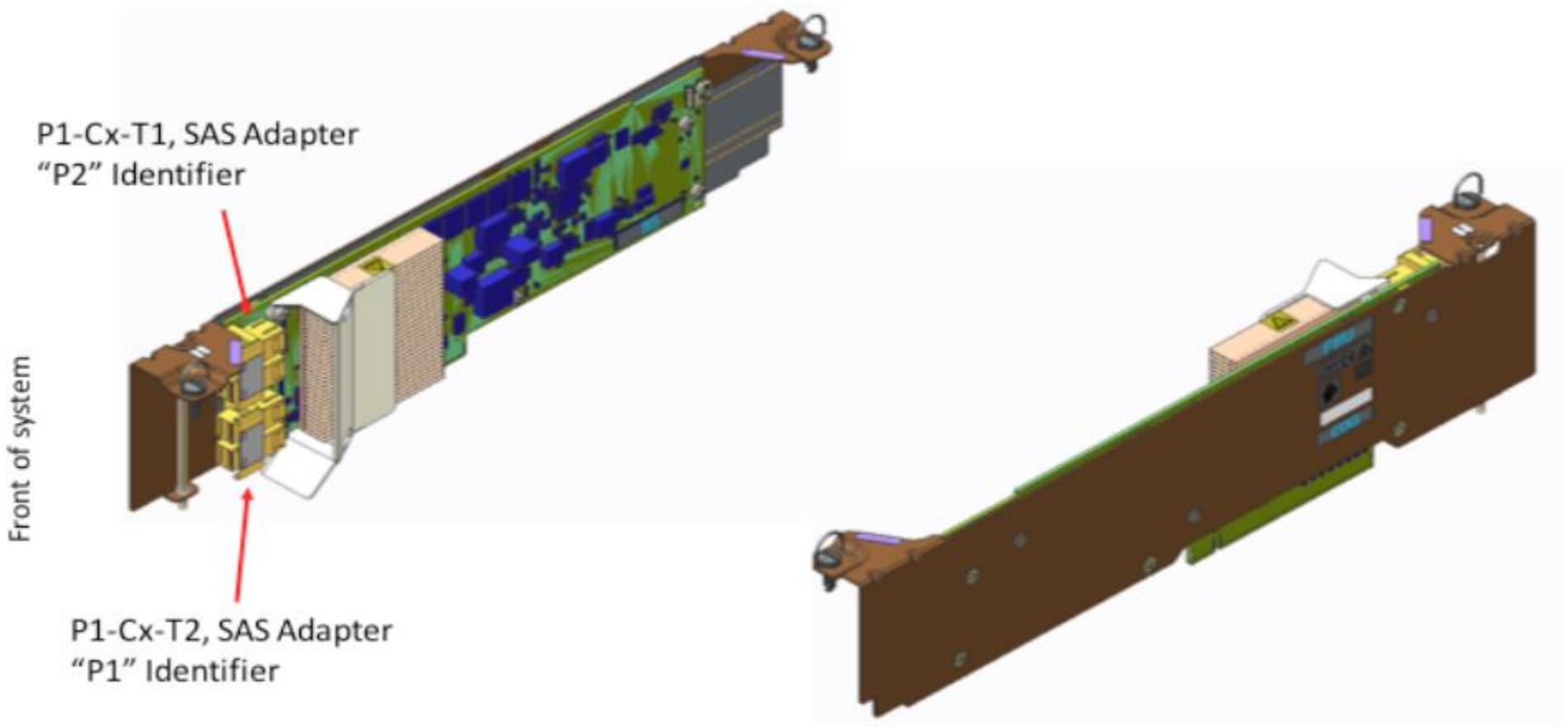


Illustration 36: ZZ 2U High Performance RAID Feature Using the Coupe Adapter

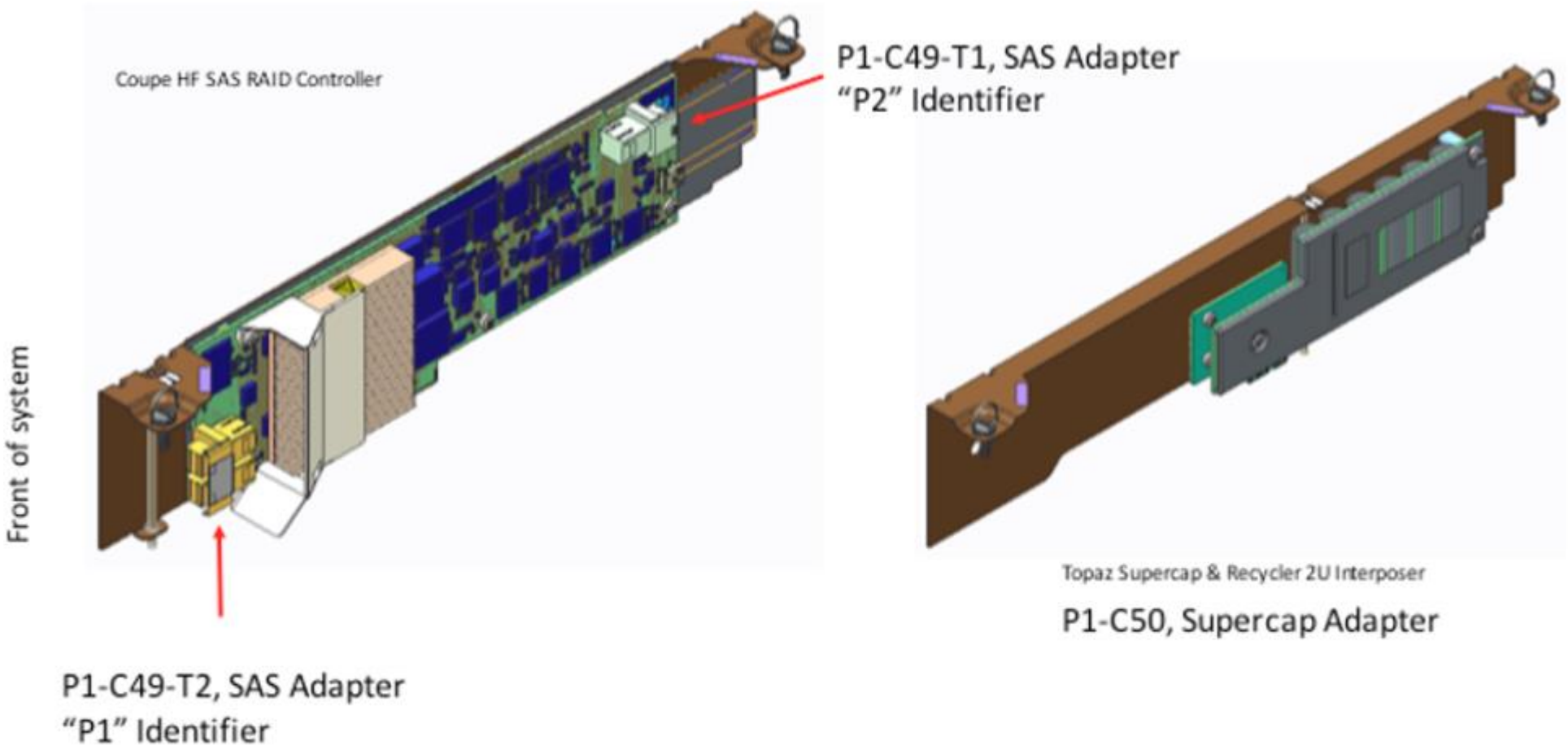
- One Coupe Crocodile high performance 6Gb RAID 0,5,6,10 adapter
- One Fandango default disk backplane which supports 8x SFF (2.5") bays
- One 8x miniSAS HD cables



Fandango DASD Backplane



Solstice Adapter



Coupe (Left) and Topaz SuperCap (Right) Cards

ZZ 2U IO Slot Attributes

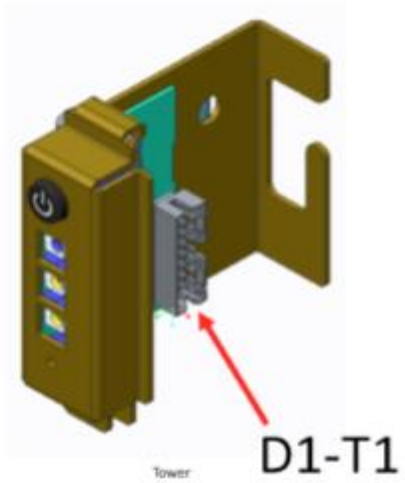
Special IO Cards

- After_Burner & El_Loco cards are for connection to external accelerato module in MEX Drawer
- Bear Paw (double-wide) card is for connection to external IO module in MEX Drawer

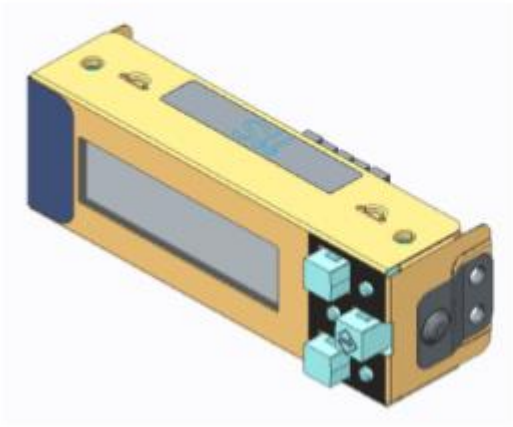
System	IO Slot	Property	Card Size	Power & Thermal Capability	Special Card Capable
1S & 2S	C1	FSP card			
2S only	C2	PCIe G4 x8 with x16C	Low Profile	55W	After Burner card OpenCAPI adapter
2S only	C3	PCIe G4 x16 or 2x8	Low Profile	75W	El Loco card GPU adapter PCIe CAPI adapter OpenCAPI adapter
2S only	C4	PCIe G4 x16	Low Profile	75W	GPU adapter PCIe CAPI adapter Bear Paw (double-wide) card
1S & 2S	C5	Not applicable			
1S & 2S	C6	PCIe G3 x8 with x16C	Low Profile	25W	El Loco card
1S & 2S	C7	PCIe G3 x8	Low Profile	60W	After Burner card OpenCAPI adapter
1S & 2S	C8	PCIe G4 x8 with x16C	Low Profile	55W	PCIe CAPI adapter
1S & 2S	C9	PCIe G4 x16	Low Profile	75W	GPU adapter PCIe CAPI adapter OpenCAPI adapter Bear Paw (double-wide) card
1S & 2S	C10	Not applicable			
1S & 2S	C11	PCIe G3 x8	Low Profile	25W	
1S & 2S	C12	PCIe G3 x8 with x16C	Low Profile	60W	

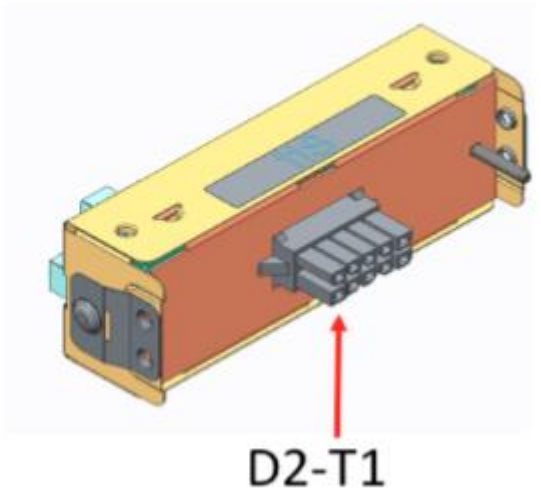
Dusty and Hill Cards (Op-Panel and LCD)

Dusty Op Panel (D1)

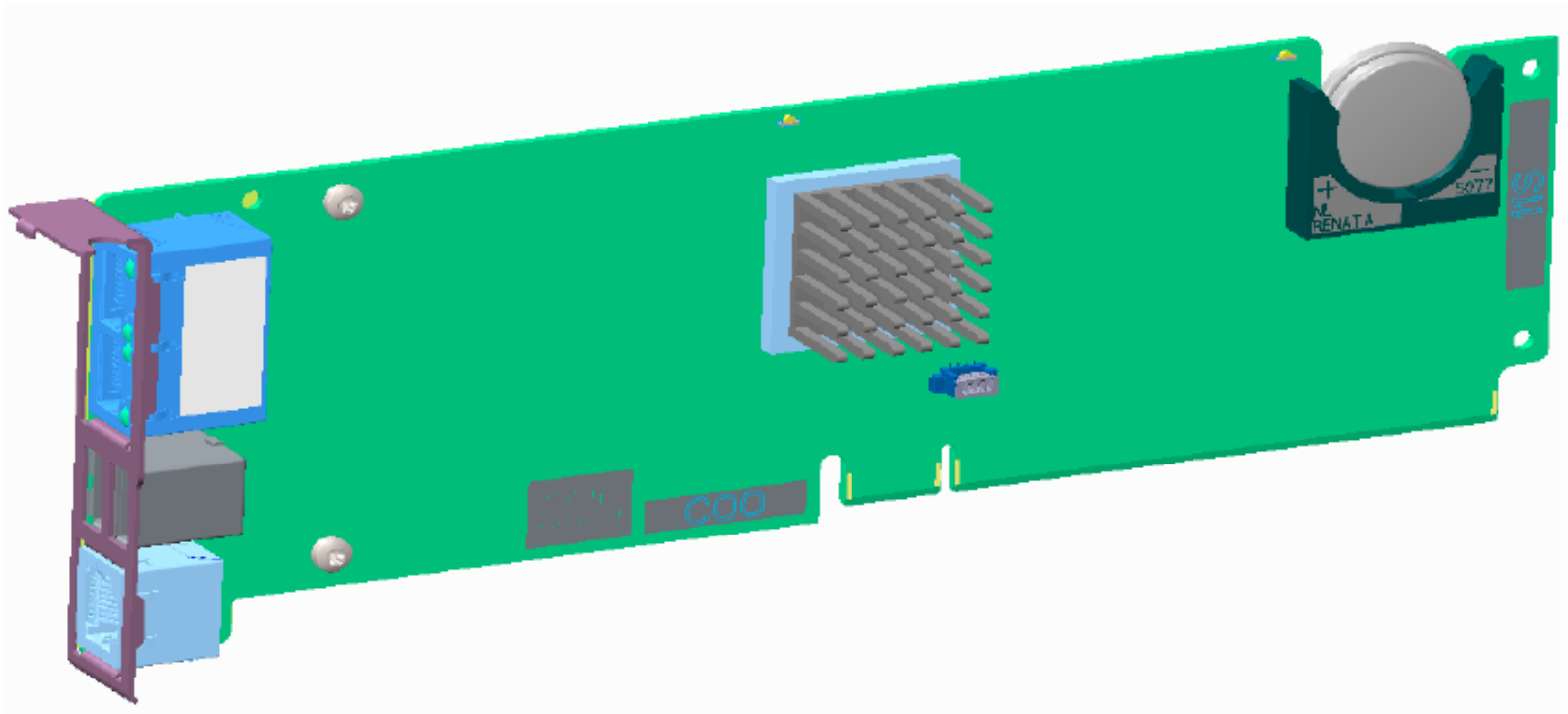


Hill LCD (D2)

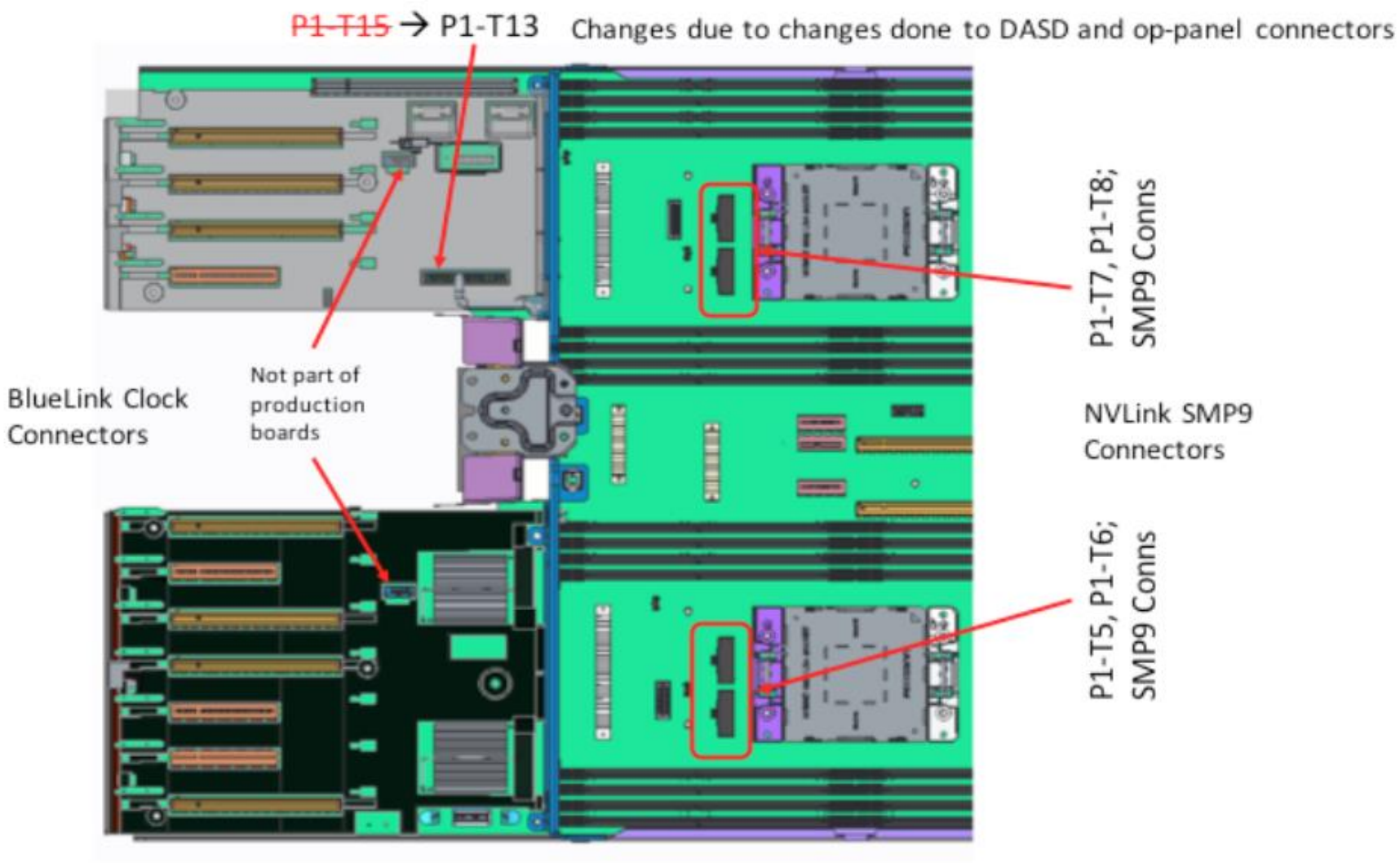




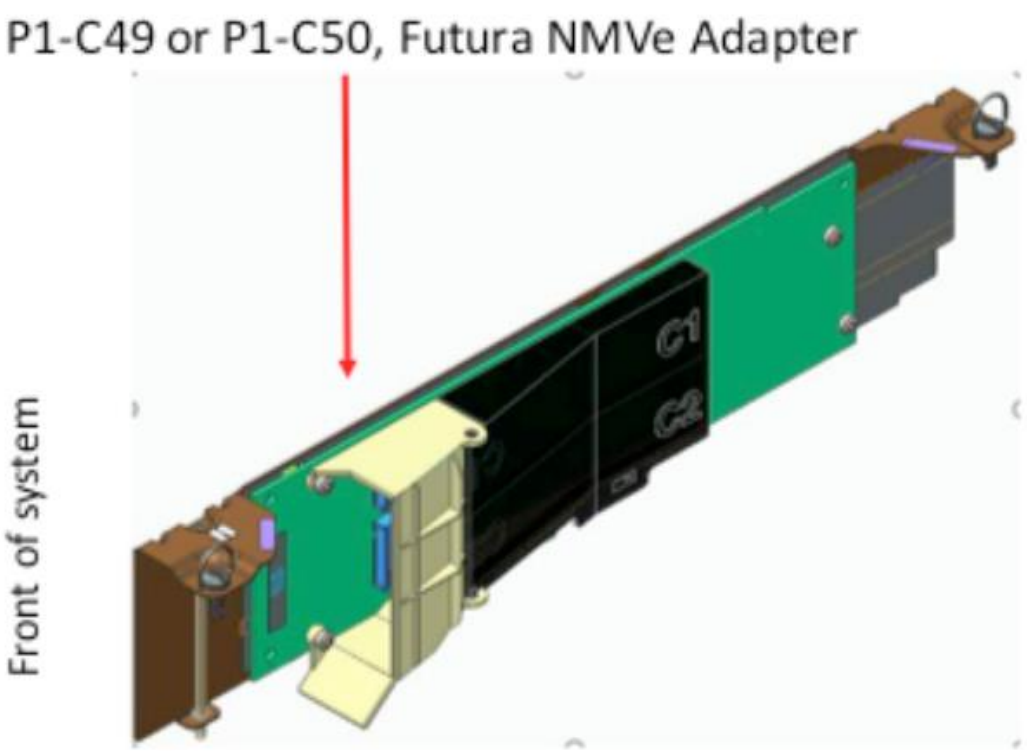
Beard (FSP) Card

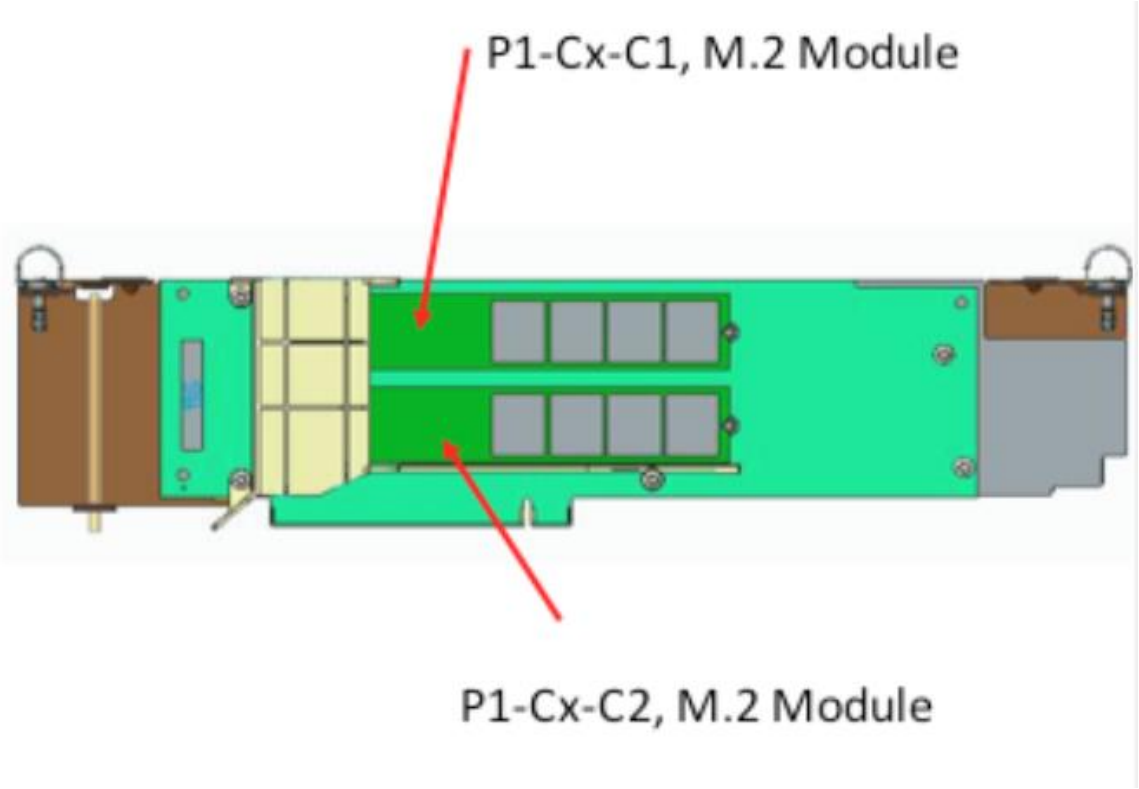


NVLink / SMP Connectors



Futura (NVMe) Adapter





END