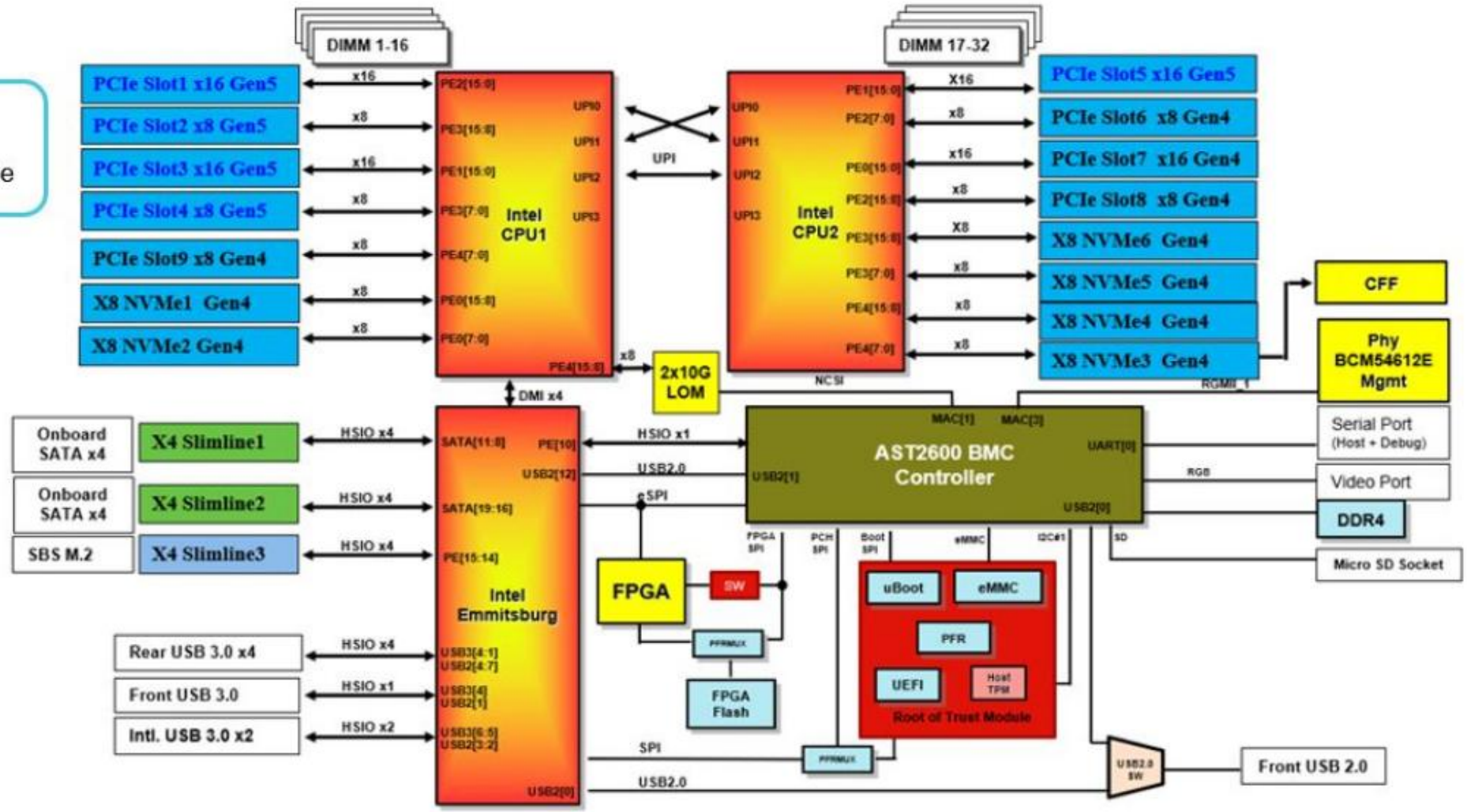
System configurations and diagrams

The ST650 V3 system block diagram and hardware configurations

Lenovo

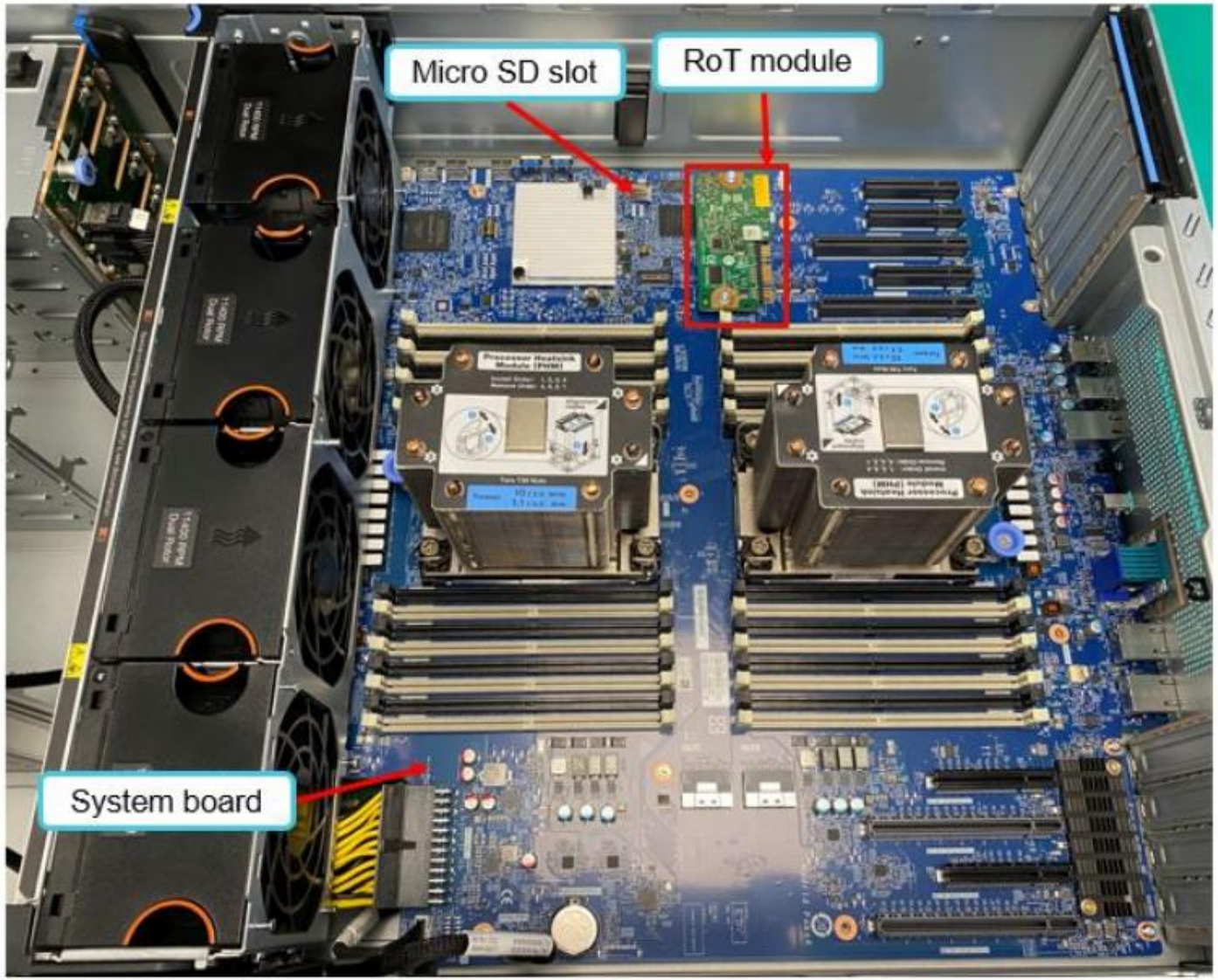
ST650 V3 system block diagram

- To use PCIe slots 5 to 8, CPU2 is required
- Only PCIe slots 1 to 5 support PCIe 5.0



Firmware and Root of Trust security module

The ST650 V3 supports the firmware and Root of Trust security module (RoT module), and it is installed on the system board.
Unlike other ThinkSystem V3 platforms, the ST650 V3 has no system I/O board. The system I/O functions and Micro SD slot are embedded on the system board.



Memory configuration

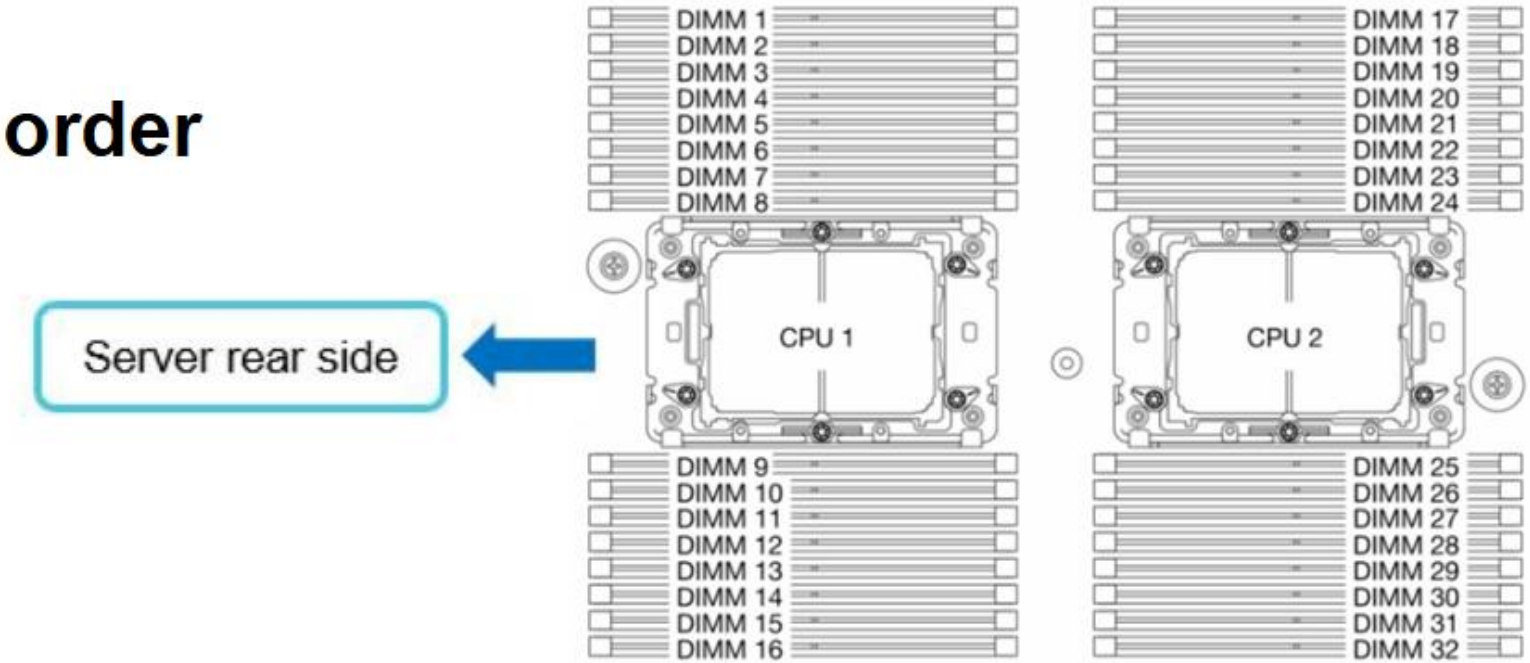
The ST650 V3 supports 16 DIMMs per processor. Each processor has eight memory channels with two DIMMs per channel (2DPC). There is support for 1DPC at 4800 MHZ and 2DPC at 4400 MHZ.

The ST650 V3 supports two memory modes:

- Independent memory m[No Title]
- Memory mirroring mode

Note: For detailed memory configuration and installation rules, refer to the Memory module installation rules and order section of the ST650 V3 User Guide.

Memory installation order



		CPU1																CPU2													
		iMC3				iMC2				iMC0				iMC1				iMC3				iMC2				iMC0				iMC1			
		CH1 (7/H)		CH0 (6/G)		CH1 (5/F)		CH0 (4/E)		CH0 (0/A)		CH1 (1/B)		CH0 (2/C)		CH1 (3/D)		CH1 (7/H)		CH0 (6/G)		CH1 (5/F)		CH0 (4/E)		CH0 (0/A)		CH1 (1/B)		CH0 (2/C)		CH1 (3/D)	
		DIMM1	DIMM2	DIMM3	DIMM4	DIMM5	DIMM6	DIMM7	DIMM8	DIMM9	DIMM10	DIMM11	DIMM12	DIMM13	DIMM14	DIMM15	DIMM16	DIMM32	DIMM31	DIMM30	DIMM29	DIMM28	DIMM27	DIMM26	DIMM25	DIMM24	DIMM23	DIMM22	DIMM21	DIMM20	DIMM19	DIMM18	DIMM17
Mode	CPU	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot	Slot
Independent	1										DDR5																						
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Independent	2										DDR5																DDR5						
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Independent	2	DDR5		DDR5		DDR5		DDR5			DDR5		DDR5		DDR5		DDR5	DDR5		DDR5		DDR5		DDR5			DDR5		DDR5			DDR5
Independent	2	DDR5		DDR5	DDR5	DDR5		DDR5	DDR5	DDR5	DDR5		DDR5	DDR5	DDR5		DDR5	DDR5		DDR5	DDR5	DDR5		DDR5	DDR5	DDR5		DDR5	DDR5	DDR5		DDR5
Independent	2	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5
Mirroring	1	DDR5		DDR5		DDR5		DDR5			DDR5		DDR5		DDR5		DDR5																
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Mirroring	2	DDR5		DDR5		DDR5		DDR5			DDR5		DDR5		DDR5		DDR5	DDR5		DDR5		DDR5		DDR5			DDR5		DDR5			
Mirroring	2	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	

Storage configuration

The ST650 V3 supports the following storage devices: SAS, SATA, NVMe, M.2, optical drives, and tape drives. There are limitations to storage combinations due to thermal design considerations. For detailed information about drive bay combinations, refer to the Supported drive bay combinations section of the ST650 V3 product guide on Lenovo Press.

2.5-inch hot-swap:
- ThinkSystem ST650 V2 2.5-inch SAS/SATA 8-Bay backplane kit
- ThinkSystem ST650 V2 2.5-inch AnyBay 8-Bay backplane kit
- ThinkSystem ST650 V2 2.5-inch NVMe 8-Bay backplane kit

3.5-inch hot-swap:
- ThinkSystem ST650 V2 3.5-inch SAS/SATA 4-Bay backplane kit
- ThinkSystem ST650 V2 3.5-inch AnyBay 4-Bay backplane kit
- ThinkSystem ST650 V2 3.5-inch NVMe 4-Bay backplane kit

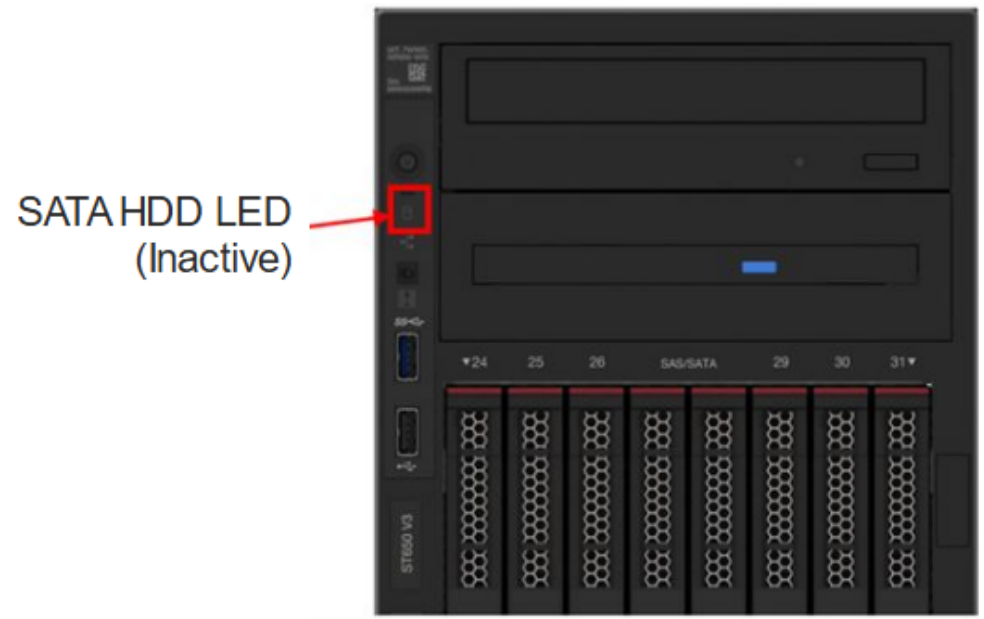
Note: The 3.5-inch simple-swap drive and drive backplate are not supported.

System configuration limitations

The ST650 V3 has the following system configuration limitations:

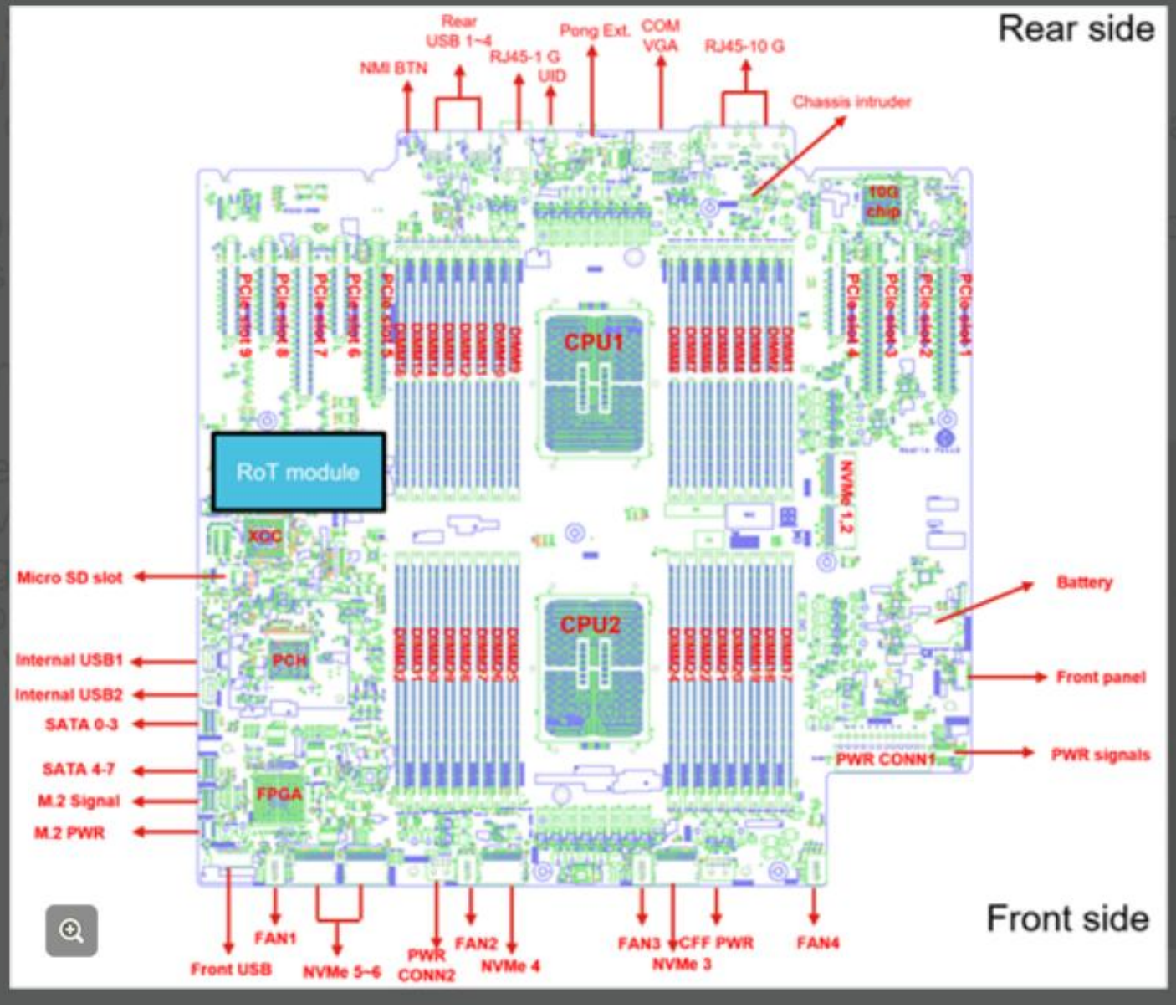
- Due to thermal limitations, CPUs can have a maximum TDP of 250 W.
- NVMe connectors 1 and 2 can only connect to BP3 and 4, and NVMe drives only support a maximum of Gen4 speeds.
- The CFF RAID card can only be connected to NVMe 2 of CPU0 or NVMe3 of CPU1. If it is connected to CPU0, the CFF card only can support up to Gen3 speeds.
  - Click the button for the connector locations **System board connectors**

- The HDD numbering sequence works from the chassis bottom to the top. However, NVMe installation works from the top to the bottom due to signal quality limitations.
- The SATA HDD LED on the front operator panel is not functional because the ST650 V3 doesn't support a simple-swap drive configuration.



System configuration limitations

System board connectors



GPU adapter installation limitations

- When a GPU (RTX A6000/A4500/A2000) is installed in zone 1, the internal RAID/HBA/Retimer adapter cannot be installed in slot 1, 2, 3, or 4
- When a GPU (RTX A6000/A4500/A2000) is installed in zone 2, the internal RAID/HBA/Retimer adapter cannot be installed in slot 5, 6, 7, or 8
- No support for mixed GPUs in the same zone (zone 1 = slots 1 to 4, zone 2 = slots 5 to 8).
- When an Nvidia A2/L4 GPU is installed in either zone, each of the remaining slots in that zone can only be used for low profile PCIe adapters. This is because the A2/L4 GPU air duct leaves no space for FHFL adapters.