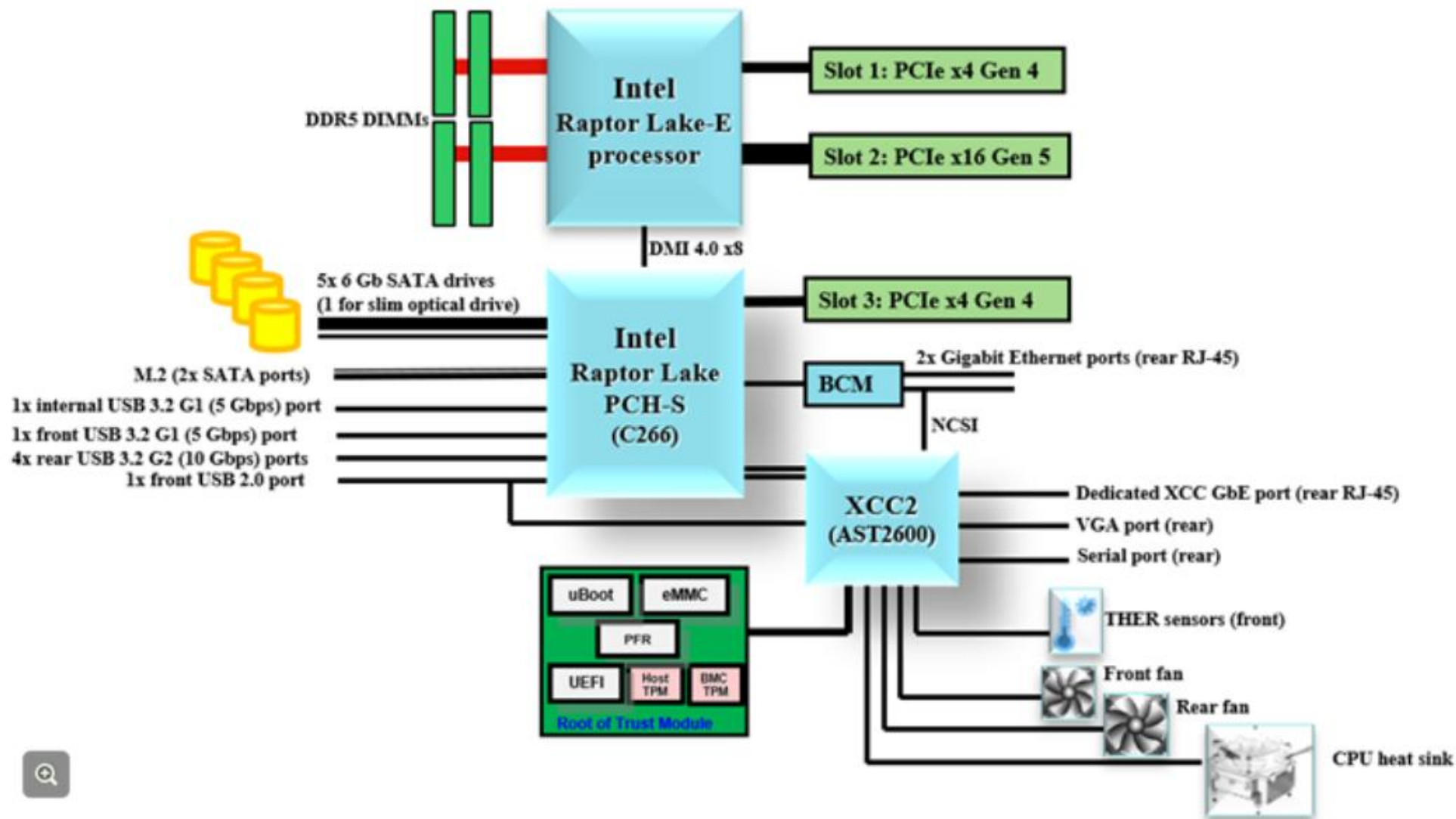# System configurations and diagrams
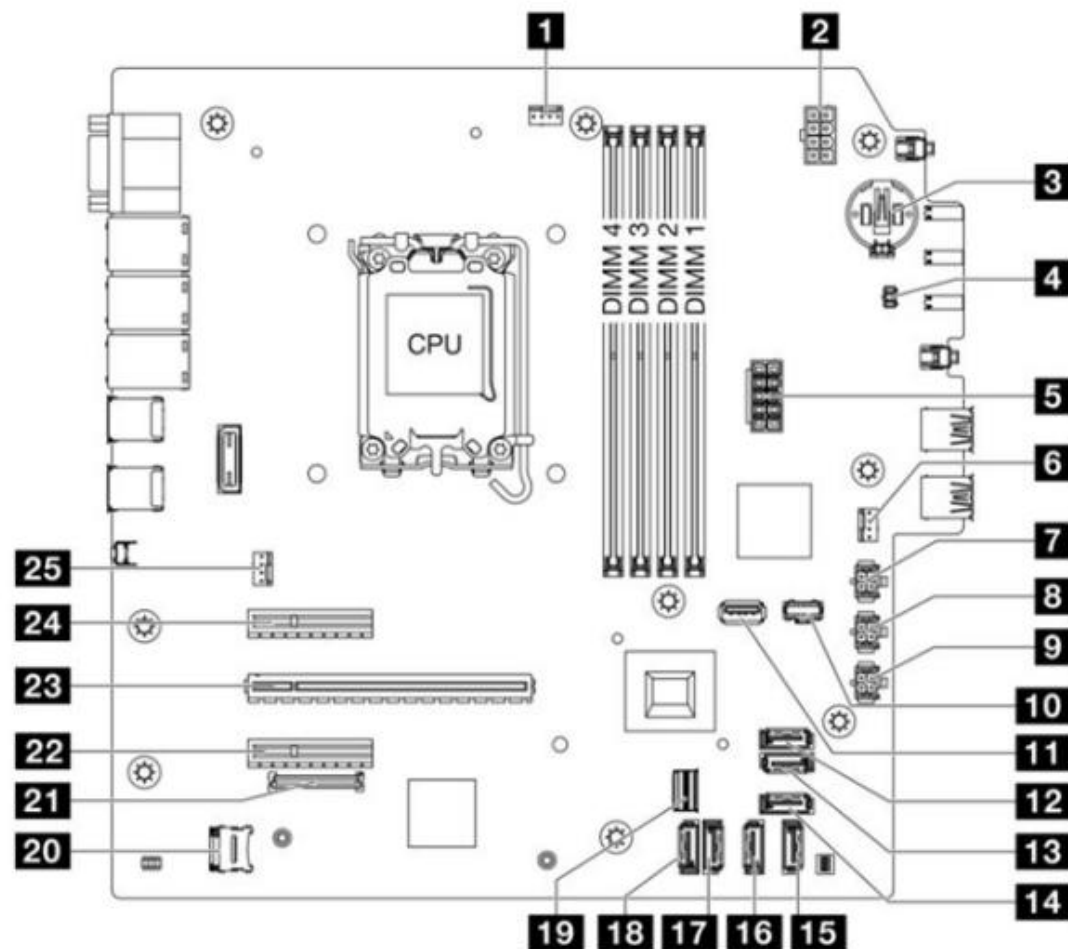
Block diagrams and hardware configurations

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System block diagram – planar

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# System board connectors

1	Processor fan connector
2	Processor power connector
3	3V battery (CR2032)
4	Intrusion switch connector
5	System power connector
6	Front fan connector
7	SATA power 3 connector
8	SATA power 2 connector
9	SATA power 1 connector
10	M.2 power connector
11	USB 3.2 Gen 1 connector
12	SATA 7 connector (M.2 kit)
13	SATA 6 connector (M.2 kit)
14	SATA 4 connector (Slim ODD)
15	SATA 3 connector (Bay 3)
16	SATA 2 connector (Bay 2)
17	SATA 1 connector (Bay 1)
18	SATA 0 connector (Bay 0)
19	M.2 slimline connector
20	Micro SD socket
21	Firmware and RoT security module connector
22	PCIe slot 3
23	PCIe slot 2
24	PCIe slot 1
25	Rear fan connector

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Minimum system configuration

The minimum configuration required for the system to start is as follows:
- One processor and one processor cooling heat sink
- One 16 GB ECC UDIMM in DIMM slot 3
- One power supply
- One 3.5-inch SATA drive in drive bay 0 (if the OS is installed)
- One system front fan

Memory mapping and configuration
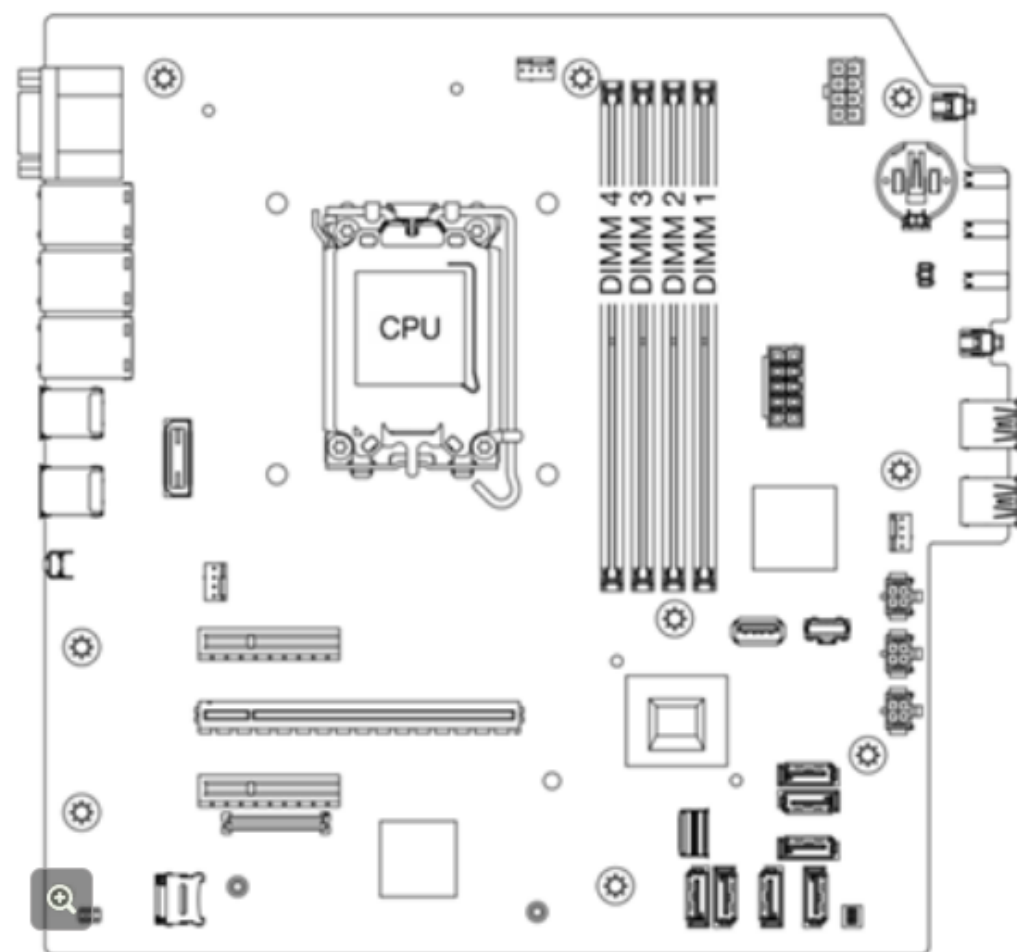
Refer to the table below for the memory population sequence.

Total memory module installed	Memory module slot number				Memory speed
	4	3	2	1	
One		√			1R: 4400 MHz
Two		√		√	2R: 4400 MHz
Three	√	√		√	1R: 4000 MHz
Four	√	√	√	√	2R: 3600 MHz

Note:
1. The following memory modules are supported:
   - TruDDR5 4800 MHz ECC UDIMM: 16 GB (1Rx8)
   - TruDDR5 4800 MHz ECC UDIMM: 32 GB (2Rx8)

   Non-ECC UDIMMs, VLP DDR5 UDIMMs, RDIMMs, 3DS-RDIMMs, LRDIMMs, DCPMMs, and MCRDIMMs are not supported.
2. Mixing single-rank (1R) and dual-rank (2R) memory modules in the same system is supported, but they will run at 2000 MHz

Storage and RAID support

The ST50 V3 supports the following internal storage adapters:
- PCH – AHCI mode
- PCH – Intel VRoC SW RAID mode (supports RAID level 0, 1, and 5)
- ThinkSystem 4350-8i SAS/SATA 12Gb HBA
- ThinkSystem RAID 5350-8i PCIe 12Gb Adapter (supports RAID level 0, 1, and 5)

RAID level	Controller	Minimum drives	Hot spare support	Remark
0	SW or HW RAID	2-3	No	3.5-inch simple-swap SSD or SATA HDD (drive bays 0, 2 and 3)
1	SW or HW RAID	2	No	3.5-inch simple-swap SSD or SATA HDD (drive bays 0, 2 and 3)
5	SW or HW RAID	3	No	3.5-inch simple-swap SSD or SATA HDD (drive bays 0, 2 and 3)
Non-RAID	Onboard SATA or HBA	1-4	No	AHCI mode or HBA

For more information about how to set up VROC, refer to the following course:
ES51780C – Servicing ThinkSystem storage controllers.

Note: The ST50 V3 supports SATA drives only. SAS and NVMe drives are not supported.

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System limitations - 1

- When an ST50 V3 has a second 3.5-inch drive cage (drive bay 2) and/or an M.2 adapter (drive bay 3), a rear system 9225 fan or 95 W L-shaped heat sink fan (if the processor TDP exceeds 80 W) must be installed in the system.
- The 95 W L-shaped heat sink fan and the rear system 9225 fan are mutually exclusive, as they would both occupy the same rear fan assembly location.

Rear system 9225 fan
(CPU TDP <= 80 W)

95 W heat sink fan
(CPU TDP > 80 W)

A drive in drive bay 2
and/or an M.2 adapter
in drive bay 3
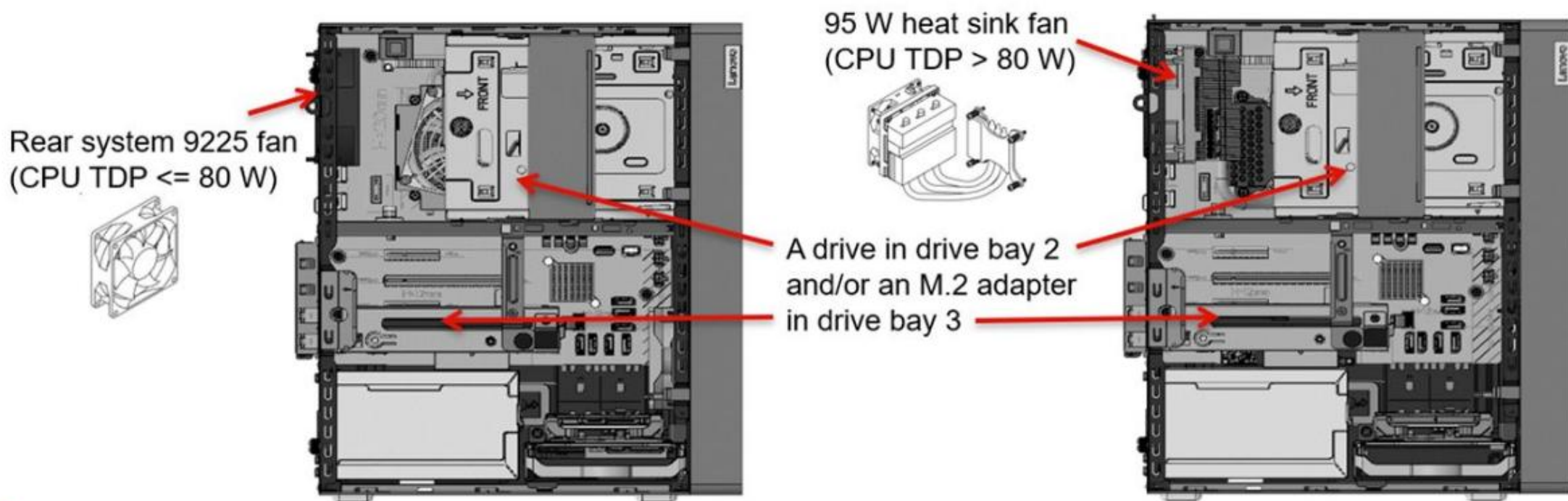
System limitations - 2

The third 3.5-inch drive cage (drive bay 3) and the M.2 boot adapter are mutually exclusive, as they would both be installed in PCIe slot 3.

PCIe slot 3